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2024
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Contraceptive use Transition and Fertility Dynamics and Reproductive Health Outcomes in Zambia

By

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A Thesis submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the award of the degree of Doctor of Philosophy in Demography and Population Studies

February 2024

ABSTRACT

Background: Improving access to and utilisation of contraceptive methods has been a major global goal of maternal health and development programming for over four decades now. Despite the benefits associated with contraceptive use, the prevalence in Zambia is still low. The country's population policy has identified high fertility rate, population growth rate and maternal mortality rate as hindrances to the country's socio-economic development agenda. Although the contraceptive prevalence rate in Zambia is still low, it has been increasing steadily from 15.2% in 1992 to 34.2% in 2001 and then from 40.8% in 2007 to 49.0% in 2018 among women of reproductive age. The sources of the observed increase in the contraceptive rate use were not known. This is because previous studies in Zambia concentrated on examining factors associated with using contraception use rather changes in usage. This study achieved the four specific objectives: (i) describe how contraceptive use has changed in Zambia over time regarding levels and trends; (ii) explore the geographic, social, economic, environmental and demographic factors that explain contraceptive use transition in Zambia; (iii) examine how contraceptive use transitions have affected fertility dynamics (iv) examine how contraceptive use transition has affected reproductive health outcomes in Zambia.

Theoretical framework: The theoretical framework used in this study reflects the fact that a woman's choice to use contraceptive is affected by a complex interplay of social, economic and interpersonal relationships at household or neighborhoods levels. It is in this regard that this study adopted the empowerment and social capital theories, reflecting social phenomena which operate at different level to influence contraceptive use. As such, contraceptive use can be viewed as a function of the level of empowerment among women, their access to social capital, and the degree to which gender inequality and problematic social norms are present in their social environment. The key woman empowerment elements include participation in the decision- making process, education attainment, access and ownership of resources, access to information, employment opportunity, and higher socioeconomic status.

Methodology: This study employed a mixed methods research design to examine factors explaining contraceptive use transition in Zambia. Quantitative analysis used a pooled dataset comprising a sample of 44,762 fecund sexually active and non-pregnant women aged (15-49 years) captured in the demographic and health surveys (DHSs) conducted between 1992 and 2018. The DHS is a cross-sectional study which applies a two-stage stratified cluster sampling design to select Enumeration areas and households. Furthermore, qualitative data analysis was conducted on the data collected through focus groups (FGD) with women of reproductive age (n=4) and key informant interviews with key staff (n=10) from the Ministry of Health and stakeholder organisations implementing family planning programmes in Zambia. All the FGDs and key informant interviews were conducted in Lusaka and Chongwe districts. The first objective was achieved by conducting descriptive and trend analysis on data to examine the changes in contraceptive use overtime. Qualitative data was used to explain the reasons behind the observed changes in contraceptive use transition. Analysis for the second was done in two steps. The outcome variable for this study is current contraceptive use. All sexually active women in the DHS were asked a question "Are you currently using any contraceptive method to prevent a pregnancy". The first step involved application of multilevel regression analysis to examine the influence of both individual and community factors on current contraceptive use in Zambia. The second step involved utilisation of multivariable nonlinear decomposition technique (Blinder Oaxaca decomposition techniques) to measure the contribution effects of both individual and contextual factors to the observed changes in contraceptive use in Zambia. This was also complimented by qualitative data to explain to

explain quantitative results. Objective three was achieved through application of multivariable Blinder-Oaxaca decomposition regression techniques to examine the effects of contraception use changes over time on fertility rate and maternal health outcomes in Zambia. Using a multivariable decomposition regression analysis technique is an improvement over previous similar research works that have been conducted in Zambia. All DHS analysis took into account the complex survey design and statistical significance was determined at α0.05.

Key findings:

Study findings show that in Zambia's contraceptive prevalence rate rose 30.8 percentage points (14.2% to 45.0%) throughout the analysis period, 1992 to 2018. This translates to an average of 1.2% annually. The major share of contraceptive use increase in Zambia happened between 1992 and 2001 (16.7%). The least change was during 2013 and 2018 (0.2%). Findings show that the rate of increase in CPR has been declining over time, even though overall CPR has increased during the analysis period. The findings show that overall, contraceptive use among sexually active women has increased significantly in Zambia, despite regional, residential, and socioeconomic differences. The study's findings support the proposed research hypothesis that contraceptive use has increased significantly in Zambia. Overall, both changes in women's compositional structure and changes in women's contraceptive behaviour significantly contributed to the change in contraceptive use in Zambia. Multivariable decomposition analysis of the determinants of change in contraceptive use has revealed that between 1992 and 2018: increase in proportion of women with secondary education (5.20%), reduction experience of child mortality (7.70%), reduction in the proportion of women desiring 6 or more children (5.63%) and increase in proportion of woman decision with making autonomy (3.33%) were the major contributors to the trend change in contraceptive use among sexually active women in Zambia. Results from the decomposition analysis reveal that the observed increase in contraceptive use in Zambia has significantly affected reduction and fertility rate and teenage pregnancy. The study results confirm the hypothesis that the increase in contraceptive use has contributed to the reduction in fertility rate and teenage pregnancy.

Conclusion:

Contraceptive utilisation among sexually active women in Zambia has shown a steady and significant progressive increase of 30.8 percentages over the 26-year period from 1992 to 2018. The larger increase in contraceptive use happened during the period 1992-2001. Although there are still regional and area disadvantage in contraceptive prevalence rate, the gap in utilisation between urban and rural areas has narrowed. Women's compositional factors have contributed differently to contraceptive use increase observed in the country. The observed increase in contraceptive use in Zambia is largely due to changes in the contraceptive behaviour of sexually active women. Positive change in women's contraceptive behaviour could be attributed to the country's huge investment in family planning programming by government and stakeholders. However, improvement in women compositional factors, such as education, decision-making autonomy, access to family planning information and child mortality experience reduction among other individual and community-level factors were key in driving contraceptive use transition. Therefore, as emphasized in the empowerment and social capital theories, social change among women is key in influencing contraceptive use transition. Furthermore, the study has established that the noted increase in contraceptive use in Zambia has positively contributed to fertility rate decline.

Implications of results

The findings of this current study imply that both changes in women's social factors and changes in the contraceptive use behaviour of sexually active women in Zambia have been driving contraceptive use transition in Zambia. This signifies that the investments in family planning programmes have been yield expected results by changing contraceptive behavior of women. The study findings further suggest that understanding social context is key to inform the design of new FP strategies and strengthening of exiting interventions aimed at further improving acceptance and utilisation of contraceptive methods among women.

Contribution to knowledge of the study

The study has made a contribution to research by delineating social factors that have contributed to the observed contraceptive use transition in Zambia. Such findings have not been explored before in the context of family planning research in Zambian. Furthermore, the study has provided evidence of how the observed increase in contraception use in the country has affected fertility, teenage pregnancy rates, and prevalence of unintended births. This information is relevant for understanding the country's population and maternal health dynamics. The findings not only validate the relevance of core principles of the empowerment and social capital theories in explaining contraceptive use transition in Zambia, but also shed light on other theoretical aspects that should be considered when understanding contraceptive use transition.

Future research

Future studies should examine rural-urban and regional variations of the determinants of contraceptive use transition. This will generate information to inform regional specific interventions. More so future studies should examine the factors that may influence a person's decision to utilise contraception in the future among sexually active adolescent girls. Doing so will generate data to inform the design of future family planning programmes that appeal to specific target groups. Furthermore, an in-depth qualitative research is required to understand how to overcome barriers of contraceptive use behaviour relating gender norms, cultural beliefs and religious values.

Key words: Women of reproductive age, contraception use, reproductive health, fertility control, social context, Zambia.

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Dedication

I dedicate this work to my sons Wongani, Mayamiko and Wanipa, and my wife Agness; may this be your inspiration to aim for greater heights in academics.

Acknowledgements

My family has been a pillar of strength for me since they gave me courage and emotional support. I am deeply indebted to my wife, Agness, and my children, Wongani, Mayamiko and Wanipa for their invaluable support, prayers and enduring my absence. Without the incredible health, strength, intelligence, and wisdom provided by the plentiful provisions of the almighty God, I could not have lasted this labour to its successful completion. I have both hope and faith in him, the Lord Jesus Christ.

Being part of the PhD programme at University of the Witwatersrand in the Demography and Population Studies (DPS) programme in the Schools of Public Health and Social Sciences has been a very inspiring choice. Such a profound doctoral research experience has been accorded to me through my supervisor, Prof. Clifford Odimegwu, whom I would like to express my sincere gratitude. I am grateful to the mentorship support I received from Dr. Simona Simona and Dr. Chester Kalinda. I would also like to thank Dr. Julius Odiambo Nyerere and Dr. Tafadzwa Mindu who coached me on publication skills and who worked tireless to support my scientific publication works. I would also like to express my sincere gratitude to the anonymous examiners and peer reviewers who improved the quality of my research works that I have contributed to the field of demography and population studies from this doctoral research, specifically, in the areas of family planning and maternal health. My appreciation goes out to the Faculty of Humanities and its staff for providing research seminars, writing workshops, and publication training as part of their academic support to PhD training. I would also like thank the staff at the Demography and Population Studies programme (DPS) for their academic mentorship and encouragement during my studies, Prof. Nicole De Wet, Dr. Sasha Frade and Ms. Gloria Bowes and Ms. Mojisola E. Oguntosin.

Prof. Clifford Odimegwu's leadership, mentorship and friendship is the best. His mentorship has been invaluable to my scholarship as a doctoral candidate. I am grateful to him for offering me great guidance and several opportunities with regards to teaching, award, peer journal publications, population conferences, seminars and writing retreats. My fellow PhD candidates at Wits DPS, Ms. Matshidiso Sello, Ms. Rebaone Petlele, Mr. Talent Tapera, Ms. Oluwatoyin Aladejebi, Mr. Bwalya Bupe Bwalya, Ms.

Elizabeth Tamara Nyirenda, Mr. Lukas Banda, Ms. Lerato Mukuapane, Mr. Francis Anzanu were also a wellspring of ideas and made the PhD programme a fun and delightful experience. I appreciate the support provided by of Dr. Henry N. Ugwu. I am also grateful to the IPUMS DHS, the DHS program and Zambia Statistics Agency (ZamStats) for providing the data and reports which made my study possible.

I am obliged to the University of Zambia, School of Humanities and Social Sciences, Department of Population Studies, for offering me study leave to pursue and complete my studies at the University of the Witwatersrand, South Africa. I am thankful to Prof. Prof Iginio Gagliardone, the Selection Committee, and the Faculty of Humanities for awarding me the 2022 PhD Publication Grant during my second year of my studies, to publish a manuscript from my PhD thesis. I am also thankful to the United States Agency for International Development (USAIDS) through the Demographic and Health Survey program for the DHS fellowship Award to attend the 2022 fellows training in data analysis and publication. The award provided me an enriching academic opportunity and practical publication experience and opened avenues of publication networking in my research areas of interest.

I am also grateful to my colleagues at University of Zambia, Department of Population Studies and elsewhere, Dr. Musonda Lemba, Dr. Buleti Nsemukila, Prof. Jacob R.S Malungo, Dr. Vesper H. Chisumpa, Dr. Namuunda Mutombo, Dr. Chabila Christopher Mapoma, Dr. Nkuye Moyo, Ms. Gloria Songolo, Mr. Emmanuel Tembo, Mr. Andrew Banda, Ms. Audrey M. Kalindi, Ms. Elizabeth Tamara. Nyirenda, Ms. Mwewa E. Kasonde, Ms. Milika Sikaluzwe, Ms. Kafiswe Chimpinde, Ms. Martha Mtonga, Mr. Emmanuel Musonda, Mr. Robert Zulu, Ms. Liness Shasha, Ms. Sibongile Namayawa, Mr. Chipililo Mphande, Ms. Annie Kunda, Mr. David Mulemena, Mr. Mwansa Mubanga, Mr. Robert Njovu, Dr. Tina Nanyangwe-Moyo, Dr. Jason Mwanza, Mr. Robert Tembo, Mr. Dominic Liche, Dr. Angel Mwiche, Mr. Jonathan Mwanza, Mr. Chrispin Chomba, Dr. Pamela Chirwa-Banda, Mr. Bruce Sianyeuka, Ms. Harriet Namukoko, Mr. Palver Sikanyiti, Mr. Mubita Sikufele, Mr. Chiti Bwalya, Mr. Aaron Phiri, Mr. Elvis Makukuka, Ms. Mwangala Mwale and others for their encouragement. Last but not the least, I want to thank everyone who helped me but wasn't specifically listed here.

Declaration

I, Million Phiri, declare that this thesis is my own original work. It is being submitted for the degree of Doctor of Philosophy in Demography and Population Studies of the University of the Witwatersrand, Johannesburg. To the best of my knowledge, it has not been submitted before in part or in full for any degree or examination at this or any other University.

1st day of February 2024

List of Acronyms

CRHE	Centre for Reproductive Health Education
CSO	Civil Society Organisation
CPR	Contraceptive Prevalence Rate
FP	Family Planning
HAS	Health Systems Alliance
HMIS	Health Management and Information System
HSAP	Health Systems Alliance Partnership
KII	Key Informant Interview
ICPD	International Conference on Population and Development
MCDSS	Ministry of Community Development
MoH	Ministry of Health
MCH	Maternal and Child Health
NGO	Non-Governmental Organisation
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
USAID	United States of America International Development
PPAZ	Planned Parenthood Association of Zambia
SFH	Society for Family Health
SRH	Sexual Reproductive Health
SRHR	Sexual Reproductive Health Rights
SRHH	Sexual Reproductive Health Rights
SDG	Sustainable Development Goal
WHO	Zambia Demographic and Health Survey
ZDHS	Zambia Demographic and Health Survey
ZamStats	Zambia Statistics Agency

CHAPTER 1 : INTRODUCTION TO THE STUDY

1.1 Background of the study

The proportion of women with met needs for limiting or spacing of births and increase in the contraceptive prevalence rate (CPR) is still a critical measure for achieving the attainment of health equity and Sustainable Development Goals 3 and 5 by 2030 (Frederiksen et al., 2017; Starbird et al., 2016). The urge to attain the Sustainable Development Goals on maternal and child health has led to increased advocacy and investment in family planning programmes (Mbizvo et al., 2020; Starbird et al., 2016).

Despite the benefits associated with contraceptive use, CPR in sub-Saharan Africa (SSA) and Zambia, in particular, remains low (Bongaarts & Hardee, 2019; Chola et al., 2020; de Vargas Nunes Coll C et al., 2019) thus increasing the risks of early pregnancy, unintended pregnancies, unsafe abortions, and high maternal deaths (Apanga & Adam, 2015; Orach et al., 2015; Tsui et al., 2017). However, some countries in SSA like Ethiopia, Kenya, Malawi, Lesotho, and Sierra Leone, among others, showed the largest increases in the contraceptive use between 2010-2019 (Ahinkorah, Ameyaw, et al., 2020; Apanga et al., 2020; United Nations, 2020) thus serving as examples of identifying best practices and strategies in family planning programmes.

Zambia is one of the countries in sub-Saharan with high population growth and fertility rate coupled with low contraceptive use (Munakampe et al., 2021; Namukoko et al., 2022a; Pauline Bakibinga et al., 2019). In Zambia, use of any contraceptive method among married women in 2018 stood at 49.6% and use of modern methods was at 48, despite knowledge of any contraceptive method being universal among childbearing women (Namukoko et al., 2022a; Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). The prevalence of women with unmet need for

family planning in Zambia is among the highest in Southern Africa. The recent demographic and health survey shows that twenty percent of married women who had desire to limit or space birth were not using contraceptive methods in 2018 (Namukoko et al., 2022a) reducing from twenty-one percent in 2013 (Mulenga et al., 2020). Despite many family planning interventions to improve modern contraceptive uptake, the prevalence of unmet need for contraception is considerably high in Zambia (Mulenga et al., 2020). This could be one of the reasons why the proportion of unintended pregnancy or births in still high in Zambia (Ameyaw et al., 2019; Chanda et al., 2017).

The government of Zambia, working with many health stakeholders, has scaled up the implementing family planning interventions with the view of improving the health and wellbeing of women and adolescents. To achieve the intended results various government-led health structural reforms and strategies have been undertaken to drive modern contraceptive use. These include the National Reproductive Health Policy; Family Planning Guidelines and Protocols; More achievements include; Reproductive, Maternal, Newborn, Child and Adolescent Health and Nutrition Communication and Advocacy Strategy 2018-2022 and National Adolescent Health Strategic Plan. To promote socio-economic development and enhance healthy lives for Zambians, the government through the Family Planning and Adolescent Health Reproductive Health Strategy and the Maternal, Newborn and Child Health strategic plans and family planning needs to be promoted in order to decrease unmet demand, according to the International Conference on Population and Development (ICPD). To do this, it is crucial to continue building on the progress the nation has made in understanding the variables that affect changes in the use of contraception. (Mbizvo et al., 2020; Ministry of Health, 2018; Silumbwe et al., 2018a).

At the global level, the Bill and Melinda Gates Foundation, the United Kingdom Department for International Development, the United States Agency for International Development (USAID),

and the United Nations Population Fund (UNFPA) launched the FP2020 initiative with the goal of reaching 120 million new users of modern contraception in developing countries by 2020 following the 2012 London Summit on Family Planning (Ahmed et al., 2019; Miller, 2017; Ouedraogo et al., 2021). During the FP conference, over 41 developing countries, including Zambia, agreed to implement the FP2020 strategies considering that access to life-saving contraception is a fundamental right for women all over the world.

Despite many family planning programme efforts, sub–Saharan Africa remains one region among the developing world where access and utilisation of family planning services have been increasing at a slower pace than other parts of the world (Bongaarts, 2017a; Ezeh et al., 2020; United Nations Population Fund, 2021). Even though Sub-Saharan Africa's fertility transition has started practically everywhere, but the fall has been slower than in other regions of the world. (Bongaarts, 2017a; Mback, 2017). This owes to the fact that at the start of fertility transition, SSA already had TFR, which was much higher than the rest of the world.

To contribute to achieving the global efforts and regional commitments such as the 2012 London summit, the government of Zambia, with support from cooperating partners, has invested heavily in family planning programming aiming an improving modern contraceptive use among women of reproductive age. These initiatives, as recognized in the national population policy and sexual reproductive health policy and other national family planning guidelines, are intended to control population growth, reduce fertility and improve maternal health. High fertility levels, rapid population growth and slow mortality decline have been identified as population factors that undermine efforts towards achieving sustainable economic and social development in the country.

Therefore, it was paramount to conduct research to understand the social context of contraceptive use transitions in the country, because the findings are key in informing the redesign

and strengthening of family planning programmes aimed at increasing contraceptive use. Furthermore, the study focused on examining how the individual and contextual factors have contributed to changes in contraceptive use levels overtime in Zambia. The study also sought to investigate whether the observed changes in the levels of contraceptive use have had any influence on fertility dynamics and maternal reproductive health outcomes. This study has potentially to contributed to the academic understanding of how to improve family planning programming and has also informed the need to evaluate current family planning interventions to justify redesigning and strengthening of existing family planning policies and strategies to benefit the society at large**.**

1.2 The Problem Statement

Existing evidence is sufficient that contraception has several benefits to both maternal and child health. Research has shown that contraception can help to reduce maternal deaths by reducing the number of unintended births, avoidance of abortions and, as a result, reduce the number of times a woman is exposed to risk of mortality (Aryanty et al., 2021; Utomo et al., 2021).

The Zambia's population policy (2019) has identified high fertility rate, teenage pregnancy, population growth rate and maternal mortality rate as hindrances to the country's socio-economic development progress. The policy has identified low contraceptive prevalence rate (CPR) among sexually active women as one of the factors leading to high total fertility rate, teenage pregnancies and maternal mortality in the country.

The Zambian Government with (UNFPA, USAID, UKAID) has been heavily funding FP programmes in order to accelerate progress towards achieving the FP2020 targets of improving access and use of contraceptive methods. The many family planning programmes implemented in

the country have led to an increase in contraceptive method use from 15.2% in 1992 to 49.0% in 2018.

The increases in contraceptive use among Zambian women of reproductive age could be as a result of a change in contraceptive behaviour of women. This increase could be also because of changes in the compositional structure of the women population over time. For example, existing research found a link between contraception use and an increase in the proportion of women's attaining secondary education in sub-Saharan Africa (SSA) (Beguy et al., 2017; Kalinda et al., 2022; Pillai & Teboh, 2010; Worku et al., 2015). Since SSA has seen an overall rise in the prevalence of the percentage of women with formal education, it is anticipated that this increase would lead to improved uptake of contraception.

The compositional structure of women, encompassing socio-economic characteristics such as level of education, household wealth status, employment status and exposure to information, can exerts a direct influence on contraceptive method utilisation. Educational attainment often correlates with increased knowledge about family planning methods, potentially leading to higher utilisation rates among more educated women (Emina et al., 2014; Götmark & Andersson, 2020; Moursund & Kravdal, 2003). Thus, an increase in the proportion of women with secondary or higher education is expected to lead to an increase in contraceptive prevalence rate. Similarly, Access to employment among women improves their socio-economic status, which can enhance affordability and accessibility of contraceptives (Al Riyami et al., 2004; Dias & de Oliveira, 2015; McDougal et al., 2021). It is thus, expected that increasing the proportion of employed women can significantly increase contraceptive utilisation in women.

However, little is known about how the prevalence of modern contraceptive techniques has changed in relation to the population's changing demographics and how much of the rise is genuinely

attributable to an increase in the proportion of Zambian women who are engaging in new reproductive behaviours.

The previous studies did not examine the contribution of other intermediate explanatory variables, such as, age at first sex, desire for more children, community education, community exposure to community health worker (CHW) visits and community fertility desire which could potentially influence contraceptive use. These variables have the potential to influence contraceptive use. For example, Age at first sex can significantly impact contraceptive use, as early initiation of sexual activity may be associated with lower awareness and access to contraception. Individuals who express a desire for more children may be less inclined to use contraceptives, reflecting a pivotal attitudinal factor that affects reproductive choices. Furthermore, community education plays a crucial role in shaping knowledge and perceptions about family planning methods. Communities with higher levels of education are likely to exhibit increased awareness and acceptance of contraceptives, fostering an environment conducive to uptake.

The other issue is that these studies were done in other countries. Therefore, we may not use these findings to infer on what social and contextual factors are influencing contraceptive use transition in Zambia. This is because of heterogeneity in socio-cultural beliefs and practices, traditional and religious beliefs, health systems and environment factors that influence demand and utilization of contraception across different countries in sub-Saharan Africa.

High levels of fertility, maternal deaths and child mortality are among the major challenges affecting social and economic progress in SSA and Zambia in particular. Although contraceptive knowledge is almost universal in Zambia and that the country has recorded steady progress in contraception prevalence rates since 1992, uptake of modern contraception among sexually active women is still low (Chola et al., 2020; Pauline Bakibinga et al., 2019). Various family planning

initiatives have been put in place by the government of Zambia since the late 1980s to stimulate contraception. Implementation of family planning strategies is aimed at strengthening service provision, access and utilization (Mbizvo et al., 2020). With adoption of first population policy in 1989 and various family planning guidelines and policies, the country has adopted approaches that integrate sexual reproductive health interventions into national health strategies and programmes with the view of reaching the national modern contraceptive use target of 58% by 2020 in line with the commitment of 2012 London summit on family planning (Mbizvo et al., 2020). At the current annual increase of 1.5% it may take another 7 years for Zambia to reach the 58% national contraceptive use target.

By applying a decomposition analysis technique to measure the percentage contribution of each predictor, we are able to gain insights on sexual and reproductive health programmatic interventions that need redesigning or additional attention. The generated information is going to guide having focused and targeted evidence-based policies and interventions needed to continue Zambia's growing trend in modern contraception demand and use. Furthermore, the study has examined how contraceptive use transition have influenced fertility dynamics and reproductive health outcomes in the country. Prior studies conducted in most regions of the world suggest evidence of a link between contraception use and reduced fertility as well as improved maternal health outcomes (Sánchez-Páez & Ortega, 2018; Stover & Ross, 2010).

Additionally, cross-sectional analysis has confirmed the expected negative relationship between contraceptive prevalence and total fertility rate in many developing countries. However, evidence show that the link between contraception and fertility reduction in Sub-Saharan Africa is substantially weaker than in the rest of the developing world. Scholars, however, argued that increasing contraceptive use has the potential to lower fertility even further in sub-Saharan African

countries (Bongaarts, 2017b, 2020). The information that has been generated by this study is of high importance to guide policy makers have evidence to inform re-designing of existing family planning interventions to address both supply and demand side bottlenecks that could have been contributing to low utilization and low pace of contraceptive use transition in Zambia.

1.3 The Purpose Statement

The purpose of this study was to investigate the drivers of contraceptive use transition in Zambia from 1992 to 2018. The study relied upon cross-section data collected through the Zambia Demographic and Health Survey. This is because of non-availability of longitudinal data. The guiding theoretical framework for this study is the empowerment and the social capital theories (Paek et al., 2008; Zimmerman, 2000) which states that individual health outcomes such as contraceptive behaviour are influenced through social development that can happen at individual, household or community levels. The independent variables at the individual level consisted of age of woman, marital status, education level, working status, age at first sexual intercourse, age at first marriage, religious denomination and those at household or community level included wealth status, family size, residence, province where a woman was living at the time of survey; cluster (enumeration area), community education, community wealth, community fertility preference and native language. The intervening variables included number of living children, ideal number of children, children ever born, family size concordance, decision maker for contraceptive use, fertility intention, husbands' education level, exposure to mass-media FP messages, experience of pregnancy loss, experience of unplanned pregnancy, experience of child mortality. All intervening variables were statistically controlled in the study. As a result, this research has contributed to knowledge, science and theory by investigating both individual and community-level determinants of contraceptive use transitions in

Zambia, as well as their contribution effect on contraceptive use transitions in sub-Saharan Africa, and Zambia in particular.

1.4 Research Questions

This study was informed by the following key research questions;

1. How have contraceptive use levels and patterns changed in Zambia between 1992 and 2018?
2. What factors have influenced contraceptive use transitions in Zambia between 1992 and 2018?
3. How has the contraceptive use change in Zambia affected fertility dynamics and reproductive health outcomes?

1.5 Research Objectives

The research objectives of the study are as follows:

1.5.1 General Objective

The overall objective of this research was to examine the contraceptive use transition in Zambia. The research focused on establishing the factors that have contributed to contraceptive use transitions overtime in Zambia.

1.5.2 Specific Objectives

More specifically, this research was guided by the following specific or secondary objectives:

i. To describe how contraceptive use has changed in Zambia over time with respect to levels, trends and patterns.
ii. To explore the social, economic, environmental, geographic and demographic factors that explain the contraceptive use transition in Zambia.
iii. To examine how contraceptive use transition has affected fertility dynamics in Zambia.

iv. To examine how contraceptive use transition has affected reproductive health outcomes in Zambia.

1.6 Definitions and Delimitations

The study utilises data from the 1992 to 2018 Zambia Demographic and Health Surveys. The study also used qualitative data from focus group discussions with women and key informant interviews. The target population are sexually active women 15-49 years. The following key concepts have been defined in this study.

Contraceptive use is defined as the intentional prevention of conception or pregnancy by a woman through the use various available methods. These methods could include; sexual practices, chemicals, drugs and or surgical procedures *(World Health Organisation 2015; Demographic and Health Survey Program, 2018).*

Contraceptive prevalence rate is defined as the proportion of women of reproductive age who are using (or whose partner is using) a contraceptive method at a given point in time *(World Health Organisation, 2012).*

Contraceptive use transition is defined as the changes in the prevalence of contraceptive methods use among women over time. The change could be positive or negative (Cliquet & Lodewijckx, 1986).

Change in contraceptive behavior refers to a modification or shift in an individual's or a population's patterns, choices, or practices related to the use of contraceptives *(World Health Organisation 2015).*

Change in compositional structure of women refers to alterations in the demographic characteristics and distribution of key factors among women within a specific population or group

over a defined period. These compositional elements typically include variables such as age, educational attainment, socioeconomic status, marital status, and other demographic attributes (Abe, 2018).

Reproductive behaviour change refers to intentional modifications in individuals' actions, decisions, and practices related to reproduction and family planning or contraception (Dewsbury, 2019).

Demand for Family planning is defined as total demand for family planning is defined as the sum of the number of women of reproductive age (15–49 years) who are married or in a union and who are currently using, or whose sexual partner is currently using, at least one contraceptive method, and the unmet need for family planning [World Health Organisation, 2015].

Unmet Need for Family planning is defined as the number or percent of women currently married or in union who are fecund and who desire to either terminate or postpone childbearing, but who are not currently using a contraceptive method (Bradley et al., 2012)

Demand for Family Planning satisfied by modern methods is defined as Percentage of women of reproductive age (15−49 years) who are sexually active and who have their need for family planning satisfied with modern methods (World Health Organisation, 2015).

Fertility dynamics is defined as the changes in population growth rates, births, deaths, migrations, age structures, population composition and distributions of people over time (Mason, 1997)

Fertility behaviour is defined as a series of choices which couples make, the choices may or may not affect their reproduction or fertility, thereby preventing them from reaching their optimum potential (Schmid, 1989, Degraff et al., 1997, Ezeh, 1997).

Maternal health is defined as the health of women during the course of pregnancy, childbirth and the postpartum period. For too many women, pregnancy, childbirth, and the postpartum period can lead to death, in most cases as a result of complications that can be prevented or effectively managed. (World Health Organisation, 2016).

1.7 Significance of the Study

The study was intended to examine the contraceptive use transition in Zambia. The information generated by this study is expected to contribute to a better understanding of how changes in different women's compositional characteristics and existing family planning programme strategies have been driving contraceptive use uptake in the country. Furthermore, the study has led to a better understanding of how contraceptive use has transitioned across the different regions in Zambia. This information will key to inform policy shifts and family programme improvement. In doing so, the study explored the factors underlying the contraceptive use transition from 1992 to 2018 in the country and described how contraceptive use level and patterns have changed overtime. The study further examined the effect of contraceptive use transitions on fertility dynamics and maternal health outcomes in the country. It was important to explore this subject further and add to existing literature because the information generated by this research will be paramount to guide the strengthen of existing family planning policies, strategies and programmes with the view of increasing contraceptive use levels for better maternal health outcomes.

Given the high levels of fertility and maternal mortality, especially in rural settings in Zambia, there is an urgent need for action responses that address access and attitude towards contraception uptake among women of childbearing age in Zambia and sub-Saharan Africa at large. Despite global efforts that have recognized family planning as an emerging component for sustainable maternal

health development agenda, previous studies on family planning reveal that sub–Saharan Africa still has a higher proportion of women who lack access to family planning information and services leading to low utilisation of the services. This has led to high prevalence of unmet needs for contraception in the region (Fekadu et al., 2020; Goldenberg & Stephenson, 2019).

Many studies have documented evidence that contraception use can reduce pregnancy-related morbidity and mortality, child mortality and reduces the risk of developing certain reproductive cancers, and can treat many menstrual related symptoms and disorders among women of reproductive age (Aryanty et al., 2021; Garrison-Desany et al., 2021; Utomo et al., 2021; Zamawe & Mandiwa, 2016). Despite the widely documented benefits, contraceptive use remains low in SSA. In order to respond to the global call to accelerate contraception use in Zambia, family planning has been highly valued by the Government of the Republic of Zambia (GRZ), which has created programmes like the National Family Planning Scaling-Up Programme aimed at improving access to sexual reproductive health information among adolescents and young women and increase contraceptive commodities among vulnerable populations. The Integrated Family Planning Scale-up Plan 2013-2020 intended to decrease unmet for contraception to 19 percent in 2015 and 14 percent by 2020 through concerted efforts aimed at increasing the usage of contraceptives (Ministry of Community Development Mother and Child Health, 2013; Mulenga et al., 2020).

Despite all these efforts, the 2018 Zambia Demographic and Health Survey shows that contraception uptake among sexually active women of reproductive age is still low at 48% among married women and unmet need for family planning was still high at 20% (Namukoko et al., 2022b). Because of this, it was imperative to conduct research to understand both individual and contextual-level factors that explain the observed contraceptive use transition in Zambia. This research has generated data that will be key to inform shaping of existing family planning policy and programme

direction in the country to further improve uptake of contraception. Family planning stakeholders at the policy design level, programme implementation level and at the health facility service provision level are the principle beneficiaries of the study findings. Furthermore, the use of mixed method approach has enhanced the generation of in-depth data to inform designing of appropriate FP programmes that should consider the social context of communities in the country.

There was no research of this nature that was conducted in the Zambian context prior to this study. Therefore, this research has become unique to the Zambia's health research platform. The potential consequences of low contraception use in Zambia encouraged the researcher to investigate the social context, explaining contraceptive use transition in the country. Earlier studies on contraception use in Zambia had focused mainly on studying factors associated with contraceptive use with the lens of individual and household level factors. However, exploring the contraceptive use transition and its potential effect on fertility dynamics (total fertility rate, family size) and maternal health outcomes (unplanned birth/pregnancies, birth interval) was overlooked in the health research sphere in Zambia. Therefore, the current study has, in part, filled this gap in the literature.

Insights that been gained through this study have not only contributed to the substantive academic body of knowledge but also contributed towards the development of interventional strategies that would advance the promotion of family planning services among women of reproductive age in Zambia. Moreover, the findings have contributed towards building knowledge on explaining factors responsible for contraceptive use transitions in Zambia. The findings of this research will be key to inform the strengthening of existing family planning direction and actions plan by the Government of Zambia and stakeholders in their quest to improve contraceptive use uptake and further reduce fertility levels in the country. To realize the country's national policy goal to address the burden of high fertility and maternal mortality. The information that has been generated

will also be key to guide the development interventions and strategies that will see significant improving in utilisation of contraception in the country.

1.8 Overview of the study

The thesis comprises 10 (ten) chapters which unpack how contraceptive use has transitioned in Zambia during the period 1992-2018. The first three chapters outline the research proposal while the other chapters relate to how the study's specific objectives were addressed. The thesis focused on understanding how changing social context has influenced contraceptive use transition in Zambia. It further examined how the observed contraceptive use transition in Zambia has influenced maternal health outcomes. By doing so, it thesis provided evidence to inform shaping of sexual and reproductive health programming.

Chapter 1: Presents the introduction to the study. In the chapter, the background, the problem statement, and the purpose of the study are explained. The key terms which are commonly used in the study are also defined to provide an understanding of how the concepts are used in the study. The chapter discusses the objectives of the study, why the study was conducted and the significant of the study.

Chapter 2: Discusses the literature on family planning and specifically contraceptive use transition conducted at a global, regional and national level. The chapter describes what is known about contraceptive use transition and its determinants and gaps in literature. The theoretical and conceptual framework is also presented.

Chapter 3: The chapter presents the methodology of the study. It describes the study context, study design and analytical approach that was used including the data source, data quality assessment as well as the study measurements which were used.

Chapter 4: The chapter presents the background characteristics of the main respondents included in the study from all the six DHSs conducted in Zambia. The description of the background characteristics included: demographic, socio-economic, fertility experience, family planning access and contraceptive use trend.

Chapter 5: This chapter presents the results for objective 1, which looked at how contraceptive use has changed in Zambia. The presentation of findings shows the levels, trends and patterns of contraceptive use according to various demographic, socio-economic characteristics at individual and community level in Zambia for the period 1992 to 2018. The chapter further presents the qualitative results discussion how contraceptive use transition has taken place in Zambia.

Chapter 6: The chapter examined the drivers of contraceptive use transition in Zambia in respect to objective 2. The chapter presents three main levels of analysis. The first level looked at determinants of current contraceptive use in Zambia based on the 2018 DHS data. The second level examined the determinants of contraceptive use transition for the period 1992 and 2018. Statistical analysis was conducted using Blinder-Oaxaca Decomposition Regression Analysis. Last, the chapter presents qualitative results discussion the reasons why contraceptive use transition has taken place in Zambia.

Chapter 7: Presents the results for the first part of the third objectives of the study. The objective examined the effect of contraceptive use transition on fertility dynamics in Zambia. Specifically, reduction in the number of children ever born and teenage pregnancy. To address this part of the objective, a multivariable Blinder-Oaxaca using Poisson regressions model and binary regression model were applied, respectively.

Chapter 8: Presents the results for the second part of the third objectives of the study. The objective examined the effect of contraceptive use transition on improvement in the reproductive health outcomes of women. Specifically, the analysis focused on examining the extent to which the observed increase in the contraceptive use prevalence led to the reduction in the prevalence of unplanned births, short birth interval and pregnancy loss. To address the objective, multivariable Blinder-Oaxaca binary regressions models were utilised.

Chapter 9: This chapter presents the discussion of findings in the context of existing literature on what is earlier studies have reported about contraceptive use transition levels, its determinants and the influence of change in contraceptive use on fertility and maternal health outcomes. It further presents the strengths and limitations of the study.

Chapter 10: In the last chapter of the study. It presents the summary of findings of all the chapters discussed in the thesis including the conclusion, policy implications and recommendations. It further proposes areas for future research in light of what this current study has established.

CHAPTER 2 : LITERATURE REVIEW, THEORETICAL AND CONCEPTUAL MODELS

2.1 Literature review

The review of literature on contraceptive use transition is divided into three parts: global overview of contraceptive use transition; contraceptive use transition in sub-Saharan Africa; and contraceptive use transition in Zambia. The world over, several studies have been about the field of contraception in terms of level, trends, patterns and determinants. Contraception has been identified as an important public health initiative (Bongaarts & Hardee, 2019) not only for addressing population growth and fertility (Ezeh et al., 2020; Mberu & Ezeh, 2017) but also to address unplanned pregnancies, unsafe abortions and maternal deaths that continue to affect the health and personal progress of millions of women of reproductive age in sub–Saharan Africa and other parts of the world (Bongaarts, 2017a; Sarnak et al., 2021; United Nations Population Fund, 2021). Contraceptive use transition refers to the changes between non-use and use of contraceptive methods over time (Bonneuil & Medina, 2009, 2017).

It is evident that the importance of contraception cannot be overemphasized. High levels of fertility, unplanned pregnancies, unsafe abortions and maternal deaths continue to affect the health and personal progress of millions of women of reproductive age in sub–Saharan Africa and other parts of the world (May, 2017; Sarnak et al., 2021; United Nations, 2019). Although scientific studies reveal improvements in contraceptive use globally (Bongaarts, 2017a), the transition has, nonetheless, been notably slower in sub–Saharan Africa than in other parts of the world (Bongaarts, 2017a; Rana & Goli, 2018).

Many studies have been done in sub-Saharan Africa to address the question of contraceptive use levels and patterns among different populations (Olika et al., 2021; Ontiri et al., 2021; Sidibé et al., 2020). From this body of studies, we know that residence, women's educational level, age,

residence, partner's education and access to family planning messages are associated with contraceptive use in sub-Saharan Africa. Although these studies are insightful in highlighting the factors that contribute to contraceptive use, they may not be adequate for studying factors that influence change in contraceptive use over time. It is important to isolate the factors that are responsible for contraceptive use transitions because they allow for targeted interventions to bolster contraceptive use in Zambia.

2.2 Contraceptive use determinants

Contraceptive use is influenced by a myriad of determinants that collectively shape individuals' reproductive decisions (Ahinkorah, 2020b; Lasong et al., 2020b; Nyarko, 2020; Rana & Goli, 2018). Socioeconomic factors, such as education and income, play a pivotal role in access to and utilisation of contraceptive methods (Chola et al., 2020; Nduku & Simo-Kengne, 2022; Ntoimo & Chirwa-Banda, 2017; Palamuleni, 2013). Cultural and religious beliefs often contribute to prevailing attitudes towards family planning, affecting the acceptability and adoption of contraceptives. Gender dynamics and women's autonomy in decision-making regarding reproductive health also significantly impact contraceptive use. Additionally, societal norms, peer influences, and media exposure contribute to shaping perceptions and behaviors related to contraceptive practices ((Babalola et al., 2017; Jacobs et al., 2017; Okigbo et al., 2018; Rusibamayila et al., 2017).

Increasing evidence from studies conducted in sub-Saharan Africa (SSA) suggests the importance of contextual factors in influencing contraception use (Ahinkorah, Seidu, Appiah, et al., 2020b; Muhoza et al., 2018; Odimegwu & Chemhaka, 2021; Ononokpono et al., 2020; Zegeye et al., 2022). However, results show non-uniform effects of contextual influences on contraceptive use due to differing socio-cultural context in SSA.

Several studies conducted in many parts of sub-Saharan Africa have documented the importance of place in shaping individual's contraceptive behaviour (Adedini et al., 2021; Ahinkorah, Seidu, Appiah, et al., 2020a; Ahinkorah, Budu, et al., 2021; Anwar, 2019; Dias & de Oliveira, 2015; Muhoza et al., 2018; Ngome & Odimegwu, 2014; Odimegwu & Chemhaka, 2021; Ononokpono et al., 2020; Zegeye et al., 2022). However, community-level factors such as education, social norms, beliefs, knowledge of contraception, women's empowerment, gender norms, economic inequality and media exposure have not influenced contraceptive behaviour in a uniform way (Makupe et al., 2019; Mejía-Guevara et al., 2020; Nyarko, 2020; Wado et al., 2019; Zegeye et al., 2022).

Data on how various community-level factors influence uptake of modern contraception among women of reproductive age in Zambia was lacking. This is because previous studies only focused on examining the association of individual-level factors with contraceptive use (Hancock, Carla J. Chibwesha, et al., 2015; Hancock, Chibwesha, et al., 2015; Lasong et al., 2020a; Namukoko et al., 2022a; Nduku & Simo-Kengne, 2022; Ntoimo & Chirwa-Banda, 2017; Sserwanja et al., 2022).

2.3 Global outlook of Contraceptive Use Transition

From the beginning of the last century, there has been a significant rise in the number of women worldwide who use some kind of contraception. In 2015, over two out of every three married or in-union women were using some kind of contraception. Contraceptive use has increased at a much slower rate in various regions of sub-Saharan Africa, but it has increased at a high rate in Asia, Latin America and the Caribbean, and other parts of Latin America and the Caribbean (Alkema et al., 2013; Population Reference Bureau, 2022; Sidibé et al., 2020). Although the combination of contraceptive methods that are used varies across areas and countries, the vast majority of contraceptive methods that are utilised are more recent forms of contemporary contraception. Despite of the development of a wide variety of effective techniques, at least one in every four countries relies solely on a single

method for more than half of all contraceptive use among married or in-union women (Population Reference Bureau, 2022). Figure 2.1 shows the global and African regional trends in modern contraceptive use among women.

Globally, there is a significant decrease in fertility rate from 3.2 live birth per woman in 1990 to 2.5 in 2019. It is projected that the global level rates will continue declining up to 2.2 live births per women in 2050 (Bongaarts, 2020; Population Reference Bureau, 2020; Sarnak et al., 2021). However, significant variations in fertility levels remain, with sub-Saharan Africa having the slowest decline in fertility compared to other regions of the world.

The slow decline in fertility trend in sub-Saharan Africa is partly attributed to the low prevalence of modern contraceptive use. Modern contraceptives are the most used contraceptive methods throughout the world. In 2019, 44 percent of women of the reproductive age group of 15 to 49 were using modern contraceptive methods comprising 90% of all contraceptive users (Ahmed et al., 2019; Lindberg et al., 2020; United Nations, 2020). Consequently, modern contraceptive methods have received significant attention in public health and demographic literature. Globally, researchers and public health practitioners have sought to analyze the trends, determinants, and changes in contraceptive use among different age groups.

Most studies report an increase in modern contraceptive use among women of different age groups (Lindberg et al., 2020; Odimegwu et al., 2018; Patel et al., 2019; Slaymaker et al., 2020). This increase is generally accompanied by a decline in the proportions of sexually active women who need to but are not using modern contraceptive methods. In others, the increase in contraceptive use was correlated with an increase in age and parity (Bongaarts & Hardee, 2019; Wai et al., 2019)

Differences have also been observed between short-acting reversible contraceptives (SARCs) like oral contraception pills and the vaginal ring and long-acting reversible contraceptives (LARCs) like intrauterine devices. Although there is evidence showing that LARCs may be more effective, safer, and cost-effective, SARCs tend to be used more (Adedini et al., 2019; Marra et al., 2020). However, a recent study in the Netherlands shows a changing trend whereby SARC use decreases significantly and LARC use increases significantly (Marra et al., 2020). These trends held even after controlling for demographic factors, including age, religion, educational level, ethnicity, and partner status.

In the Netherlands, the observed change in contraceptive use from SARCs to LARCs was due to religious affiliation and educational attainment in the population. Religion and educational attainment are also part of the factors explaining contraceptive use transition in India (Singh, 2020). Educational attainment, especially primary and secondary level has been associated with an increase in the age at first marriage, which subsequently lowers fertility rate. In terms of religion, there are social norms in certain religions bodies which discourage the use of contraceptive methods before the first birth. In India, for example, Muslims were found to use fewer contraceptives compared to Hindu religious groups (Singh, 2020). Other variables associated with the change in contraceptive use include mass media exposure, age, and zonal classification.

2.4 Contraceptive use Transition in sub-Saharan Africa

Sub-Saharan Africa lags other regions both in terms of fertility rate and contraceptive use. The United Nations reports that the fertility rate fell sub-optimally in sub-Saharan Africa from 6.3 births per woman in 1990 to 4.6, the slowest decline in comparison with other regions. On the other hand, contraceptive use among women in the reproductive age group has increased from 13 percent to 29

percent in the same period. This is also the slowest increase when compared with other regions (Ahmed et al., 2019; Bongaarts & Hardee, 2019; Rana & Goli, 2018).

Sub-Saharan Africa is no different from the global dynamics both in terms of lack of literature on contraceptive use transition and the narratives regarding the driving forces of contraceptive use transition. Of the literature reviewed, most of them report on the factors influencing contraceptive use (Seidu et al., 2020; Yaya & Ghose, 2018) (Yaya et al, 2018; Seidu et al. 2020). Decision-making autonomy, participation in labour force, reduction in abuse and violence, and knowledge level are some of the determinants of contraceptive use. Other factors that are associated with modern contraceptive use include age, employment, partner's education, region of residence, frequency of listening to radio and partner's desire for children (Seidu et al., 2020).

LARCs have also received relative attention in sub-Saharan Africa in terms of exploring trends and determinants. Adedini and colleagues (2019) investigated Trends, patterns and determinants influencing the use of long-acting reversible contraception by women in sub-Saharan Africa (Adedini et al., 2019). Key predictors for LARCs use from the study were age, work status, exposure to mass media, level of education and wealth index. Women's occupation, history of abortion, ideal number of children, sex of head of the household and wealth index have also been found to contribute to LARCs in Ethiopia (Fekadu et al., 2020).

Literature show that determinants of contraceptive use are varied from one country to another. Women's educational level remains a consistent predictor of met needs for contraception the worldwide (Abdulrahman et al., 2019; Marra et al., 2020; Singh, 2020). Education has long been associated with delayed childbearing due to young women's desire to complete their education before first pregnancy. Educated women are also better informed about available reproductive health services and may have better financial and geographical access to utilise these services (Marra et al.,

2020). Other determining factors explored by different scholars include gender equality, age at first marriage, media exposure and religious affiliation among others.

Determinants of contraceptive use rarely explain the changes in use of contraceptive among women. In other words, an increase in usage of contraceptives may not be attributable to factors that determine usage but rather to changes in the social and economic structures of society. For example, change in the population structure, such as women's educational attainment, women's changing contraceptive behavior and urbanization could drive observed change in contraceptive use rather than traditional aspects of family planning programming (Yussuf et al., 2020). Contraceptive use transition has not received much attention in the global literature. This may partly be explained by the methodological rigor that is required to delineate effects of specific factors over time. However, research generally shows variations in the factors associated with the decline in fertility as well as increase or decline in contraceptive use. The increase in infecundity across all age groups, challenging economic conditions and the change in the social norms seemed to drive down total fertility rates in Jordan. Overall, the prevailing economic and social-cultural environment at the structural level seemed to impact women's choices and practices on contraceptive choices, hence accounting for observed changes in contraceptive use (Bietsch et al., 2021).

2.5 Determinants of contraceptive use transition in sub-Saharan Africa

Although the observed increase in contraceptive use in sub-Saharan Africa is sub-optimal, massive variations exist among countries. As such, there are a variety of reasons behind the observed increase in contraceptive use overtime in sub-Saharan Africa. Both individual and structural population characteristics have been found to influence contraceptive use transition differently across sub-Saharan Africa. In Ethiopia, a study reported that changes in the population structure contributed to

34% of the overall change in contraceptive use from 2000 to 2011 (Worku et al., 2015). Family size concordance and women's educational attainment have particularly been instrumental in driving this change.

Rwanda recorded an increase in modern contraceptive prevalence rate (mCPR) from 17% to 52% between 2005 and 2010, which was mostly (77%) explained by changes in effects while 17% was explained by changes in the population structure (Muhoza et al., 2016). In Tanzania, a significant percentage (12%) of the increase in modern contraceptive use is explained by women's characteristics which include partner's education levels, recent sexual activity and being visited by a family planning worker (Yussuf et al., 2020). The rest of the changes in mCPR were attributable to the rural population (44.1%) while women who experienced a termination of pregnancy contributed about 7.1%.

Furthermore, age at first sex, changes in reproductive behaviour, place of residence, women's education, experience of child mortality, number of women with unmet needs, wealth index, marital status, ethnic group, contraceptive discontinuity and region have all been associated with the contraceptive use transition in different countries of sub-Saharan Africa (Ariho & Kabagenyi, 2020; Beguy et al., 2017; Muhoza et al., 2016; Ontiri et al., 2021; Sarnak et al., 2021; Sidibé et al., 2020)

Aggregate studies focussing on factors contributing to contraceptive use transition in the whole or part of sub-Saharan Africa have also observed several different drivers. Bongaarts and Hardee (2019) for example observed that women's education attainment contributed significantly to contraceptive use increase in SSA. On the other hand, Goldenberg and Stephenson (2019) reported that the main contributing factors to contraceptive use transitions across countries were education and marital status. Other scholars reported decision-making autonomy, participation in labour force, reduction in abuse and violence, and knowledge level were associated with contraceptive use (Yaya & Ghose, 2018).

2.6 Overview of Contraceptive use transition and patterns in Zambia

In Zambia, research on contraceptive use has scaled up in the past decade, both for the overall and long-acting or permanent methods. Factors associated with contraceptive use and unmet needs among women in the reproductive age group are well studied (Chola et al., 2020; Hancock, Chibwesha, et al., 2015; Lasong et al., 2020a; Pauline Bakibinga et al., 2019). These studies reveal that women who have many years of education, with a high wealth status background, married to men who are older than them and are sensitized about family planning at the health facility are more likely to use modern contraceptives. The studies also show that the number of children ever born from a woman and women's region of residence were the most important predictors of unmet need for spacing (Imasiku et al., 2014; Mulenga et al., 2020; Namukoko et al., 2022a). Furthermore, studies show that for long-acting permanent methods use, age, education, wealth, and the desire to stop having children are the major predictors (Mutombo & Bakibinga, 2014; Pauline Bakibinga et al., 2019).

Factors influencing contraceptive use among key populations, including HIV-positive women and female sex workers, are also examined in Zambia. It is established that HIV status disclosure and sexual activity were associated with contraceptive use among women living with HIV/AIDs (Hancock, Chibwesha, et al., 2015) while access to condoms was the major factor associated with an increase in condom use and a reduction in unplanned pregnancy (Chanda et al., 2017). It is important to note that the study by Hancock and others was just focused on Lusaka province and not nationally representative, which makes it not generable national-wide.

Health systems are often the subject of study in many health outcomes, and they may have independent effects outside individual or contextual level factors. The literature in Zambia, indeed, validates this point. Health system research by Silumbwe and others 2018 and Nkole et al 2021),

indicate that the main determinants of contraceptive uptake were distance to health facility, stock-outs of preferred methods as well as positive health personnel attitudes (Silumbwe et al., 2018a).

Methodologically, most studies have used cross-sectional data and binary logistic regression to examine the predictors associated with contraceptive use in different populations or segments of the population. Cross-sectional methods are snap in time used in studies that seek to map out relationships between variables at a particular time. This characteristic renders cross-sectional studies and associated binary logistic regression inappropriate for studies like the current one, that have an objective of finding the nature, type, and factors explaining social context in contraceptive use transition overtime in Zambia. Furthermore, prior studies paid less attention to examining the influence of other intermediate individual and community level factors that have the potential to influence contraceptive use. Identifying drivers of contraceptive use transition can necessitate the formulation of appropriate policies and strategies to accelerate contraceptive uptake in Zambia.

2.7 Deficiencies in the existing literature

Population structures and individual characteristics contributing to contraceptive use transition in sub-Saharan Africa have shown significant differences in the contextual make-up of each country. This means that no universal determinants of contraceptive use transition can suffice for all countries. A few studies have applied decomposition analysis technique in sub-Saharan Africa countries to measure contraceptive use transitions overtime among women of reproductive age (Beguy et al., 2017; Fekadu et al., 2020; Muhoza et al., 2016; Pillai & Teboh, 2010; Worku et al., 2015; Yussuf et al., 2020). These studies used repeated cross-sectional data to measure contribution to contraceptive use transitions overtime due to changes in composition of women and contraceptive use bahaviour. However, these studies did not factor in heterogeneity in the DHS data structure to take into account

community influences. This study therefore proposes to examine how both individual and community level variables influence contraceptive use behavior among sexually active women in Zambia.

Earlier studies have also neglected some critical variables that could be associated with contraceptive use transitions, such as undesired pregnancy experience, a woman's decision about her own health, desire for more children, age at first sexual intercourse, decision maker for contraceptive use and contraceptive use pattern.

Given that there are no known studies that have examined drivers of contraceptive use transition in Zambia, this research is warranted to fill in this gap in knowledge. The bulk of studies in Zambia have explored the factors associated with contraceptive use (Chola et al., 2020; Hancock, Chibwesha, et al., 2015; Munakampe et al., 2021; Ntoimo & Chirwa-Banda, 2017; Silumbwe et al., 2018a) and a few have focused on factors influencing method use (Hancock, Chibwesha, et al., 2015; Mutombo & Bakibinga, 2014; Pauline Bakibinga et al., 2019). Although previous studies attempted to understand contraception trends and its associated factors in Zambia, there was however, no information on how much change in contraceptive use trend in Zambia is as a result of changes in different women's compositional factors or changes due new reproductive behaviour being adopted by women of childbearing age. This information is needed to make informed decision making on which family planning strategies require redesigning or further scale-up to accelerate uptake of contraceptive methods.

Furthermore, there was also insufficient research to understand how community-level factors influence contraceptive use transition of sexually active women in the country. Studies conducted elsewhere in sub-Saharan Africa have shown that community level factors have the potential to influence contraceptive among women (Ahinkorah, Seidu, Appiah, et al., 2020b; Anasel & Haisma, 2020; Bolarinwa et al., 2021a; Dias & Oliveira, 2015; Hailegebreal et al., 2021).

To tailor specific and targeted preventive strategies to sociodemographic groups that lag in the contraceptive use, it was important not only to map out the trends in contraceptive use over time but also to identify factors responsible for that change. In doing so, relative contributions of both population structures, individual characteristics, community factors and any other conditions to contraceptive use transition have been illuminated. The relative influence of different factors on contraceptive use transition has also revealed the assumption of hierarchy common in most data structures, but which has not been well addressed in most studies on contraceptive use transition in sub-Saharan Africa.

The current study addressed the gaps in literature by focusing on the less studied topical area in the Zambian population by decomposing the factors associated with contraceptive use transition to identify their relative influence while accounting for hierarchical data structures. In this regard, multivariate decomposition analyses techniques with multilevel regression models were appropriate for this study as they have provided useful insight on contraceptive use transition in Zambia from 1992 to 2018.

2.8 Theoretical and Conceptual Models

Since the onset of family planning programmes in the early 1990s in sub–Saharan African, modern contraceptive prevalence has remained low in the region with wide variations across countries and sub-regions. In social science research, theoretical approaches have been useful to offer explanations of individual or community behaviour (Gerber et al., 2018). Therefore, this study applied different theoretical frameworks to explain how individual or household or community behaviours influenced contraceptive use transition in Zambia.

Studying factors that influence contraceptive use transition from the perspective of different theoretical frameworks can aid researchers, policy makers and programmes experts in gaining a deeper understanding of issues that need adjustment in policy and interventions. Several theoretical perspectives have been advanced to explain determinants of contraceptive use transition in sub - Saharan Africa and elsewhere. It is against this background that this section presents the theoretical underpinnings that provide a basis for understanding contraceptive use transition in Zambia in particular. The study further advanced a conceptual framework in understanding contraceptive use transition in the Zambian context.

2.9 Theories

Two theories were applied in this study to explain how various socioeconomic, demographic, geographic and environmental factors potentially influence contraceptive use transition in Zambia. Several theoretical approaches have attempted to explain how socio-economic, demographic, and environmental influence women's reproductive behavior to adopt contraceptive use. The theories were discussed in terms of two general strands, and these include individual, and structural theories. Each of the strands is represented by one theory. This was intended to depict the societal complexity under which women find themselves. Women's individual characteristics, also called compositional factors, can hinder their use of contraceptives over time and some can intimate or influence micro relationships as well as societal or community structures. Specifically, the study used empowerment, social capital, and feminist theories.

2.9.1 Empowerment Theory

Empowerment is a construct that links individual strengths and competencies, natural helping systems, and proactive behaviours to social policy and social change (Perkins & Zimmerman, 1995).

Empowerment theory includes both processes and outcomes, suggesting that actions, activities, or structures may be empowering, and that the outcome of such processes result in a level of being empowered (Zimmerman, 2000). This is the reason why Kabeer (1999)'s conceptualisation of empowerment includes resources (pre-conditions), agency (process) and achievements (outcome). By resources, Kabeer means not only the economic but also the social environment in which individuals are located. It means the ability to mobilise resources from a multiplicity of social relationships and institutional domains which make up a society (such as family, community) (Kabeer, 1999).

Access to resources of that nature reflects conformity with the rules and norms which govern distribution and exchange in different situations. Some actors are privileged with power and authority by the intrinsic societal rules and norms to determine the principles of distribution and exchange of resources so that the distribution of `allocative' resources tends to be embedded within the distribution of 'authoritative resources' (Giddens, 1979). Heads of households, community and traditional leaders and generally those who occupy higher socioeconomic status are endowed with decision-making power.

The second dimension relates to agency, which refers to the individual's ability to exercise power or freedom of choice to pursue and achieve that which they value, free from external constraints (Sen, 1985). Agency has often been conceptualised as `decision-making' in the social science literature, but it can take several forms, such as bargaining and negotiation, deception and manipulation, subversion, and resistance (Kebeer, 1999). Moreover, agency encompasses the motivations and meanings which individuals attach to their behaviors and actions, and it can be exercised by individuals as well as collective.

Resources and agency constitute what is called capabilities, according to Sen (1985), which can collectively be regarded as the potential that people have for living the lives they want, of achieving valued ways of `being and doing' (Kabeer, 1999). When an individual lacks the capability to achieve valued goals because of some deep-seated and external constraint, rather than a reflection of personal laziness and incompetence, that can be taken as a manifestation of disempowerment. Thus, empowerment theory provides a theoretical model for comprehending the process and outcomes of attempting to apply control and influence over individuals' decision-making processes (Turner & Maschi, 2015; Zimmerman, 2000). In this regard, empowerment is being viewed as a process in which people grow to recognize a firm connection between their goals and an understanding of how to achieve the goals as well as a link between the efforts made and their desired life outcomes.

Access to resources and freedom of choice, also known as capability recognises key empowerment elements needed to drive social change in order to improve an individual's life and these include participation in decision-making process, access to resources, access to information, high wealth status and employment, among others (Zimmerman, 2000). Each of these fundamental components has a beneficial influence on people's ability to achieve life goals. In many areas of research agenda, including public health, this theory has been explored extensively (Joseph, 2020). The theory, therefore, posits that different individual, household and community characteristics can either have a positive or a negative impact on the individual's ability to experience a better life, including adequate use of contraceptives. Different studies have applied this hypothesis to investigate health behavior in various settings, including countries with similar environments to Zambia (Yaya et al., 2018).

Since empowerment helps to achieve desired goals, the assumption of empowerment theory is that women who are empowered to have higher decision-making authority, freedoms to make choices, having resources and access to information and higher socioeconomic status have an enhanced ability to use contraceptives. It can also be assumed that positive changes in the elements of empowerment will result in improved use of contraceptives. Overtime, it is expected that changes in the individual characteristics of women such as education, employment and wealth status will drive positive change in using contraceptives among women.

2.9.2 Social Capital Theory

Social capital is described as "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000). Social capital may also refer to resources that are within social relationships and can be mobilised to achieve certain ends (Burnett & Veenstra, 2017). These resources can be in terms of information, knowledge, and social contacts. Membership to these groups or social networks is a result of strategy in social positioning that must be instigated by the members.

Social capital is often considered a community-based resource that helps to provide positive outcomes for individuals and motivates micro-to-macro transitions in individual behaviors and actions. That is why social capital is not only about social networks but also shared norms of togetherness and mutual trust, which instigates corporation and coordination among members of the community (Paek et al., 2008). Therefore, social capital is synonymous with community cohesion, which may result from positive progressive dimensions of the community anchored in positive norms of mutual trust and reciprocity between community members.

Positive community social networks and relationships enhance good health outcomes because they act as a buffer for stress-inducing situations. It is within social networks that people can acquire and share knowledge about good practices for better health and healthcare. Community social networks are also a source of motivations for actions against health hazards within and between people in the community. It is expected that differences in social capital between communities are associated with variances in social behavior and health outcomes across communities.

The assumption is that women who have social capital at community level may get material and moral support from their social networks to bolster their ability to access information and subsequently enhance good health outcomes (Paek et al., 2008). Indeed, many studies have found evidence of a positive relationship between social capital and good health outcomes (Campbell et al., 2002; Kawachi et al., 1997; Kawachi & Kennedy, 1997). It is thus expected that differences in social capital between communities will affect individual's contraceptive use. It is also plausible that community changes in social capital will result in changes in contraceptive use, either positive or negative.

2.9.3 Integrating theoretical frameworks to understand contraceptive use transition study in Zambia

As it is established in the empowerment and social capital theoretical frameworks, a woman's choice to use contraceptives is affected by a complex interplay of social factors that includes her own demographic characteristics, interpersonal relationships, as well as the broader sociocultural environment in which they live. To understand women's utilisation of contraceptives methods, all contributing factors must be considered. This study sought to encompass all possible factors that have the potential to influence women's use of contraceptives. That is why a multilevel understanding of social phenomena relating to understanding contraceptive use transition was adopted both in terms of

theory and methodology. The theoretical framework which was used in this study reflects the fact that women are nested within complex interpersonal relationships and communities or neighborhoods and that the effects of these relationships vary in terms of characteristics and over time.

It is in this regard that this study adopted two different theories, including empowerment and social capital, reflecting social phenomena which operate at different but influence contraceptive use. As such, contraceptive use is a function of the level of empowerment among women, their access to social capital, and the degree to which gender inequality and problematic social norms are present in their social environment. As already established, key empowerment elements included participation in the decision-making process, access and ownership of resources, access to information, and higher socioeconomic status. In this regard, it was hypothesised that woman's education level, partner's education level, literacy, household wealth status, a woman's participation in decision making at household level, occupation, knowledge about family planning and residence do influence or explain her decision to use contraception hence explaining contraceptive use transition in Zambia.

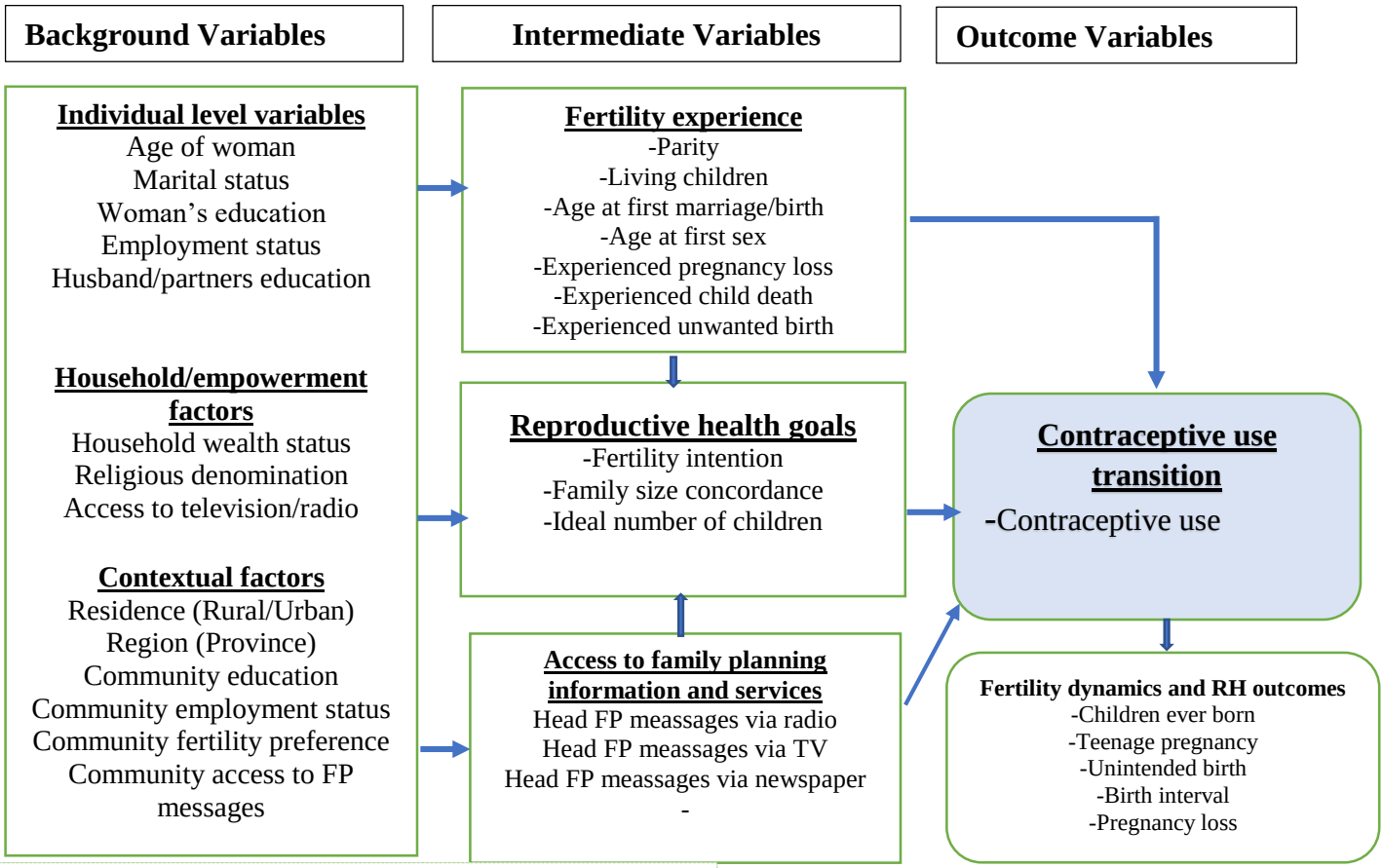
This is because a woman's exposure to education, decision making at personal and household level, access to income and access to health information are expected to influence her contraceptive autonomy, which can lead to positive attitude to contraceptive use. For example, it is expected that an educated woman makes independent and informed decisions about contraceptive choice and use. Similarly, a working-class woman can have easy access to health care services. These associations are expected to be explained through a woman's ability to undergo an empowerment process at the individual or household level. These factors do not only drive contraceptive use, but any observed transition in contraceptive use may be a result of changes in women's compositional factors that may include the level of women's empowerment in the community.

Social capital which is used here as one of the theories which reflect resources that are imbedded in interpersonal relationships, shared norms, and mutual trust. Social capital is synonymous with community resources that could be utilised to access contraceptives. But it should be noted that it would be difficult for a woman without an element of empowerment to do so. In other words, empowerment is needed to adequately benefit from social capital. Social capital is based on the concept of reciprocity, and this would mean that one needs to have something to share to fully benefit from the social networks, otherwise one may not be welcome in a social relation. In this regards, interpersonal and community variables representing social capital such as marriage, family size, family planning messaging among others, are important predictors of contraceptive use and changes in these variables could instigate contraceptive use transitions across the country. Those from higher socioeconomic status, for example, may not be as negatively affected by overarching gender norms as those from lower socioeconomic status. That is why a triangulation of theories to explain contraceptive use transition was warranted in this study.

2.10 Conceptual Frameworks

Based on the theoretical frameworks and literature review, this study proposed a conceptual framework for understanding contraceptive use transition in Zambia. The framework recognises that change in contraceptive use has two major components: change in population composition and change in effects, as emphasised in previous research. The framework attempted to explain the paths in which different factors interact to influence contraceptives use transition. According to the framework, several factors can influence contraceptive use transition. Whilst factoring in literature reviewed on contraceptive use transitions, it was rational to hypothesise three main possible pathways that could lead to the study outcomes.

The first pathway hypothesised that an individual woman's background characteristics influence her contraceptive behaviour and choices. This relationship can work directly or can pass through explanatory variables identified as fertility experiences, reproductive health goals and access to information. The second pathway was that a woman's individual, household and community level variables influence her contraceptive use through access to family planning information and services. The third possible pathway was that fertility experiences and access to family planning information and services may not directly influence a woman's contraceptive behaviours and choices, but may operate a woman's reproductive health goals and consequently influence contraceptive behaviour and choices. While some of these factors may have a significant connection, others may not. The background, intermediate and outcome variables examined in this study were collected in all the DHSs conducted in Zambia.



Source: Adapated based on reviewed literature)

Figure 2.1: Conceptual framework for understanding the determinants of contraceptive use transition in Zambia

2.11 Research hypotheses

This study attempted to add to existing literature on contraceptive use transition in sub-Saharan Africa. It aimed at investigating the various underlying factors explaining the contraceptive use transition and established how contraceptive use transition has affected fertility dynamics and reproductive health outcomes in Zambia. In keeping with the overall purpose of the study, the following hypotheses were envisaged based on reviewed literature, theoretical and conceptual frameworks. The hypotheses were tested at significance level: $\alpha=0.05$

Research Hypothesis 1

H_o (Null): There has not been a significant increase in contraceptive use among sexually active women of reproductive age in Zambia over the past 26 years (1992-2018).

H_a (Alternative): There has been a significant increase in contraceptive use among sexually women of reproductive age in Zambia over the past 26 years (1992-2018).

Assumptions

This hypothesis was based on the assumption that if a country is characterized by improvements in access to maternal healthcare, education, and women's employment opportunities and woman decision making autonomy, contraceptive use will increase. This increase can be attributed to factors such as increased awareness of family planning information, such as benefits of using contraceptives, improved access to contraceptives, and changing individual and societal attitudes towards family planning (Alabi et al., 2019; Boadu, 2022; Karaoğlan & Saracoglu, 2018; Mangimela-Mulundano et al., 2022).

Research hypothesis 2

H_o (Null): There is no significant association between contraceptive use increase in Zambia and changes in women's compositional (education, employment, wealth status) characteristics.

H_a (Alternative): Contraceptive use increase in Zambia can be explained by changes in women's compositional (education, employment, wealth status) characteristics.

Assumptions

This hypothesis is based on the premise that changes in women's factors such as education level, employment opportunities, household wealth, fertility preference and access to mass-media are key in changing contraceptive behaviour of women. This hypothesis was based on the assumption that if women have higher levels of education, are employed, have access to mass-media or belong to wealth households will have correct knowledge and autonomy to an make informed choice about family planning and the use of contraceptives methods (Alabi et al., 2019; Boadu, 2022; Kohan et al., 2014; Nadeem et al., 2021; Seidu et al., 2022; Tesfa et al., 2022). Therefore, an increase in the proportion of women with secondary or tertiary education, employed women or who belong to rich households, is expected to contribute to the increase in contraceptive use

Research hypothesis 3

H_o (Null): There is no significant association between an increase in contraceptive use and a reduction in fertility and teenage pregnancy rates and reduction in the prevalence of unintended births, short interval and pregnancy loss in Zambia.

H_a (Alternative): The increase in contraceptive use is associated with a reduction in fertility and teenage pregnancy rates and reduction in the prevalence of unintended births, short interval and pregnancy loss in Zambia.

Assumptions

This hypothesis is based on the assumption that increased contraceptive use among women of reproductive age has the potential to lead to a reduction in fertility and improved maternal health

outcomes such as a reduction in the prevalence of unwanted births, reduction in short-birth interval and reduced risks of teenage pregnancy (Ahinkorah, 2020a; Chandra-Mouli & Akwara, 2020; Damtie et al., 2021; Khan & Islam, 2022; Yeakey et al., 2009)

CHAPTER 3 : METHODOLOGY

3.1 Introduction

This chapter presents the study's methodology of the study. In section 3.2 the study setting has been described by providing the background context of the place where the study was conducted. The study design employed in this study has been provided in section 3.3. The study population, sample as well as the sample derivation criteria of the study is described in section 3.4. The description of the secondary data sources where data was sourced for this study has been described in section 3.5. The instruments that were used to collect the secondary and primary data used in this study are described in section 3.6. Section 3.7 provides a detailed description of the variables used in the study as well as how they are measured. The step taken in preparing and both quantitative and qualitative data are described in section 3.7. The statistical analysis procedures performed to answer research questions and address the specific objectives is elaborated in section 3.9. The data quality assessment procedures are described in section 3.10. Ethical considerations are described in section 3.11. The study dissemination plan is presented in section 3.12

3.2 Study Setting

This study was conducted in Zambia during the period 2022 to 2023. Zambia is one of the low middle-income countries in sub–Saharan Africa located in the southern part of the continent. The country is geographically demarcated into ten provinces (Figure 3.1), then into 116 districts, which are also divided into 156 constituencies and then 1,624 wards as the lowest administrative level (Central Statistical Office, 2012; GRID3 Zambia, 2020). In 2022, the country had an estimated population of 19.6 million. Thirty percent of this population comprised women in the reproductive age-group (15-

49) years (Central Statistical Office, 2013; Zambia Statistics Agency, 2022). Specifically, there has been an overall 40.8% population growth rate since the last census was conducted in 2010, with the population expected to double by 2051 (based on the current annual growth rate of 3.4) (Central Statistical Office, 2012; Zambia Statistics Agency, 2022). As of 2022, a majority (60.0%) of Zambians were living in rural areas and 40.0% were urban dwellers (Central Statistical Office, 2013; Zambia Statistics Agency, 2022).

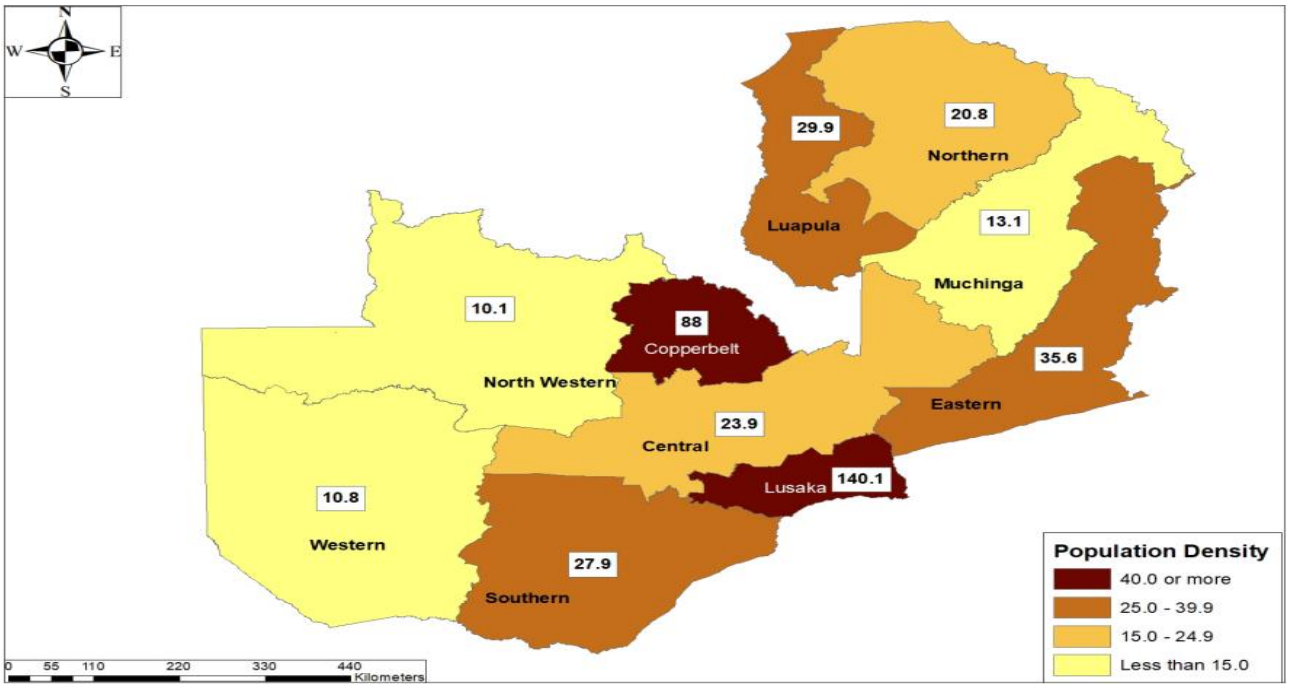


Figure 3.1: A map showing Zambia provincial boundaries by population desnity: source: Zamstats (2022:23)

In 2018, the country's total fertility rate (TFR) was 4.7 children per woman; higher in rural areas (5.8) than in urban areas (3.4) (Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). TFR has decreased from the 2013/14 Zambia Demographic and Health Survey (ZDHS) estimates of 5.3 at the national level, 3.7 in urban areas, and 6.6 in rural regions. In 2010, almost 61 percent of Zambia's population lived on less than a dollar a day, but by 2015, that number had dropped to 54 percent. Rural poverty is more prevalent (77.9% in 2010 and 76.6 percent in 2015) than urban poverty (27.5% in 2010 and 23.4 percent in 2015) (Central Statistical Office, 2016; Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019).

Maternal mortality in Zambia remains high and is one of the major health problems with far-reaching adverse repercussions on the country. Overall, there has been a downward trend in the pregnancy related mortality rate since 2001 in Zambia. Deaths due to pregnancy-related complications was estimated to have dropped from 729 per 100, 000 live birth in the 2001 DHS to 389 per 100, 000 live birth in the 2013-14 DHS and then to 398 in the 2018 DHS (Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019)

The country's reproductive health policies and programmes have oscillated between hostility to and support for family planning (FP) initiatives since Zambia's independence. The official population policy in the 1960s and 1970s was pro-natalist and anti-contraception (van den Borne et al., 1996). Therefore, during this period, organized population programmes and modern family planning commodities were mainly absent. As a result, despite having a high level of literacy, few couples used modern contraception in the early 1990s (University of Zambia, Central Statistical Office, Demographic and Health Surveys Macro International Inc., 1993). Zambia's first population policy was formally enacted in 1989 (Ministry of National Development Planning, 2019) to address the management of population growth. To achieve this, the Fourth National Development Plan (1989-1993) attempted to handle population and development challenges in a methodical manner, with a focus on population growth rate regulation (Ministry of Health, 1992). This led to the development of family planning policies and initiatives in the late 1980's to provide adequate family planning services in order to influence people's fertility behaviour.

The most recent Zambia demographic and health survey of 2018 shows that modern contraceptive use among married women of reproductive age in Zambia increased from 33 in 2007 to 48% in 2018 (Zambia Statistics Agency et al., 2019). Zambia has now created an enabling policy environment to reduce fertility and improve maternal and child health by increasing access and

encourage utilization of FP services with a special focus on adolescents and women of reproductive age (Ministry of Health, 2018). In Zambia, the following advancements in family planning and fertility management have been made thus far: creating the National Population Policy (Ministry of National Development Planning, 2019), Family Planning Guidelines and Protocols (Ministry of Health, World Health Organization, United Nations Population Fund, United Nations Child Fund, Health System Support Program, 2006) and the National Reproductive Health Policy (Ministry of Health, 2000)

Reproductive, Maternal, Newborn, Child and Adolescent Health and Nutrition Communication and Advocacy Strategy 2018–2021 is one of the accomplishments of the family planning policies in Zambia (Ministry of Health (MOH), 2019); other achievement include the Health Sector Strategic Plan (Ministry of Health, 2018) and the 2017 National Adolescent Health Strategic Plan (Ministry of Health (MOH), 2017). All of these health policies and recommendations were developed to address the contextual and individual barriers that prevented adolescents and women, especially those living in marginalised groups, from having access to information and reproductive health services.

The country has over the year observed steady progress in contraceptive use among women. Use of any modern method of contraception among currently married women in Zambia increased from 9% in 1992 to 33% in 2007 and 48% in 2018. The contraceptive prevalence rate (CPR) among currently married women age 15-49 is 49.6%, with 48% using a modern method. Among sexually active unmarried women, 44% were using any modern contraceptive method in 2018 (Zambia Statistics Agency et al., 2019). As previously stated, there was no publicly available research in Zambia which looked at how social context has been driving contraceptive use transitions. And whether the observed change in contraceptive use in the country has affected fertility dynamics and

maternal health as expected. This made Zambia an intriguing place to conduct such a research because national level data was widely available to achieve the research objectives.

3.3 Study Design

This study employed both descriptive and exploratory research designs to examine factors that explain contraceptive use transitions in Zambia over the period 1992 to 2018. To achieve this, the study utilised a mixed method approach to gather the data that was required for answering the research questions. The choice for mixed methods was to facilitate a better understanding of the complexity of the relationship between social context and contraceptive use transition (McKim, 2017). While qualitative methodologies emphasized the importance of understanding the influence of socio-cultural perspective and contextual factors on contraceptive behaviour among women of reproductive age, the quantitative methods were used to quantify the contribution effects of various individual and contextual social factors to contraceptive use transitions overtime in Zambia.

3.4 The Study Population and Sample

The target population for this study comprised women of reproductive age as captured in the six cross-sectional Zambia Demographic and Health Studies (ZDHSs) conducted in the period 1992 to 2018. The ZDHS employed a two-stage sampling design to select households in sampled enumeration area (EAs). All women of reproductive age 15–49 in selected households were eligible for interviews (Croft et al., 2018; Zambia Statistics Agency et al., 2019). The study population also included women in the age range of 15-49 who were interviewed during qualitative data collection in Lusaka and Chongwe districts. Lusaka district was chosen because it represented the urban population while Chongwe district was chosen because it represented the rural population. The two districts were easily accessible to the researcher. Further, the study population included key policy

and programme personnel in the Ministry of Health and other agencies that deal with Sexual Reproductive Health (SRH) programme design and implementation in Zambia. In this study, a pooled dataset comprised a sample of 44,762 sexually active and non-pregnant women captured in all the six ZDHSs was drawn using the append command in Stata software.

The sexually active women of reproductive age health captured in ZDHSs formed the first sample used in the analysis. The second sample comprised women of reproductive age who were selected during the qualitative data collection exercise. While the third sample consisted staff from the Ministry of Health and stakeholder institutions complementing government on the implementation of family planning programmes in the country. The sample size derivation criteria showing how women were sampled from each DHS survey is described in Figure 3.2.

The analysis was conducted only on women who had a risk of falling pregnant during the survey period. Thus, women who were pregnant or never had sexual intercourse or were sterilised had no risk of falling pregnant during the survey period. This explains why these groups of women were removed from the analytical sample.

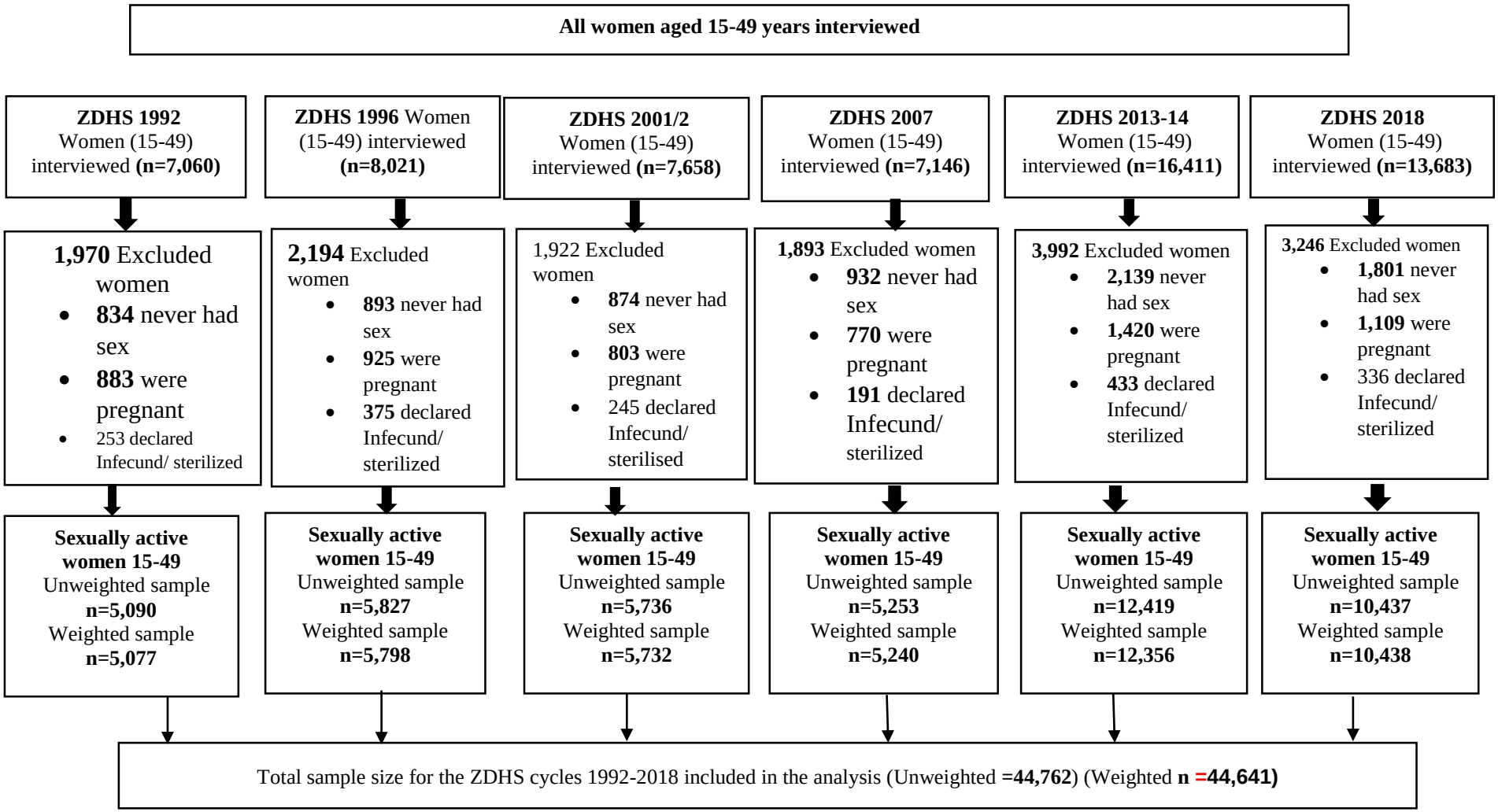


Figure 3.2: Sample devivation of sexually active women from the 1992 to 2018 Zambia Demographic and Health Surveys

3.5 The 1992-2018 Zambia Demographic and Health Surveys

Since 1992, the Zambia Demographic and Health Survey (ZDHS) has been conducted in partnership with the Ministry of Health (MoH) by the Zambia Statistics Agency (ZamStats), formerly the Central Statistics Office (CSO). The DHS Program, which is supported by the US Agency for International Development (USAID) is conducted in many low-income and developing countries around the world. The Global Fund (GF), Zambia's Department for International Development (DFID), and the United Nations Population Fund (UNFPA) are among the institutions and organizations that provide technical or financial assistance to ensure the DHSs are successfully conducted in Zambia.

The ZDHS' primary aim is to provide up-to-date estimates of basic demographic and health indicators for the country to inform tracking of various health programmes being implemented by the government. All the six ZDHS conducted in Zambia gathered data on fertility levels, contraception use, maternal and child health, infant, and neonatal mortality rates, maternal mortality, and gender, nutrition, and awareness of HIV/AIDS and other health issues that are relevant to achieving the Sustainable Development Goals (SDGs). Data gathered by the ZDHS is meant to aid policymakers and programme managers in analysing and designing programs and initiatives to improve the health of the country's population.

Prior to conducting the DHSs, the Censuses of Population and Housing (CPH) were used as sampling frames. The sampling frame usually contains data for all the country's enumeration areas (EAs). An enumeration area (EA) is a geographical area allotted to an enumerator for the purpose of conducting a census count; each EA usually has an average of 110 households, according to the Zambian census frames (Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). Each EA has a cartographic map with identifying information and a size measure, which is the number of residential households identified in the CPH. A stratified two-stage sample design was

used in the ZDHSs, similar to what is done in DHSs conducted in other countries around the globe. In the first step, primary sampling units (clusters) were selected within each sampling stratum. The enumeration areas were chosen with a probability proportional to their size.

The second stage involved household sampling, which was done methodically. In most cases, a household listing process was carried out in all the specified clusters. Then, in each sample enumeration region, 25 households were chosen at random using an equal probability system. At the national, urban and rural, and provincial levels, the sample size obtained was representative. All women between the ages of 15 and 49 and men 15 to 59 who are usual residents or guests who spent the previous night before the interview were eligible to participate in all the DHS's conducted in Zambia (Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019).

The Household questionnaire, the Woman questionnaire, the Man questionnaire, and the Biomarker questionnaire were the main data collection tools used in collected data for the DHS conducted from 1992 to 2018. The questionnaires were adapted from The DHS Program's Model Questionnaires to suit the demographic and health dynamics of Zambia's population. Various stakeholders representing government ministries and agencies, nongovernmental organisations, and international cooperating partners took part in providing feedback on the questionnaire's content before surveys were implemented. The Woman questionnaire was used to gather data from all eligible women between the ages of 15 and 49. Questions about contraception, fertility, and reproductive health were asked of these women. Data was collected by well-trained enumerators who underwent intensive field training (Croft et al., 2018; Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019).

3.6 The Study instruments

The instruments used in this study comprised the DHS woman questionnaire, the key informant interview schedule, and the focus group discussion schedule. The woman DHS questionnaire was administered to all women who either spent a night in the household before the interview or were usual members in all selected households for the 1992 to 2018 DHSs. This study did not make any modification to the DHS woman questionnaire, but adopt the variables of interest as they were collected in the surveys. However, where necessary, the variables were recorded to suit the presentation style of the researchers' choice. The key informant interview (KII) guide was designed and used to collect qualitative information from staff in the Ministry of Health and stakeholders' institutions complementing the government in implementation of family planning programmes in Zambia. The focus group discussion schedule was developed and used to collect qualitative data from women of childbearing age (15-49) who were selected to be part of this study.

3.6.1 DHS woman questionnaire

The 1992-2018 DHS used three main questionnaires (Household, Woman and Man) to collect data socio-demographic and health-related data from eligible women and men. This study utilised information collected using the woman questionnaire. The woman questionnaire was used to collect information on family planning from all women of reproductive age who were found in all the selected households (Zambia Statistics Agency et al., 2019). An extract of the variables from the Woman questionnaire used in this study is presented in table Appendix 3; Chapter 3 Appendices.

3.6.2 In-depth interviews schedule and focus group discussion guide

The study also collected qualitative data in Lusaka and Chongwe districts. The qualitative data was collected from women of reproductive age (15-49) years using a focus group guide and an in-depth interview schedule was used to collect qualitative data from key informants who are participating in the implementing of family planning and reproductive health programmes in the Ministry of Health and its key stakeholder organisations. A total of 10 staff from the Ministry of Health were interviewed (2 from Headquarters, 2 from District Health Office, 6 from Health Facilities). The study also interviewed five (5) staff from the family planning implementing institutions. The organizations included the following; Centre of Reproductive Health (CHRE), Planned Parenthood Association of Zambia (PPAZ), and United Nations Population Fund (UNFPA). These organizations were selected because of the involvement in implementing family planning programmes in Zambia. A total of four (4) focus group discussions were conducted in two districts, namely; Lusaka and Chongwe within Lusaka province. This number of FGDs was sufficient considering the time and resources available to the researcher.

Two focus group discussions were conducted with adolescents and young women (age 15-24 years) and another two with older women (aged 25-49 years). The thematic areas for the focus group discussions are knowledge of contraceptives methods; sources of contraception methods; contraceptive use; social context and contraceptive use transition; barriers to contraceptive use and recommendations for improving contraceptive use uptake. All the data collection for the qualitative study were subjected to audio recording after obtaining informed consent from the participants. Two research assistants with a graduate degree from a university were recruited to support data collection. The research assistants were trained in basic research methods and research ethics, specifically, how to conduct an FGD and an in-depth interview, transcribing data and how to manage data. The recruited of participants for the focus group discussion was done by the Neighbourhood health

committee (NHC) working at family planning clinic in one of the health facilities located in the study sites. The NHC helped with the identification and selection of participants using eligibility criteria (sex, age, participants coming from same community and have interaction with family planning). The focus group discussions (FDG) were conducted at a health facility located in the community where participants came from. All focus group discussions were conducted in local language. Each FGD consisted 10 participants. Audio recorded interviews were then transcribed verbatim by the principal researcher, who was supported by two research assistants who mainly helped with the process of conducting the interviews. To avoid loss of meaning during transcription and translation process, an external research assistant was engaged to check transcripts while listening to the audio recordings. The interview guides are in Chapter 3 Appendices.

3.7 Variable Identification

The variables of interest in this study were classified at five levels: independent (background) variables, household, community variables, intervening variables, and outcome (dependent) variables. The ZDHS datasets contain data which was collected from women of reproductive age (15-49 years) at all the four levels. Therefore, the unit of analysis for the study comprised sexually active, non-pregnant and fecund women in the age range of 15-49 years who met the study inclusion and exclusion criteria.

3.7.1 Dependent variable

The main outcome variable for this study was contraceptive use. The outcome of interest was measured using the DHS variable; current use of any contraceptive method to prevent pregnancy (using/not using). Current use of contraceptives included using of both conventional (withdrawal, periodic abstinence, rhythm, lactational amenorrhea method (LAM), and folkloric) and modern methods. In the DHS dataset, the variable contraceptive use was coded with four response categories

(Not using modern method, using traditional method, intends to use later and does not intend to use). To facilitate binary analysis, the variable was recorded as "0" for sexually active women who were not using any method to prevent pregnancy, while women who were using any contraceptive method to prevent pregnancy were coded as "1".

Table 3.1: Dependent variable

No.	Variable	Operational description	Measurement
1	Contraceptive use	The act of using a device or medication or procedure to use prevent a pregnancy	0. Not using 1. Using

3.7.2 Independent variables

Independent variables were identified based on the review of existing literature. These factors were identified for inclusion in this study because prior research has shown that contraception use among women varies according these demographic and socioeconomic factors (Bolarinwa et al., 2021a; M. Chola et al., 2023; Hailegebreal et al., 2021; Lasong et al., 2020a; Munakampe et al., 2021; Ntoimo & Chirwa-Banda, 2017). Demographic and socioeconomic variables were presented at the individual level for women, as shown in the study conceptual framework. The demographic variables included in the study were age and marital status. Education level, literacy, religious denomination and working status were classified as the socioeconomic variables. A list of variable definitions and operational measurement is outlined in the table 3.2.

Table 3.2: Individual level variables

No.	Variable	Operational description	Measurement
	Demographic		
1	Age	A woman's age in completed years	Years
2	Marital Status	Current marital status of a woman at the time of the survey	1. Never been in union 2. Married/Living with a man 4. Widowed 5. Divorced 6. Separated
	Socioeconomic		
3	Education	Level of education attainment by a woman	0. None

			1. Primary 2. Secondary 3. Higher
4	Husband/partners education	Level of education attainment by a partner	0. None 1. Primary 2. Secondary 3. Higher
5	Employment status	Whether or not a Woman is working	1.Not working 2.Working
6	Religious denomination	Woman's religious denomination	1. Catholic 2. Protestant 3. Muslim 4. Other

3.7.3 Household level variables

Prior studies have revealed that factors examined at the household level, such as wealth status, family size and ownership to ICT commodities such as radio or television have been associated with increased access and utilisation of maternal health care such as contraception use. According to several studies conducted in different counties in SSA (Lasong et al., 2020a; Mutombo & Bakibinga, 2014; Worku et al., 2015) women who belong to moderate or rich family have an increased probability of accessing and utilising family planning services in comparison to those who come from poor families. Thus, household wealth, number of living children and exposure to media were expected to contribute to contraceptive use transition in Zambia. The household level variables to be examined in this study are described in table 3.3 below.

Table 3.3: Household level variables

No.	Variable	Operational description	Measurement
1	Wealth quintile	Wealth index of a household where a woman lived	1.Poor 2.Middle 4.Rich
2	Ownership of radio	Whether the household in which a woman lived has a radio	1.Yes 2.No
3	Ownership of television	Whether the household in which a woman lived has a television	1.Yes 2.No

3.7.4 Community-level variables

The Zambia DHSs categorised region of residence according to the nine provinces that were in existence during the 1992 to 2007. Thereafter the 2013 and 2018 DHSs had ten provinces. These were Central, Copperbelt, Eastern, Luapula, Lusaka, Muchinga, Northern, North Western, Southern and Western. The place of residence was categorised as urban or rural. The variables constructed at community level comprised community education (proportion of individuals with secondary or higher education in the EAs, community wealth (proportion of households classified as rich or richer, community employment (proportion of women who were working), community woman decision making autonomy (proportion of women who make daily decisions at household level), community access to community health workers (proportion of women who were to family planning information through community health workers), community desire for large family size (proportion of women residing in communities whose average number of ideal children was four or more), community exposure to FP messages (proportion of women who were exposed to family planning information through mass media at the community level), community young age at first marriage (proportion of women living in the communities where the average age at first marriage was below the age of 18 years). the extent of diversity in the community where respondents live based on the composition of ethnic groups) and prevalence of a large family norm in the community (proportion of individuals living in communities where individuals have four or more children).

Therefore, community education was constructed by aggregating women's responses to questions on their individual educational attainment. Community wealth was constructed by aggregating responses to household wealth quintiles whereas community employment was constructed aggregating individual's responses to a question on working status. Community woman decision making autonomy was constructed by aggregating responses to a set of questions asked to a woman (who makes decision on household purchase; who makes decision on her health; who makes

decision on her visits; who makes decisions on spending household earnings). Community access to CHW visit was constructed by aggregating individual's responses to a questions on exposure to family planning information via community health worker. Women were asked to indicate whether in the past 12 months they had accessed FP information via radio, television or newspaper. This information was used to create to a community level variable for exposure to FP messages. Moreover, to create the variable community young age at first marriage, which is the proportion of women living in communities where the average age at first marriage was below 18 years, individual responses to the question asking women to report age at which they got married for the first time were aggregated. Lastly, the variable desire for a large family size in the community was generated by aggregating individual responses to questions pertaining to ideal number of children.

The community level in this analysis was defined at the EA level. This is because EA was the lowest primary sampling unit or point of data collection in the ZDHS. An EA usually contains households with similar characteristics. Thus, making analysis of community effects on contraceptive use transition appropriate. Prior studies have shown that regional differentials in contraceptive use may reflect inherent inequalities in livelihood, access to health services, access to information, employment opportunities and poverty in populations (Blackstone et al., 2017; Goldenberg & Stephenson, 2019; Nyarko, 2020; Tegegne et al., 2020). In many studies conducted in SSA, region of residence, type of residence, community education, community employment, community wealth, community fertility preference, community access to media FP messages were among community level variables that have been found to be associated with contraception use (Ahinkorah, Seidu, Appiah, et al., 2020b; Dias & Oliveira, 2015; Hailegebreal et al., 2021; Okigbo et al., 2018). Based on this evidence from literature, these variable were considered in this study (Table 3.4). Apart from region and place of residence, other community level variables were constructed from individual level compositional variables through aggregation at the primary sampling unit (PSU) or cluster level,

which in this instance is the DHS survey Enumeration Areas (EAs). For easier interpretation, proportions for categorization were applied on each community level variable, that is low, moderate, and high.

The construction of community-level variables from individual-level variables involved aggregating data from individual respondents within each defined DHS EA. This process was important to facilitate the understanding collective community characteristics on contraceptive use. To create each community-level variable, an individual level variable was aggregated or averaged across all individuals within an EA. This allowed for capturing of the overall status of the community. The construction of these variables enabled the process of exploring community-level patterns, disparities, and trends in contraceptive use, and facilitated a comprehensive understanding of the contextual factors influencing contraceptive use transition.

Table 3.4: Community level variables

No.	Variable	Operational description	Measurement
1	Province	Province of residence where a woman lived	1.Central 2. Copperbelt 3. Eastern 4.Luapula 5. Lusaka, 6. Muchinga 7.Northern, 8. North-Western 9.Southern 10. Western
2	Place of residence	Place of residence where woman lived	1.Urban 2.Rural
3	Community education	The level of education in a community were a woman lived	1.Low 2.Medium 3.High
4	Community wealth	The level of poverty in a community were a woman lived	1.Low 2.Medium 3.High
5	Community employment	The level of employment in a community were a woman lived	1.Low 2.Medium 3.High
6	Community fertility preference	The level of fertility desire in a community were a woman was residing	1.Low 2.Medium 3.High
7	Community access to media FP messages	The level of access to media FP messages in community were a woman resided	1.Low 2.Medium 3.High
8	Community access to CHW visit	The level of access to CHW visits	1.Low 2.Medium 3.High

3.7.5 Intervening level variables

Prior studies have revealed that the use of contraceptive methods is associated with a women's decision to meet her reproductive health goal as well as access to family planning information and services (Fekadu et al., 2020; Maïga et al., 2015; Pauline Bakibinga et al., 2019; Yaya et al., 2018). Additionally, theoretical framework and the conceptual framework were used can guide the identification of potential intervening variables by providing insights into the underlying processes or pathways through which the independent variable affects contraceptive use among women. At the level of the individual, the household, or society, independent variables may not always have a direct influence on contraceptive use, but they may do so indirectly through intervening variables or proximate determinants. The intervening variables have been identified in the study as those related to a woman's fertility experience, reproductive health goals and access to family planning information, as reported in the literature (Table 3.5). Identifying intervening variables in this study was crucial for gaining a deeper understanding of the mechanisms at work in influencing contraceptive use transition. Such information is necessary for developing more targeted and effective maternal health interventions or family planning policies.

Table 3.5: Intervening variables

No.	Variable	Operational description	Measurement
1	Ideal number of children	as the number of children that a woman or man would have if they could go back to the time when they did not have any children and could choose exactly the number of children to have in their whole life	Number
2	Children ever born	Number of live births a woman has ever had	Number
3	Family size	The number of living children a woman had at the time of the survey regardless of where they were living	Number
4	Family size concordance	Whether a woman wants the same number of children or fewer or more as the partner	1.Same number 2.More children 3.Fewer children 4.Don't know

5	Age at first marriage	Age at which a woman was first married	Number
6	Fertility intention	Whether a woman wants to have another child or not	1. Have another child 2. No more 3. Undecided
7	Exposure to mass-media FP messages	Whether or not a woman had exposure to mass-media family planning	1. Yes 2. No
8	Experience of pregnancy loss	Whether or not a woman had experienced pregnancy loss	1. Yes 2. No
9	Experience of child mortality	Whether or not woman had experienced child mortality	1.Yes 2.No
10	Age at first sexual intercourse	A woman's age at first sexual intercourse in completed years	Years

3.7.6 Fertility dynamics and maternal health variables

Contraception use has been reported to have health benefits at both the individual, household level and society level. Many studies have shown that enhancing contraceptive use among women is key in spearheading fertility transition as well as improved maternal health in sub-Sahara Africa (Ahmed et al., 2012; Bietsch et al., 2021; Bongaarts, 2017b, 2020; Maïga et al., 2015). Among the notable personal and household benefits of contraception include reduction in number of children ever born, reduction in unintended births and improvement in birth internal and child health (Ariho & Kabagenyi, 2020). In this study, the variables listed in the table 3.6 below were identified as population dynamic and reproductive health indicators that can be affected by contraceptive use transition.

Table 3.6: Fertility dynamics and maternal health variables

No.	Variable	Operational description	Measurement
1	Number of children ever born	Number of children which a woman has ever had	Number
2	Experience of unintended birth	Whether or not a woman had occurrence of an unplanned birth	1. Yes 2. No
3	Birth interval	How soon a after birth a woman gives birth again	1.Short birth interval (less than 33 months) 2.Long birth interval (33+ months)
4	Teenage pregnancy	Weather women experienced a pregnancy during the age range 15-19 years.	1.Yes 2. No
5	Pregnancy loss	Whether a woman had experienced a pregnancy loss	1. Yes 2. No

3.8 Steps in data analysis

Data analysis involved a systematic process which included a reflection of the research questions and specific research objectives. Data analysis was carried out in accordance with the study's specific objectives stated in (section 1.5 in Chapter 1). To answer the formulated research questions and achieve the stated specific objective, both statistical and qualitative data analysis techniques were conducted. Furthermore, the mixed methods analytic tools facilitated the process of examining the social context of contraceptive use transition in Zambia from 1992 to 2018.

3.8.1 Statistical analysis

Statistical analysis was performed using Stata Standard Edition (SE) version 17 software, taking into consideration complex survey design, cluster effect and post-stratification weights in the ZDHS datasets. The analysis process was done in four stages. In the first stage, univariate analysis was conducted to describe the levels, trends, and patterns in contraceptive use in Zambia between 1992 and 2018. Then, bivariate analysis was performed through cross-tabulation of the independent variables with outcome variables using Pearson's Chi-Square test to establish the associations among the variables. At stage three, multilevel analysis was conducted to explore the influence of both individual and community level factors on contraceptive use in Zambia. Lastly, multivariate decomposition analytic models were applied to examine the factors explaining contraceptive use transitions over time and establish the effects of contraceptive use transitions on fertility dynamics and reproductive health outcomes.

3.8.2 Qualitative analysis

Qualitative analysis involved synthesizing the data collected during key informant interviews (KIIs) and focus group discussions. The qualitative data sources formed an important part of thematic data analysis. Management and analysis of qualitative data involved loading all transcripts into Atlas.ti

software version 7, a software designed specifically for the analysis and management of qualitative data. Thematic Coding Analysis (TCA) was applied to ensure that every part of the data that was loaded into Atlas.ti software was read multiple times, and open coding was utilized so that potential codes were inductively identified (Pope and Mays, 2000; Nowell et al., 2017). Similar indicative codes emerging from the data, together with deductive code derived from the objectives, were merged and a final hard copy codebook with a list of all codes related to factors influencing contraceptive use transitions were developed. Each code in the codebook was then given a definition which helped to facilitate consistent coding of all transcripts. Using Atlas ti7, outputs codes linked to quotations from transcripts were created to represent recurrent themes related to factors influencing contraceptive use transition. This then served as the basis for further analysis to explain why contraceptive use transition has taken place in Zambia.

3.9 Statistical analysis procedures

Quantitative data analyses were performed using Stata software version 17.0 taking into consideration the DHS complex survey design, cluster effect and post-stratification weights. As stated earlier, statistical analysis consisted of descriptive analysis, bivariate or crosstabulations, trend analysis, multilevel analysis and multivariable decomposition analysis. The first level analysis was presented in the form of percentage distributions, prevalence and means. Bivariate analysis comprised cross-tabulations which depicted relationships between outcome variables and predictor variables. This was done using the Chi-square test of independence. The last level applied multivariable analysis models (multilevel modelling and Blinder-Oaxaca decomposition techniques). Multilevel models were used to examine individual and contextual factors associated with contraceptive use among sexually active women between 1992 and 2018. Multivariable decomposition analysis was applied to examine determinants of contraceptive use transition. The following is a detailed analytical description of how each study's specific objective was addressed.

Objective 1- To describe how contraceptive use has changed in Zambia over time with respect to levels, trends and patterns.

To achieve this objective, the six repeated cross-sectional surveys datasets from the Demographic and Health Surveys (DHS) conducted in (1992, 1996, 2001, 2007, 2013 and 2018) were pooled into one dataset in Stata software which formed the main source of secondary data. In Stata, data pooling refers to the process of combining data from multiple datasets into a single dataset. This process is useful in various situations where a researcher has separate datasets, which have to be analyzed together a single dataset.

Pooling data is often necessary when dealing with panel or longitudinal data, where information is collected over time from the same or different units, but in separate datasets. The "append" command was used in Stata software to stack observations from each dataset below another. The appending process was done logically starting with the 1992 DHS and ending the 2018 DHS dataset. This was appropriate because the DHS datasets used had the same variables which represent different time periods.

The unit of analysis comprised sexually active women in the reproductive age group (15-49 years) captured in each of the six cross-sectional surveys. The analysis sample excluded women who were pregnant at the time of the survey and those who were declared infecund or sterilised.

Descriptive analysis was performed using the "tabulate" command in Stata software to establish the levels, trends and patterns of contraceptive use with respect to socio-economic, demographic and geographic variables. The first level analysis involved producing descriptive statistics to measure contraceptive use levels for each DHS year. This analysis showed the trends in the proportion of sexually active women who were using contraceptive methods over the DHS years and trend change between the first DHS year and the last DHS year. The levels of contraceptive use were also analysed overtime, with respect to region (province) and place of residence (rural/urban).

This analysis was used to establish regional heterogeneity in trends of contraceptive use in Zambia. In the second level, analysis of contraceptive use pattern over time was conducted. This analysis was useful in depicting the pattern of contraceptive use among women of reproductive over the years (1992-2018). The analysis disaggregated the trends with respect to adolescent girls, young women, and older women. This analysis information was useful to inform tailor made recommendations on designing sexual reproductive health programmes to improve contraceptive use.

Furthermore, trend analysis was performed on the data to determine whether changes between DHS phases and changes between the first and the last survey were significant. To achieve this, a Chi-square test of independence was used. The Chi-Square statistic test was computed using the formula: $X^2_c = \Sigma\ (Oi - Ei)^2/Ei$, where c represents degrees of freedom; *Oi* represents the observed value and *Ei* is the expected value. In addition, Chi-square test of independence was conducted to assess the observed association of various independent variables with contraceptive use overtime. This statistical analysis will be complemented by qualitative data collected through key informant interviews with the Ministry of Health and stakeholders implementing family planning programmes in Zambia. The qualitative data was also helpful in understanding the supply side factors associated with provision and access to family planning services in the country.

Objective 2: To explore the social, economic, environmental, geographic and demographic factors that explain the contraceptive use transition in Zambia.

This objective was achieved by mainly analysing quantitative data and was complemented by analysis of qualitative data. Quantitative data was used to examine the factor that are associated with contraceptive use in Zambia. Furthermore, this data was used to measure the contribution effect of various factors to contraceptive use transition in Zambia. Qualitative analysis was used to the explain the quantitative results. Analysis of Objective 2 focused on identifying the underlying social forces explaining contraceptive use transitions in Zambia. To do this, the analysis considered both individual

and community level factors, because the ZDHS datasets contained this information. The individual factors were measured for demographic and socio-economic levels while the community level factors were measured at geographic and socio-economic level. A two analysis step was applied here. In step one, multilevel binary logistic regression was performed on the 2018 DHS dataset to determine individual and community predictors of current contraceptive use in Zambia. This level of analysis was important because it helped to identify the determinants of contraceptive use which were considered for decomposition analysis.

Multilevel Analysis Modelling

In order to examine the separate and combined effects of independent variables (demographic, social, environmental, geographic, and economic factors) on contraceptive use, a multivariate multilevel (or random effects) regression approach was adopted. Random intercept models (intercepts of independent variables that vary by community) were fitted to explain variance in contraceptive usage behavior of women. The inclusion of random slopes did not increase the models' goodness of fit on the model, thus the random effect analysis was considered sufficient in examining the influence of both individual and contextual factors on contraception use. To achieve the desired analysis, a two-level multilevel analysis modeling was applied: at level-1; individual sexually active women aged 15-49 were analysed and women nested within clusters (or communities) were analysed at level-2. The

Since the DHS surveys, does not directly collect at community level with the exception of a few instances involving variables related to residence and region. In this analysis, community level variables were derived by calculating proportions or a mean of individual level characteristics, which were then aggregated at the cluster (that is the PSU unit) level. Because households in the PSU are expected to be homogeneous, thus the PSU was taken to represent a community.

Moreover, multilevel (random intercepts) models were thought to be essential for analyzing contextual influences on reproductive behavior for nested variables due to the hierarchical data structure of DHS surveys (where women are nested in the clusters), as there are multiple clusters in the DHS dataset which allows estimation of community variance (Diez 2002). Multilevel regression approaches were applied on the pooled data for the 2018 ZDHS to identify the variation in contraceptive behavior resulting from differences at the community level and in variables for specific women. By using a random intercept technique, an outcome's intercept is expected to vary randomly by cluster or community (Kaggwa et al., 2008). The following is an explanation of the study's multilevel analytical approach.

Firstly, a null/empty model was taken into account (Model 0);

- Model 0: This model had only the outcome variable. There were no independent variables in the model. This model examined whether there was a significant variation in the use of contraceptive methods between DHS enumeration areas in Zambia.

Secondly, here a model with only individual-level variables (level-1 factors) was considered (Model 1);

- Model 1: The individual-level independent variables were included in Model 1. The analysis in model 1 involved a multilevel binary regression model. In this analysis, the community-level factors were not considered or ignored.

Thirdly, a model with community level factors (level-2) variables was conducted. This model excluded the individual level factors (level-1) variables (Model 2);

- Model 2: This model took into account the independent effects of community-level factors on the utilisation of contraceptives.

Lastly, the final or full model accounted for all individual-level and community-level variables that were taken into consideration for the research. (Model 3);

- Model 3: The full model took into account all the individual-level and community-level factors examined in the study taking into account community and residential heterogeneity or variations (cluster, urban-rural), demographic factors (age, marital status), socioeconomic factors (wealth status, employment, education), reproductive health goals (fertility intention, family size concordance, ideal number of children), fertility experience (parity, age at first sex, pregnancy loss, experience of child death, experience of unwanted birth), access to FP information (exposure to FP messages via radio, exposure to FP messages via TV, exposure to FP messages via newspaper) and at community level (place of residence, region, exposure to media FP message, community education, community employment, community fertility experience).

The multilevel models assessed the probability p_{ij} of a woman or women i in a community j using a contraceptive method to prevent a pregnancy. This analysis was represented as:

$$logit\ (p_{ij}) = \beta_0 + \beta \mathrm{X}_{ij} + uj + \upsilon \quad \text{(Hedeker, 2008)}$$

Where X_{ij} is a vector of independent variables at individual and community levels, uj is normally distributed with variance σ_u^2; υ is normally distributed with variance σ_u^2.

Intra-cluster correlation coefficient

Regarding the variations used to understand the variations of relationships within communities and the relative effect of community-level variables, the intraclass correlation coefficient (ICC) was used. The ICC provides information on the share of variance at each analysis model level. The latent method was used to calculate the ICC at each analysis level. It assumed a

threshold model, approximating the level 1 variance by $\pi^2/3(\approx 3.29)$ (Goldstein, n.d.; Merlo, 2005). The community level variance was calculated as follows:

$$ICC_{Community} = \frac{\sigma_u^2}{\sigma_u^2 + \pi^2/3} \qquad \text{(Goldstein, 2011)}$$

Propositional Change in Variance

To explain the heterogeneity in the probabilities of contraceptive use experience, the Proportional Change in Variance (PCV) was computed for each model in comparison to the empty model (Diez-Roux, 2000; Goldstein, 2011; Merlo et al., 2016). The PCV provided information on the share of variance at each analysis level. The PVC was thus calculated as follows;

$$PCV = \frac{\sigma^2_{u[Model\ \ 2]} - \sigma^2_{u[Model\ \ 3]}}{\sigma^2_{u[Model\ \ 2]}}$$

(Merlo et al., 2016)

The median odds ratio

For random intercept logistic regression, the median odds ratio (MOR) is calculated as:

$$MOR = \exp\left\{\sqrt{2\psi} \times \Phi^{-1}(0.75)\right\}$$

(Merlo et al., 2016)

Where; (0.75) –1 Φ = 0.6745 indicated the 75th percentile of the cumulative distribution function for the standard normal distribution, with the mean value of 0 and variance of 1.

Hence, the MOR equation can be simplified to the following formula:

$$MOR = \exp\left\{\sqrt{2\psi} \times 0.6745\right\} \equiv \exp\left(0.95\sqrt{\psi}\right)$$

(Merlo et al., 2016)

The model with the lower AIC was considered to be a better fit for the data. Thus determining the model's goodness of fit. Wanatabe–Aikake Information Criteria (WAIC) was used to compare models and measure the goodness of fit (Goldstein, 2011; Merlo et al., 2016).

Multivariable Decomposition Analysis Technique

Step two of the multivariate analysis applied multivariate nonlinear decomposition technique to measure the contribution effects of independent variables to changes in contraceptive use in Zambia. Multivariable decomposition approaches utilise outputs of regression models to partition change overtime into components attributed to impacts of independent variables and changes related to survey composition (Powers & Yoshioka, 2011). Specifically, the two-component decomposition analysis technique was used to analyze changes in contraceptive use that are due to differences characteristics and those due to coefficients between two points in time (1992-2018). The model building for the multivariable decomposition model informed by results from the multivariable multilevel logistic regression models. All independent factors that showed a p-value of less than 0.05 were considered for inclusion in the decomposition analysis.

Binder-Oaxaca decomposition method

The Blinder-Oaxaca decomposition analysis technique was developed by Blinder (1973) and Oaxaca (1973), and it was later generalized by Neumark (1988). This method enabled the decomposition of outcome variables between two groups into a part that is explained by differences in observed characteristics, as well as a part that is attributable to differences in the estimated coefficients. Blinder-Oaxaca decomposition technique has been utilised in multiple studies for the purpose of analyzing models with binary dependent variables (Sinning et al., 2008). The decomposition formula to compute the mean difference in the binary outcome (Y) between two groups or time periods was decomposed as;

$$\overline{Y}_A - \overline{Y}_B = \overline{F(X_A\beta_A)} - \overline{F(X_B\beta_B)}$$
$$= \underbrace{\left\{\overline{F(X_A\beta_A)} - \overline{F(X_B\beta_A)}\right\}}_{E} + \underbrace{\left\{\overline{F(X_B\beta_A)} - \overline{F(X_B\beta_B)}\right\}}_{C}$$

(Powers & Yoshioka, 2011)

Where the component labeled '**E**' refers to the part of the differential attributable to differences in endowments or characteristics, usually called the explained component or compositional characteristics effects. The '**C**' component refers to the part of the differential attributable to differences in coefficients or effects, usually called the unexplained component or coefficients effects. **'A'** represents the comparison time and **'B'** was the reference time. Thus, **'E'** reflected a counterfactual comparison of the difference in outcomes from group time **'A's'** perspective. The component **'C'** reflected a counterfactual comparison of outcomes from group **'B's'** perspective (de-Boer & Rodrigues, 2020; Powers & Yoshioka, 2011).

Blinder Oaxaca-type, two-component decomposition was applied to examine the factors that explain change in contraceptive use among sexually women of reproductive age in Zambia between three time periods; 1992 to 2001; 2007 to 2018 and 1992 to 2018. Multivariate decomposition analysis technique offered the option of constructing a normalized decomposition using the estimates of the usual regression equation. When the coefficients of the normalised equation are further specified as $\alpha * i = \alpha i + \mu\alpha$ where the coefficient of the reference group is zero, that is, $\alpha 1 = 0$. The normalized equation for the decomposition analysis technique is presented as;

$$y = (a + \overline{\alpha}) + \sum_{i=1}^{I} (\alpha_i - \overline{\alpha}) d_i + z\gamma + \varepsilon$$

where y denotes the dependent variable factor, *α represents a vector of coefficients, z is a matrix of independent variables* (Powers & Yoshioka, 2011). To complement the quantitative analysis

conducted, thematic data analysis was conducted on qualitative data using Atlas.ti software to identify the factors which respondents thought explained transition in contraceptive use in Zambia.

Objectives 3 and 4: To examine how contraceptive use transitions have affected fertility dynamics and reproductive health outcomes in Zambia.

To achieve this specific objective, a pooled dataset coming from the six Zambia Demographic and Health Survey datasets formed the primary data source for the analysis. The objective aimed at examining how contraceptive use transitions in Zambia overtime impacted the population dynamic indicator (total fertility rate) and reproductive health outcomes (unplanned birth, teenage pregnancy and birth interval) in Zambia. Multivariable decomposition regression models were conducted to examine the contribution effects of contraception use changes on selected fertility dynamics and reproductive health indicators.

Decomposition methods are a useful approach that identifies the main sources of change in the outcomes of interest, so that is why the method was used for this analysis. Two decomposition analysis models were conducted when examining the effect of contraceptive use transitions on total fertility rate. In the first model, place of residence and education level were included as control variables when analysing the effect of contraceptive use transition on population dynamic indicator (total fertility rate). This was done because of the observed differential association of contraceptive use with place of residence and education attainment among women of reproductive age (Ariho & Kabagenyi, 2020; Bongaarts, 2017b; Palamuleni, 2013). For instance, it has been reported in SSA that the use of contraceptives is higher among women who live in urban areas and who have higher education categories compared to their counterparts who live in rural areas and those who have lower education categories (Ariho & Kabagenyi, 2020; Nkoka et al., 2020; Palamuleni, 2013).

In the second analysis model, the examination of the effect of contraceptive use transition on total fertility rate involved controlling for individual and contextual level variables (education, employment status and place of residence) as well as intermediate variables such as age at first marriage, age at first sex, desired family size, education level of partner, experience of child mortality).

Multivariable Decomposition Poisson Regression Model

In order to examine the contribution of contraceptive use transition to fertility rate reduction in Zambia, Poisson regression modeling is utilised. Fertility rate reduction was measured using trend reduction in children ever born (CEB) between 1992 to 2018. Because CEB is a count variable and assuming that the count variable, children ever born, is not completely independent, the single-level Poisson regression method was the fundamental model of choice that was utilised. This model is typically utilised in situations in which the count data does not exhibit any dispersion, or when the mean value of the data is equivalent to the variance. Therefore, the analysis of the effect of contraceptive use transition on fertility rate was based multivariate Poisson regression equation, which, decomposed the elements that are responsible for the drop in the overall fertility rate in Zambia during the period from 1992 to 2018.

The negative binomial and Poisson regression models have the same mean structure, resulting in identical decomposition equations. However, coefficients and standard errors from a negative binomial model will differ from those of a similarly specified Poisson regression model when $\alpha > 0$ (Powers & Yoshioka, 2011). In the case of a Poisson or negative binomial regression model with an offset term, the decomposition pertains to a difference in aggregate group rates, as opposed to a difference in average counts. We define the overall (or central) rate in group j in the usual demographic sense as the number of occurrences (total number of children ever born) divided by total

exposure to risk (total number of women aged 15-49 years) (Powers & Yoshioka, 2011; Sinning et al., 2008).

Poisson decomposition is a statistical technique used to decompose data, which is collected as count. It does this by breaking down the count variable into two parts: the expected value, which is the mean, and a random component that accounts for the variation in the data that occurs around the mean. A logarithmic link function is used to perform the decomposition, which ensures that the predicted values are positive and that the relationship between the predictor variables and the response variable is multiplicative rather than additive. This is achieved by ensuring that the logarithmic link function is positive. (Bauer & Sinning, 2008, 2008; Powers & Yoshioka, 2011).

Therefore, the Poisson regression equation is written as follows:

$$\ln(E(Y|x)) = \beta 0 + \beta 1x1 + \beta 2x2 + ... + \beta pxp$$

where E(Y|x) is the expected value of the count variable Y given the predictor variables x1, x2, ..., xp. The term ln() represents the natural logarithm, and β0, β1, β2, ..., βp are the regression coefficients that need to be estimated (de-Boer & Rodrigues, 2020; Powers & Yoshioka, 2011; Sinning et al., 2008).

To add a decomposition component to the model, it can be modified from the above equation as follows:

$$\ln(Y|x) = \ln(E(Y|x)) + \varepsilon$$

where ε is a random error term that follows a normal distribution with mean zero and variance σ^2.

To further decompose the expected value into its components, we can use a log-linear model as follows:

$$\ln(E(Y|x)) = \beta 0 + \beta 1x1 + \beta 2x2 + ... + \beta pxp + \theta 1z1 + \theta 2z2 + ... + \theta qzq$$

where z1, z2, ..., zq are additional predictor variables that capture the random variability in the data, and θ1, θ2, ..., θq are the decomposition coefficients that need to be estimated (de-Boer & Rodrigues, 2020; Powers & Yoshioka, 2011; Sinning et al., 2008).

Putting it all together, the Poisson decomposition regression equation can be written as:

$$\ln(Y|x) = \beta 0 + \beta 1x1 + \beta 2x2 + ... + \beta pxp + \theta 1z1 + \theta 2z2 + ... + \theta qzq + \varepsilon$$

where Y is the count variable, x1, x2, ..., xp are the predictor variables, and z1, z2, ..., zq are the additional decomposition variables. The model estimates the regression coefficients β0, β1, β2, ..., βp and the decomposition coefficients θ1, θ2, ..., θq using maximum likelihood estimation (de-Boer & Rodrigues, 2020; Powers & Yoshioka, 2011; Sinning et al., 2008).

The Poisson regression model operates under the presumption that the mean and variance of the dependent variable are equivalent to one another. In the event that this assumption is broken, the model might not be suitable and other models, such as the negative binomial regression model, could need to be employed instead. Poisson regression models have been applied in a broad variety of domains, including public health, epidemiology, and the social sciences. These models have been widely utilised wherever count data has been gathered (Alamneh et al., 2022; Muhoza et al., 2016; Ndagurwa & Odimegwu, 2019; Worku et al., 2015).

Furthermore, the analysis of the effect of contraceptive use transitions on reproductive health indicators (experience of unplanned birth, birth interval and experience of teenage pregnancy) was conducted by controlling for all individual, contextual and intermediate factors. This analysis was useful to inform the implication of family planning programming on improving maternal health and reducing fertility in Zambia. This analysis was conducted using multivariate Blinder-Oaxaca binary regression, which has been outlined in detail under analysis for specific objective two.

3.10 Data Quality Assessment (DQA)

This section splits the assessment of quality of data into three by looking at graphical presentation of single year and grouped data, presentation of Whipple's index indices and presentation the Myer's index indices.

Data quality assessment was performed on demographic data. The Demographic and Health Survey collected age data from all interviewed women aged 15-49 years. Age data captured during surveys or census usually suffer from problems such as age heaping, age misreporting, and digit preference (mainly for ages ending in 0 and 5) among others. Considering that age is one of the main demographic variables required in demographic analysis, it is crucial to ensure that age data is adequately evaluated to detect any errors that may affect data quality.

The age ratio, the sex ratio, the UN age-sex accuracy index (joint score), Whipple's index, and Myers' blended index are some of the common demographic tools of ratios and indices that are used to discover mistakes of misreporting, age heaping, or digit preference for age and sex data. Other tools include the age ratio and the sex ratio (Shryock et al., 1976, Moultrie et al., 2013, Spoorenberg, 2007).

The appraisal of age data in the 1992 to 2018 ZDHS was conducted using the following demographic tool; graphical presentation, Age ratio analysis, Whipple's index and the Myer's index. The following is a detailed description of the demographic methods used to assess age data quality.

- **Graphical methods**

A graphical depiction of age data for a single year was used to perform the initial analysis of the age data reporting. This was done for all the participants included in the study population captured by the DHSs. The graphical depiction of data for a single year provides a quick and easy-to-understand method for determining whether the age data contains inaccuracies or digit preferences. In order to accomplish this, a line graph was constructed with individual years along the x-axis and the number of individuals reporting each age along the y-axis. If the population under consideration has not been subject to significant shifts in fertility or mortality rates, as well as high levels of migration, one can anticipate that the distribution of its members across years will seem like a smooth linear graph (Ibisomi 2007).

As a result, any noticeable variations in the graph point to the possibility of an error in the enumeration or the presence of other factors that distort the data. According to research done by the United States Bureau of the Census in 1985, digit preference is present when there are spikes at the numbers 0 and 5, as well as even digits like 2 and 8 (US Bureau of the Census, 1985).

- **Age ratio analysis**

Age ratios are used to measure the smoothness of the age distribution. If the study population has not experienced sharp swings in fertility or mortality or remarkable levels of migration, the enumerated size of a specific cohort should be almost equal to the average size of the immediately preceding and subsequent cohorts. That is, the ratio of the census count for a specific cohort to the average of the adjacent cohorts is almost equal to 1.

The smoothness of the age distribution can be determined by using age ratios as a measurement tool. If the population under study has not been subject to significant fluctuations in fertility or mortality rates, as well as high levels of migration, the enumerated size of a particular cohort should be roughly identical to the average size of the cohort that came directly before it and the cohort that came after it. That is to say, the ratio of the census counts for a particular cohort to the average of the cohorts that surround it is extremely close to being equal to 100. Therefore, any significant variations from 100 reflect the occurrence of mistake in the enumeration or other factors that contribute to the overall skewing of the results (US Bureau of the Census, 1985).

The age ratios were calculated by comparing the population of a specific age group to the average population of the two age groups that were immediately adjacent to that age group. The age ratio, often known as the AR, can be mathematically represented as:

$$ {}_5AR_x = \frac{{}_5P_x}{1/2\,({}_5P_{x-5} + {}_5P_{x+5})} $$ (US Bureau of the Census, 1985)

Where: 5ARx represents the age ratio for people between the ages of x and x+4, 5Px represents the population of people between those ages, 5Px-5 represents the enumerated age population in the next lower age category, and 5Px+5 represents the enumerated age population in the adjacent higher age category (US Bureau of the Census, 1985).

- **Whipple's index**

The Whipple's index is a demographic measure utilized for assessing the quality of single year age data to indicate the extent of heaping on certain ages, typically 0 or 5 in the age range of 23 to 62. This index is utilized for showing the age distribution of a population. The American demographer George C. Whipple created a method of evaluation called the Whipple's index in order to show

preferences for terminal digits of '0' and '5'. On a scale ranging from 0 to 500, this is measured as follows: 0 indicates entire avoidance; 100 indicates uniform distribution across ages ending in each of the ten digits; and 500 indicates that all recorded ages end in either 0 or 5 (US Census Bureau 1985). Table 3.7 provides the scale that was applied to determine how well the age data should be estimated. The range of ages for which the Whipple's index can be applied for single years of age returns is from 23 to 62 inclusive. The younger and older ages are not taken into consideration because there is a greater possibility that they will be affected by other kinds of error reporting compared to the possibility of preference for particular terminal numbers (US Bureau of the Census, 1985; (Shryock & Siegel, 1976). The expression for Whipple's index (W) is as follows: The computation for measuring age preferences for both 0 and 5 is as follows:

$$W_{0,5} = \sum(p_{25} + p_{30} + p_{35} + p_{40} \dots + p_{60}) \,/\, {}^{1}/_{5}\sum(p_{23}, p_{24}, p_{25} + \dots + p_{61} + p_{62}) * 100$$

The computation for measuring preferences for 0 and 5 individually is as follows:

$$W_0 = \sum(p_{30} + p_{40} + p_{50} + p_{60}) \,/\, {}^{1}/_{10}\sum(p_{23}, p_{24}, p_{25} + \dots p_{60} + p_{61} + p_{62}) * 100$$

$$W_5 = \sum(p_{25} + p_{35} + p_{45} \dots + p_{60}) \,/\, {}^{1}/_{10}\sum(p_{23}, p_{24}, p_{25} + \dots p_{60} + p_{61} + p_{62}) * 100$$

(Shryock & Siegel, 1976)

Table 3.7: United Nations standard for measuring age heaping using Whipple's index

Whipple's Index	**Quality of Data**	**Deviation from Perfect**
<105	very accurate	< 5%
105–110	relatively accurate	5–9.99%
110–125	OK	10–24.99%
125–175	Bad	25–74.99%
> 175	very bad	≥ 75%

- **Myer's index**

In the year 1940, Myers devised this technique for evaluating the accuracy of age data. The Myers index evaluates data from a single calendar year. Errors can be reported for people of any age (10 and older) using this measurement of the degree of preference for each of the ten digits (0-9). It is predicated on the premise that if there are no systematic anomalies in the reporting of age, the total population of those whose ages end in one of the ten digits should account for roughly 10% of the overall blended population. This is the assumption that underpins the calculation. If the sum of any given digit's total blended population is greater than 10%, this may indicate that there is a preference for ages that end in that digit or that there is an over selection of those ages. A negative deviation, on the other hand, indicates that one should steer clear of ages that end in that digit. The Myers index can vary from 0 to 90, with 0 indicating the absence of age heaping and 90 suggesting that all recorded ages terminate in a single digit. The theoretical range of the Myers index is 0 to 90 (US Bureau of the Census, 1985; (Shryock & Siegel, 1976).

3.10.1 Graphical Presentation of Age Data by DHS Year

Age ratios analysis

The distribution of single years' age of women captured in the 1992 to 2018 ZDHSs is presented n Figure 4.4. Graphical presentation shows that there was, to some extent, a tendency to prefer ages that ended with digits, such as 0, 5, and 8. Spikes were more pronounced in the data collected in the 2013 and 2018 DHS. that are more noticeable than males. The graphs display a declining trend along the age range for all the surveys, notwithstanding the spikes that appear in the data. Five-year age group data was evaluated also using a graphical representation of the age distribution over the six DHSs. Figure 4.5 illustrates the age assessment results for the grouped data. The graph reveals that there were clear peaks in the age group 20-24 year in the data collected in 1992, 1992 and 2013,

whereas there was just a modest peak in the age group 25-29 years for the 1996 and 2007 data. As was expected, there is a decreasing trend all the way along the age cohorts for the six DHSs.

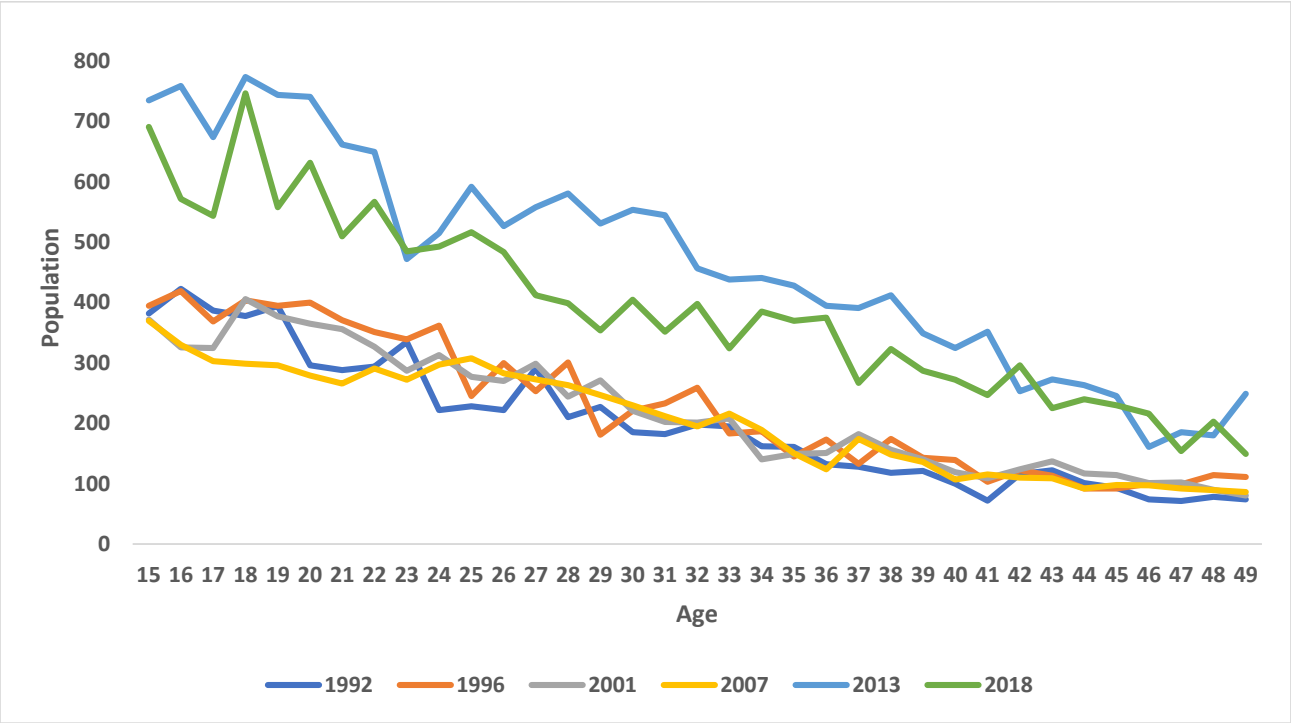


Figure 3.3:Single age distribution of women aged 15-49 years, Zambia, 1992 -2018 DHS

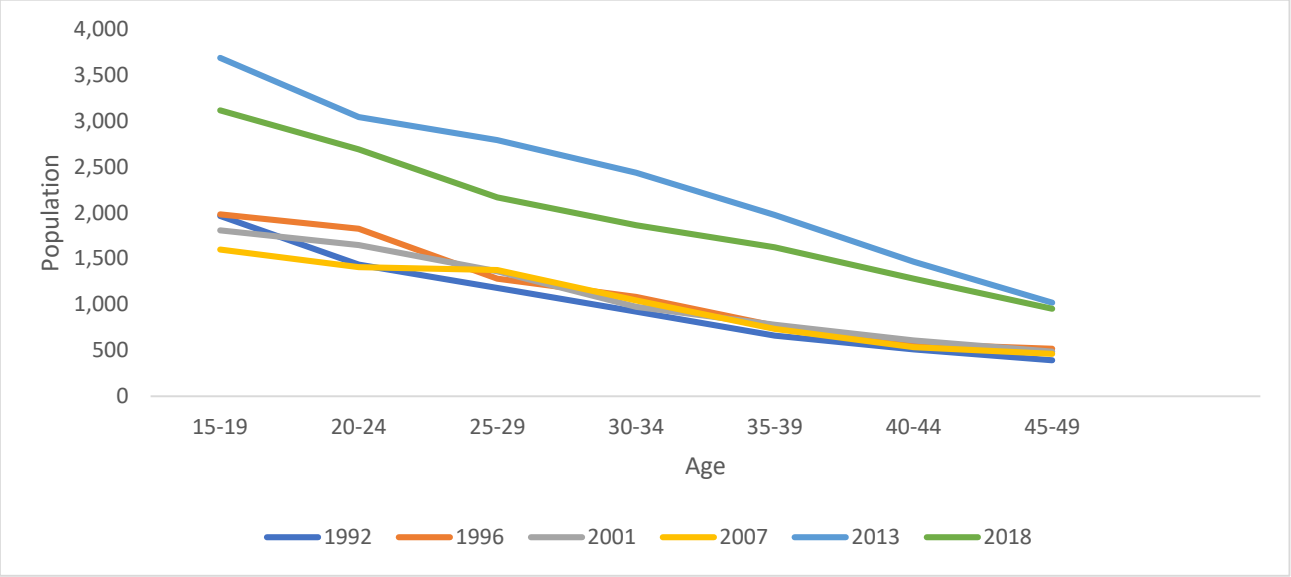


Figure 3.4:Five-year age distribution of women aged 15-49 years, Zambia, 1992 -2018 DHS

3.10.2 Age Ratio Analysis

Age ratios were used to assess the trends of the smoothness of the age distribution for all the six surveys. Figure 4.6 presents the five-year age ratios for women aged 15-49 years captured in the DHS samples. The results show non smooth trends lines for all age groups for the six DHS. Specifically, the 1996 and 2017 DHSs showed major negative and positive deviations, respectively. The 1996 DHS showed revealed negative deviations in the age range 25-29 years and 35-39 years while the age groups 20-24 years and 30-34 years showed positive deviations. On the other hand, the 2007 DHS showed positive deviations in the age group 25-29 years and negative deviations in the age groups 25-39 and 40-44 years while the 2018 DHS shows minor deviations across all the age groups.

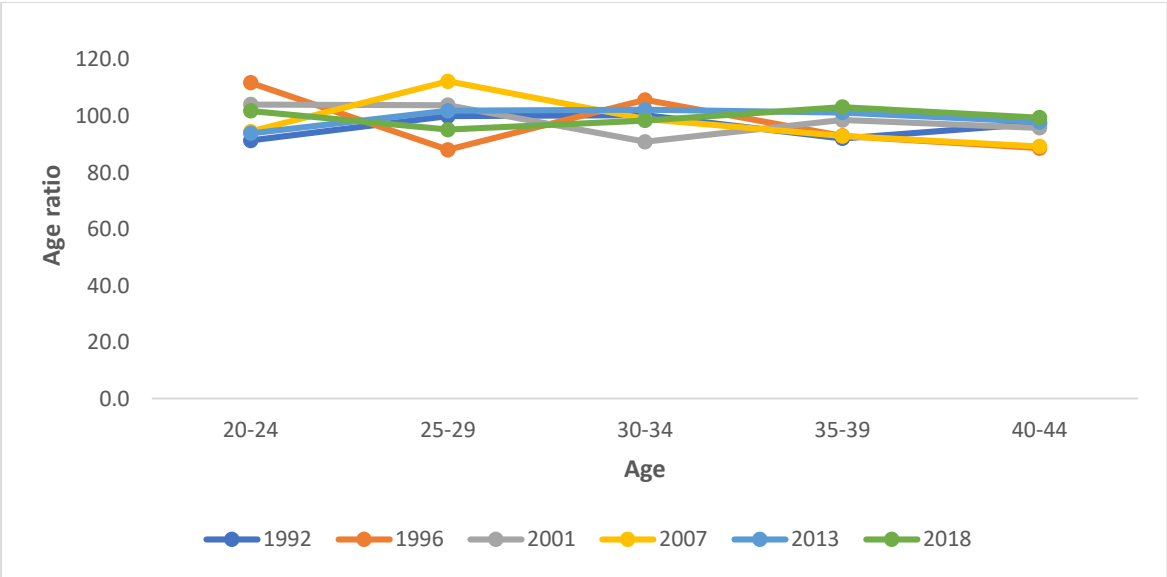


Figure 3.5:Age ratios of women for 5-year age groups, Zambia, 1992-2018 DHS

3.10.3 Whipple's Index

The Whipple's index was further used to determining the extent of age misreporting in the data collected by the six DHSs. The summary values for of three indices ($W_{0,5}$), (W_0) and (W_5) for all women of childbearing ages has been presented in Table 4.6. Although the indices trends show no

systematic trends, the findings indicate that the quality of age data was good. In all the DHS years, the Whipple's ($W_{0,5}$) index values were less than the value of 105, indicating that the data was good. Also, some improvement was noticed in preference for ages ending in digit 0, as the Whipple's index value dropped from 82.4 to 76.4 between 2013 and 2018. Although all Whipple's indices (W_5) for all the surveys were in the range 110.0–124.9, implying that age data was approximately accurate, the trends showed that the index slightly increased between 2007 and 2018 from the value of 119.5 to 122.4. index improved to 98, indicate age reporting was highly accurate (less than 105). The findings over show that there were no major problems with the quality of reporting of age data among women of reproductive age in the DHSs conducted in Zambia.

Table 3.8:Trends in Whipple's index depicting preference for ages ending in 0 and 5

DHS Year	W_0	W_5	$W_{0,5}$
1992	67.6	111.8	90.9
1996	73.2	121.2	85.6
2001	70.8	123.2	91.6
2007	71.5	119.5	94.8
2013	82.4	120.9	100.4
2018	76.4	122.4	101.2

3.10.4 The Myers' Blended Index

The Myers' blended index was used to assess the quality of age data as reported by women in the six DHSs conducted in Zambia. This index assesses single-year age data by measuring the extent preference of each ten terminal digits, 0 to 9. The results presented in Table 4.7 show the trends of the percent distribution of deviations of each percentage of the blended population from 10.0 for each of the terminal digits. The computed indexes show that the quality of age data was fairly good in all the DHSs conducted in Zambia. However, there were cases of incorrect age reporting among females in all the surveys. In 1992, 4.6% of the women reported incorrect ages. The proportion of women reporting incorrect ages have been reducing over time from 4.6% in 1992 to 3.4% in 2013. A minor

increase in the percentage of women reporting incorrect ages was noticed between 2013 and 2018. Overall, the most preferred terminal digits among women captured in the DHSs were 5, 8, 9 and 2. Difference were observed over time in terms of preference for certain terminal digits. For example, the recent DHS shows that ages ending in terminal digits 5, 6 and 8 were the most preferred. However, there were minor variations between the most preferred and least preferred terminal digits in all the survey years, thus suggesting that age heaping was not a major problem. The computation of the indexes was done on ages 20 to 49 years because the DHS data was only collected from women aged 15-49 years.

Table 3.9:Trends in Myers' blended index depicting preference for terminal digits

Year	1992	1996	2001	2007	2013	2018
Terminal digits	% distribution for digit preference	% distribution for digit preference	% distribution for digit preference	% distribution for digit preference	% distribution for digit preference	% distribution for digit preference
0	8.2	8.9	8.5	8.5	9.6	9.0
1	8.1	9.0	8.7	8.9	10.3	8.6
2	10.5	10.4	9.6	9.2	9.1	10.6
3	11.7	9.7	10.4	10.1	9.0	9.1
4	9.7	9.5	9.4	10.0	9.6	10.6
5	10.2	9.4	9.7	10.1	10.3	11.1
6	9.4	10.0	10.0	9.8	9.3	11.4
7	11.2	11.5	11.9	11.3	10.3	9.2
8	10.0	10.5	10.6	11.1	11.2	10.8
9	11.0	11.0	11.1	11.0	11.3	9.7
Sum	100	100	100	100	100	100
Index	**4.6**	**3.5**	**4.0**	**3.6**	**3.4**	**4.5**

3.11 Ethical Issues

The secondary data used in this study was obtained from the IPUMS DHS and DHS program official websites (https://www.idhsdata.org/idhs/) and (https://www.dhsprogram.com/). Procedure to access the 1992-2018 ZDHS data is detailed at the DHS program website (https://www.dhsprogram.com/). The DHS datasets can be downloaded freely from the DHS program or IPUMS DHS websites after

registration and authorisation. DHS program requires all users to provide contact information, research project title, and a data analysis description approach. Dataset access is only granted after meeting all the set requirements for research purposes. All the six Zambia Demographic and Health Survey methodology protocols and measurements for biomarkers were approved by the institutional review boards (IRBs) at ICF and the Tropical Diseases Research Centre (TDRC) in Zambia. In general, the DHS dataset used in this study contained data that is anonymous. The dataset contained no unique identifiers, such as names and addresses of survey participants. During data collection, consent forms and accent forms were provided to the participants in all selected households describing the purpose of the survey, the duration, the confidentiality of their answers, and their right to refuse participation in the survey. For qualitative data collection, ethical approval was sought from the ERES converge Ethics Review Board in Zambia and also from the Ethical Review Board at the University of the Witwatersrand. Informed consent was obtained from all participants included in the qualitative survey. The participant information and participant consent forms are placed in Chapter appendices section.

3.12 Dissemination plan for conferences and manuscripts

Table 3.10: List of manuscripts, conferences and target journals

No	Title of manuscript	Conference	Journal	Status
1	Unmet need for family planning among married women in sub-Sahara Africa: A Meta-analysis of DHS data (1995 – 2020)	Population Association of America: (Accepted)	BMC Contraception and Reproductive Medicine	Published
2	Unmet need for family planning among married women in Zambia: lessons from 2018 DHS data	The Union for African Population Conference	BMC Women's Health	Published
3	Patterns and Correlates of Contraceptive Use Intention among Women of Reproductive Age in Developing Countries	European Population Conference	-Global Health Action, Taylor & Francis	Published
4	Multilevel analysis of trends and predictors of teenage pregnancy in Zambia (2001-2018)	The Union for African Population conference 2024	Reproductive Health, Biomed Central	Published

5	COVID-19 and sexual reproductive health service utilization among women of reproductive age in Zambia	Population and Reproductive Health Dynamics under COVID-19 in Sub-Saharan Africa.	Development Southern Africa, Taylor & Francis	Published
6	Collective norms and modern contraceptive use in men and women: A multilevel analysis of DHS Program data in Nigeria and Zambia	International Conference on Family Planning 2022	Gates Open Research	Published
7	Correlates of modern contraceptive use among sexually active women in Zambia: do contextual factors matter?	The Union for African Population Conference	Sexual and Reproductive Health Matters-Taylor & Francis	Under review
8	A systematic review and meta-analysis of individual and contextual-level factors associated with contraceptive use in Africa (2010-2022)	The Union for African Population Conference	BMC Systematic Reviews	Under review
9	Decomposition analysis of contraceptive use transition among sexually active women in Zambia (1992-2018	The Union of African Population Conference	PLOS ONE	Under review
10	Decomposition analysis of determinants of modern contraceptive use transition in Zambia: is there rural-urban differential?	International family planning conference 2024	SAGE Open	Under review
11	Individual and neighbourhood factors associated with unmet need for contraception among sexually active adolescent girls and young women in Zambia	UAPS FP/SRHR conference (presented)	BMJ Open	Under review
12	A systematic review of contraceptive use transition in sub-Saharan Africa: a systematic review and meta-analysis	The Union for African Population conference 2024	BMJ Reproductive Health	Under review
13	Contraceptive use transition and Reproductive health outcmes in Zambia (1992-2018): a decomposition analysis approach	The Union for African Population conference 2024	PLOS ONE	Draft
14	Global patterns and correlates of timing of first use of contraception among young women.	2022 Annual Hybrid Conference-University of Nigeria	PLOS Global Health	Draft
15	Contraceptive use transition and fertility dynamics in Zambia	The Union for African Population conference 2024	Frontiers in Public Health	Draft

16	Reproductive health goals and contraceptive use transition in Zambia	IUSSP 2025	-BMJ Sexual & Reproductive Health	Draft
17	Spatial and multilevel mixed effect analysis of modern contraceptive utilisation by sexually active adolescent girls and young women in Zambia:	South African Population Conference	-Sexual and Reproductive Health Matters – Taylor & Francis	Draft
18	Choice of contraceptive method use among young women in SSA: What matters?	Population Association of Southern Africa	- Women's health- Taylor & Francis	Draft
19	Fertility experience and contraceptive use transition in Zambia	Population Association of America	-Global Public Health Gateway	Draft
20	Which married young women are using contraception in sub-Saharan Africa to prevent second pregnancy?	International Population Conference 2025	-Frontiers of Public Health	Draft

CHAPTER 4 : BACKGROUND CHARACTERISTICS OF THE RESPONDENTS

4.1 Introduction

The respondents' main characteristics from the primary datasets used in the study are presented in detail in this chapter. According to the review of the literature presented in Chapter 2, changes in the background characteristics of individuals are associated with contraceptive use transition. Therefore, this chapter presents the trends in the distribution of characteristics of sexually active women of reproductive age who were interviewed in all the six ZDHSs conducted between 1992 and 2018. Univariate analyses of the survey data findings are presented on the background profile of the study population. The background characteristics relate to demographic, socio-economic, health, geographic and community variables. The background characteristics of respondents for this study have been presented at two main levels; individual and household (micro) level (section 4.1.1) and community/contextual (macro) level (section 4.1.2). Furthermore, the characteristics of respondents have been presented in relation to programme access factors related to family planning information access (section 4.13) and factors related to fertility experience and reproductive health outcome (section 4.14). The chapters also present the results of data quality assessment of the age distribution for the study population (section 4.2). Last, section 4.3 concludes the chapter by providing a summary.

4.2 Individual level characteristics of study participants

The percent distribution of sample characteristics of all sexually active respondents captured in all the six DHSs are presented in Table 4.1. In the first three surveys 1992, 1996 and 2001, most of the women captured were in the age group of 15-24 years (41.6%, 41.4% and 38.7%, respectively). The 2007, 2013 and 2018 surveys had most women interviewed in the age group 25-34 years (38.8%, 37.0% and 34.3% respectively. In terms of education level, most of the sampled women had primary

level of education, ranging from 59.8% in 1992 to 45.2% in 2018. Those with tertiary education increased from 1.9% in 1992 to 5.9% in 2018. Most of the women were married, 67.7% in 1992, 65.8% in 1996, 66.9% in 2001, 68.7% in 2007, 67.3% in 2013 and 62.4% in 2018. Over one third of the respondents in all the survey years were from poor households, while those from rich households increased from 43.6% in 1992 to 45.6% in 2018. Majority of the respondents belonged to Protestant religious denomination in all the six surveys ranging from 69.3% in 1992 to 81.2% in 2018. In all the surveys except for 1992, women who were in employment were in majority compared to those not in employment. The proportion of those employed has been fluctuating with the highest being 2001, 57.8% and lowest was 49.7% in 1996.

Table 4.1 further reveals that most of the women started sexual debut in during the age group 15-19 year. The proportion of women who started sexual debut in the age group 15-19 year increased from 41.7% in 1992 to 71% in 2018. Similarly, most of the women in all the survey years were first married when they were still in the adolescence age group 15-19 years. This proportion has however, been reducing from 53.5% in 1992 to 45.1% in 2018. Nearly three quarters of the women had a high decision-making autonomy in 1996, the proportion of women with a high decision making autonomy increased to 76.1% in 2013 and then 78.3% in 2018.

Table 4.1:Percent distribution of selected individual background characteristics of sexually active women's (15-49 years)

Background Characteristics	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
	N=5,090	N=5,827	N=5,736	N=5,253	N=12,419	N=10,437
Age						
15 – 24	2113 (41.6)	2402 (41.4)	2217 (38.7)	1696 (32.0)	3896 (31.5)	3447 (33.0)
25 – 34	1714 (33.8)	1953 (33.7)	1952 (34.1)	2036 (38.9)	4566 (37.0)	3581 (34.3)
35 – 49	1250 (24.6)	1443 (24.9)	1564 (27.3)	1508 (28.8)	3895 (31.5)	3410 (32.7)
Education level						
None	872 (17.2)	792 (13.7)	746 (13.0)	605 (11.6)	1126 (9.1)	855 (8.2)
Primary	3035 (59.8)	3427 (59.1)	3356 (59.0)	2930 (56.0)	6072 (49.2)	4719 (45.2)
Secondary	1075 (21.2)	1402 (24.2)	1449 (25.3)	1414 (27.0)	4498 (36.4)	4248 (40.7)
Higher	94 (1.9)	176 (3.0)	181 (3.2)	290 (5.5)	650 (5.3)	617 (5.9)
Marital status						
Never married	869 (17.1)	1022 (17.6)	914 (15.9)	831 (15.9)	2215 (17.9)	2292 (22.0)
Married	3438 (67.7)	3813 (65.8)	3833 (66.9)	3598 (68.7)	8319 (67.3)	6511 (62.4)
Formerly married	770 (15.2)	962 (16.6)	986 (17.2)	810 (15.5)	1822 (14.7)	1635 (15.7)
Partners education level						
None	409 (9.9)	364 (7.8)	365 (7.7)	301 (7.1)	609 (6.2)	361 (5.8)
Primary	1963 (47.6)	2084 (44.5)	2127 (45.0)	1896 (44.1)	3719 (37.9)	2301 (36.7)
Secondary	1552 (37.6)	1879 (40.1)	1870 (39.6)	1662 (38.7)	4600 (46.8)	3017 (48.1)
Higher	199 (4.8)	357 (7.6)	362 (7.8)	435 (10.1)	891 (9.1)	595 (9.5)
Wealth status						
Poor	_	2242 (38.7)	2120 (37.0)	1920 (36.6)	4509 (36.5)	3753 (36.0)
moderate	_	1028 (17.7)	1151 (20.1)	956 (18.2)	2421 (19.6)	1922 (18.4)
Rich	_	2527 (43.6)	2462 (43.0)	2365 (45.1)	5426 (43.9)	4764 (45.6)
Religion						
Catholic	1393 (27.4)	1400 (24.1)	1307 (22.8)	1065 (20.3)	2184 (17.7)	1784 (17.1)
Protestant	3519 (69.3)	4296 (74.1)	4303 (75.1)	4082 (77.9)	9997 (80.9)	8475 (81.2)
Other	166 (3.3)	102 (1.8)	122 (2.1)	93 (1.8)	175 (1.4)	179 (1.7)
Employment status						
Unemployed	2398 (47.2)	2917 (50.3)	2417 (42.2)	2464 (47.1)	5550 (45.1)	5146 (49.3)
Employed	2678 (52.8)	2877 (49.7)	3312 (57.8)	2768 (52.9)	6754 (54.9)	52 93 (50.7)
Age at first sex						
Less than 15 years	917 (18.1)	1174 (20.2)	948 (16.5)	605 (11.5)	1189 (9.6)	1863 (17.8)
15 - 19 years	2118 (41.7)	2642 (45.6)	2844 (49.6)	2558 (48.8)	6182 (50.0)	7417 (71.1)
20+ years	2042 (40.2)	1983 (34.2)	1940 (33.8)	2077 (39.6)	4985 (40.3)	1159 (11.1)
Age at first marriage						
Less than 15 years	720 (14.2)	713 (12.3)	641 (11.2)	549 (10.5)	1011 (8.2)	820 (7.9)
15 - 19 years	2714 (53.5)	3034 (52.3)	3151 (55.0)	2751 (52.5)	6352 (51.4)	4712 (45.1)
20+ years	1644 (32.4)	2051 (35.4)	1940 (33.8)	1940 (37.0)	4993 (40.4)	4907 (47.0)
Decision making autonomy						
Low	_	647 (25.7)	3708 (64.7)	1731 (33.0)	2948 (23.9)	2264 (21.7)
High	_	1870 (74.3)	2024 (35.3)	3509 (67.0)	9408 (76.1)	8175 (78.3)

Note: (-) means data for the variable was not collected in the respective DHS year. Table is based on weighted counts

4.3 Community-level characteristics of study participants

Table 4.2 presents the distribution of women by community level characteristics in all the six survey points. The 1992 survey captured 51.1% of women who were residing in urban areas while 48.9% were residing in rural areas. In terms of province, most women sampled were from the Copperbelt, Lusaka, and Southern provinces. For example, in the 2018 survey, 20.2% of the sampled women were

from Lusaka province, 15.6% from Copperbelt, 12.0% from Eastern and 11.7% from Southern province. The distribution of community education shows that most women came from communities with low education level in all the six surveys, although the proportion of communities with low education is declining from 55.1% in 1992 to 43.0% in 2018. Similar trends were also observed in terms of community wealth. Most participants in all the surveys were coming from low wealth communities. The proportion of low wealth communities declined from 51.4% in 1996 to 43.0% in 2018. Table 4.2 further shows that most women came from communities which had a high proportion of women with low decision-making autonomy. Trends show that the proportion of communities with low decision making autonomy declined from 52.3% in 1992 to 49.5% in 2018.

In terms of community access to community health workers, the proportion of communities with women who have high access increased from 19.9% in 1992 to 27.0% in 2018. Those with low access declined from 52.3% to 49.5% between 1992 and 2018. The proportion of women from communities that desired a large family size also declined over the years from 27.2% in 1992 to 20.2% in 2018. Communities with high exposure to FP messages also showed an increase from 18.1% in 1992 to 28.7% in 2018. Furthermore, communities with a high proportion of young age at first marriage and young age at first birth showed declining trends between 1992 and 2018. Communities with a high proportion of young age at first marriage declined from 26.0% in 1992 to 22.8% in 2018.

Table 4.2:Percent distribution of selected community characteristics of sexually active women (15-49 years), DHS 1992 - 2018, Zambia

Community Characteristics	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
	N=5,077	N=5,798	N=5,732	N=5,240	N=12,356	N=10,438
Residence						
Urban	2593 (51.1)	2593 (44.0)	2293 (40.0)	2133 (40.7)	5515 (44.6)	4814 (46.1)
Rural	2484 (48.9)	3245 (56.0)	3440 (60.0)	3107 (59.3)	6841 (55.4)	5625 (53.9)
Province						
Central	455 (9.0)	474 (8.2)	410 (7.2)	493 (9.4)	1121 (9.1)	877 (8.4)
Copperbelt	1214 (23.9)	1090 (18.8)	1098 (19.2)	880 (16.8)	1965 (15.9)	1623 (15.6)
Eastern	558 (11.0)	811 (14.0)	708 (12.4)	739 (14.1)	1492 (12.1)	1248 (12.0)
Luapula	294 (5.8)	501 (8.6)	435 (7.6)	374 (7.1)	868 (7.0)	798 (7.6)
Lusaka	902 (17.8)	1019 (17.6)	883 (15.4)	849 (16.2)	2394 (19.4)	2113 (20.2)
Muchinga	_	_	_	_	630 (5.1)	562 (5.4)
Northern	425 (8.4)	609 (10.5)	738 (12.9)	701 (13.4)	908 (7.4)	782 (7.5)
North-western	133 (2.6)	210 (3.6)	269 (4.7)	266 (5.1)	559 (4.5)	544 (5.2)
Southern	769 (15.1)	610 (10.5)	640 (11.2)	549 (10.5)	1574 (12.7)	1225 (11.7)
Western	328 (6.5)	475 (8.2)	551 (9.6)	390 (7.4)	843 (6.8)	662 (6.3)
Community education						
Low	2798 (55.1)	3424 (59.1)	2974 (51.9)	2702 (51.6)	5704 (46.2)	4489 (43.0)
Medium	1651 (32.5)	1420 (24.5)	1719 (30.0)	1455 (27.8)	2494 (20.2)	2444 (23.4)
High	627 (12.4)	954 (16.5)	1039 (18.1)	1083 (20.7)	4158 (33.7)	3505 (33.6)
Community wealth						
Low	_	3137 (54.1)	2761 (48.2)	2572 (49.1)	5884 (47.6)	4485 (43.0)
Medium	_	1391 (24.0)	1642 (28.6)	1379 (26.3)	2606 (21.1)	2729 (26.1)
High	_	1270 (21.9)	1330 (23.2)	1289 (24.6)	3865 (31.3)	3224 (30.9)
Community employment						
Low	2623 (51.7)	3248 (56.0)	2940 (51.3)	2840 (54.2)	6209 (50.3)	5149 (49.3)
Medium	1472 (29.0)	1473 (25.4)	1599 (27.9)	1358 (25.9)	2693 (21.8)	2586 (24.8)
High	982 (19.3)	1078 (18.6)	1193 (20.8)	1042 (19.9)	3454 (28.0)	2703 (25.9)
Community woman decision making autonomy						
Low	3015 (59.4)	3566 (61.5)	3512 (61.3)	2937 (56.1)	4819 (39.0)	4288 (41.1)
Medium	1503 (29.6)	1601 (27.6)	1604 (28.0)	1584 (30.2)	2486 (20.1)	2402 (23.0)
High	559 (11.0)	631 (10.9)	616 (10.8)	719 (13.7)	5051 (40.9)	3748 (35.9)
Community access to CHW visits						
Low	2656 (52.3)	3161 (54.5)	3190 (55.7)	2824 (53.9)	5820 (47.1)	5162 (49.5)
Medium	1409 (27.8)	1515 (26.8)	1489 (26.0)	1358 (25.9)	2802 (22.7)	2460 (23.6)
High	1013 (19.9)	1086 (18.7)	1053 (18.4)	1058 (20.2)	3734 (30.2)	2817 (27.0)
Community desire for large family size						
Low	2119 (41.7)	2595 (44.8)	2946 (51.4)	2758 (52.6)	6891 (55.8)	5878 (56.3)
Medium	1577 (31.1)	1502 (25.9)	1489 (26.0)	1274 (24.3)	2722 (22.0)	2454 (23.5)
High	1381 (27.2)	1701 (29.3)	1297 (22.6)	1208 (23.1)	2743 (22.2)	2106 (20.2)
Community exposure to FP messages						
Low	2604 (51.3)	2758 (47.6)	2552 (44.5)	2344 (44.7)	6396 (51.8)	4989 (47.8)
Medium	1555 (30.6)	1662 (28.7)	1505 (26.3)	1280 (24.4)	2318 (18.8)	2451 (23.5)
High	919 (18.1)	1377 (23.8)	1676 (29.2)	1616 (30.9)	3642 (29.5)	2998 (28.7)
Community young age at first marriage						
Low	2240 (44.1)	2607 (45.0)	2910 (50.8)	2533 (48.3)	6646 (53.8)	5973 (57.2)
Medium	1518 (29.9)	1683 (29.0)	1523 (26.6)	1440 (27.5)	2567 (20.8)	2087 (20.0)
High	1319 (26.0)	1508 (26.0)	1300 (22.7)	1267 (24.2)	3144 (25.4)	2379 (22.8)

Note: (-) means data for the variable was not collected in the respective DHS year. Table is based on weighted counts

4.4 Family Planning Programme Access Characteristics

Table 4.3 describes the trends in family planning programme characteristics of sexually active women included in the surveys. The proportion of women who visited the health facility in the last 12 months

prior to the survey showed an increase between from 67.2% in 1996 to 69.8% in 2001. Then declined to 50.2% in 2007 and rose to 60.6% in 2013 and then to 65.9% in 2018. Those who received FP information from a health provider showed a slight increase from 43.5% in 1996 to 46.1% in 2018. The proportion of women who were visited by a community health workers increased from 4.8% in 1996 to 14.1% in 2018. Exposure to radio and television among women increased during the period under study. The proportion of women with exposure to radio increased from 58.6% to 60.2% between 1992 and 2018, while the proportion of exposure to television increased from 20.1% in 1992 to 34.8% in 2007 and then increased to 42.4% in 2018. Exposure to reading newspaper showed a decline from 40.8% in 1992 to 20.7% in 2018 while that of exposure to mass-media family planning messages increased from 6.8% in 1992 to 14.9% in 2018.

Table 4.3:Percent distribution of family planning programme access characteristics of sexually active women's (15-49 years), DHS 1992 - 2018, Zambia

Background Characteristics	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
	(N=5,090)	(N=5,827)	(N=5,736)	(N=5,253)	(N=12,419)	(N=10,437)
Visited health facility in last 12 months						
No	_	1902 (32.8)	1729 (30.2)	2607 (49.8)	4869 (39.4)	3562 (34.1)
Yes	_	3896 (67.2)	4003 (69.8)	2631 (50.2)	7476 (60.6)	6876 (65.9)
Received FP information from a health provider						
No	_	2199 (56.5)	2607 (65.1)	1279 (48.7)	3953 (52.9)	3708 (53..9)
Yes	_	1692 (43.5)	1395 (34.9)	1347 (51.3)	3520 (47.1)	3168 (46.1)
Visited by CHW						
No	_	5513 (95.2)	5144 (89.8)	4872 (93.0)	1 (89.0)	8967 (85.9)
Yes	_	280 (4.8)	584 (10.2)	365 (7.0)	1351 (11.0)	1472 (14.1)
Exposure to listening to radio						
No	2193 (41.4)	2555 (41.6)	2441 (40.0)	1584 (26.6)	4746 (30.4)	5392 (39.8)
Yes	2877 (58.6)	3236 (58.5)	3288 (60.0)	3654 (73.4)	7600 (69.6)	5046 (60.2)
Exposure to watching television						
No	4047 (79.9)	4211 (72.7)	4042 (70.6)	3407 (65.1)	6986 (56.6)	6013 (57.6)
Yes	1021 (20.1)	1584 (27.3)	1685 (29.4)	1831 (34.9)	5356 (43.4)	4425 (42.4)
Exposure to reading newspaper						
No	2995 (59.2)	4405 (76.0)	4444 (77.7)	3520 (67.2)	8173 (66.3)	8276 (79.3)
Yes	2064 (40.8)	1389 (24.0)	1276 (22.4)	1715 (32.8)	4151 (33.7)	2163 (20.7)
Exposure to media FP messages						
No	4734 (93.2)	4289 (74.0)	4175 (72.8)	4002 (76.4)	9589 (77.6)	8882 (85.1)
Yes	343 (6.8)	1509 (26.0)	1557 (27.2)	1238 (24.6)	2767 (22.4)	1557 (14.9)

Note: (-) means data for the variable was not collected in the respective DHS year. Table is based on weighted counts

4.5 Fertility Experience and Reproductive Health Characteristics

Table 4.4 describes the trends in fertility experience and reproductive health characteristics of sexually active women included in the 1992 to 2018 Zambia Demographic and Health Surveys. The proportion of women who had six or more living children declined from 18.3% in 1992 to 15.2% in 2018 while the proportion of women who had 2-3 living children increased from 25.4% in 1992 to 30.6% in 2018. Similarly, the proportion of women who had ever given birth to 6 or more children declined between 1992 and 2018 from 25.2% to 19.1%. The proportion of women who reported age at first birth of 20 years or older increased from 23.5% in 1992 to 32.2% in 2018. Those who indicated that their partners wanted the same number of children as them increased from 32.3% in 1992 to 41.8% in 2018. Furthermore, the proportion of women whose ideal number of children was 6 or more showed a decline from 54.3% in 1992 to 35.1% in 2007 and further declined to 30.8% in 2018. Results in table 4.4 also show that women whose desired number of children was 2-3 showed an increase from 9.3% to 20.6% between 1992 and 2018.

Table 4.4:Percent distribution of selected fertility experience and reproductive health goals characteristics of sexually active women's (15-49 years), DHS 1992 - 2018, Zambia

Background Characteristics	DHS 1992	DHS 1996	DHS 2001/2	DHS 2007	DHS 2013-14	DHS 2018
	N=5,090	N=5,827	N=5,736	(N=5,253)	(N=12,419)	(N=10,437)
Living Children						
0-1	2020 (39.3)	2252 (38.8)	2104 (36.7)	1664 (31.8)	3761 (30.4)	3505 (33.6)
2-3	1288 (25.4)	1637 (28.2)	1709 (29.8)	1658 (31.7)	3777 (30.6)	3192 (30.6)
4-5	842 (17.0)	1023 (17.7)	1003 (17.5)	1087 (20.8)	2715 (22.0)	2155 (20.6)
6+	927 (18.3)	886 (15.3)	917 (16.0)	830 (15.9)	2103 (17.0)	1587 (15.2)
Children ever born						
0-1	1746 (34.4)	1948 (33.6)	1824 (31.8)	1474 (28.1)	3468 (28.0)	3295 (31.6)
2-3	1229 (24.2)	1489 (25.7)	1557 (27.2)	1462 (27.9)	3549 (28.7)	3060 (29.3)
4-5	821 (16.2)	1011 (17.4)	1034 (18.0)	1129 (21.6)	2565 (20.8)	2088 (20.0)
6+	1281 (25.2)	1350 (23.3)	1318 (23.0)	1174 (22.4)	2775 (22.5)	1996 (19.1)
Age at first birth						
Less than 15 years	321 (7.6)	315 (6.4)	268 (5.4)	243 (5.2)	438 (4.0)	409 (4.4)
15 - 19 years	2925 (68.9)	3291 (67.4)	3366 (68.2)	2943 (63.7)	7199 (65.8)	5759 (63.5)
20+ years	887 (23.5)	1280 (26.2)	1301 (26.4)	1436 (31.1)	3308 (30.2)	2977 (32.2)
Family Size Concordance						
Both want same	1108 (32.3)	1375 (36.1)	1593 (41.6)	1337 (37.2)	3376 (40.7)	2655 (40.8)
Husband want more	754 (22.0)	1035 (27.2)	804 (21.0)	785 (21.9)	2007 (24.2)	1566 (24.1)
Husband want less	374 (11.0)	337 (8.8)	327 (8.5)	226 (6.3)	517 (6.2)	573 (8.8)
Don't know	1190 (34.7)	1062 (27.9)	1107 (28.9)	1241 (34.5)	2392 (28.9)	1718 (26.4)
Ideal Number of children						

0-3	507 (10.0)	819 (14.1)	1294 (22.6)	1154 (22.2)	2601 (21.0)	2364 (22.6)
4-5	1814 (35.7)	2334 (40.3)	2409 (42.0)	2247 (42.9)	5556 (45.0)	4862 (46.6)
6+	2757 (54.3)	2645 (45.6)	2029 (35.4)	1838 (35.1)	4199 (34.0)	3213 (30.8)

Note: Table is based on weighted counts

Table 4.5 describes the trends in selected maternal health characteristics of sexually active women included in the 1992 to 2018 Zambia Demographic and Health Surveys. The proportion of women who experienced pregnancy loss showed a decline trend from 18.8% to 10.0% between 1992 and 2018. Experience of unplanned birth showed an increasing trend to 48.1% in 2007 and then declined to 41.5% in 2018. The proportion of women who experienced child mortality reduced from 19.3% in 1992 to 16.4% in 2001 and further declined to 13.4% in 2018. Furthermore, trends show that experience of early childbearing has declined in among women of childbearing age in Zambia from 76.5% in 1992 to 73.6% in 2001. The prevalence further declined from 73.6 in 2001 to 67.4% in 2018.

Table 4.5:Percent distribution of selected maternal health characteristics of sexually active women's (15-49 years), DHS 1992 - 2018, Zambia

Population dynamic and maternal health characteristics	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
	(N=5,090)	(N=5,827)	(N=5,736)	(N=5,253)	(N=12,419)	(N=10,437)
Experienced pregnancy loss						
No	-	-	4652 (81.2)	4471 (85.3)	10970 (88.9)	9394 (90.0)
Yes	-	-	1078 (18.8)	769 (14.7)	1385 (11.2)	1044 (10.0)
Experienced unplanned birth						
No	2035 (62.2)	2267 (58.9)	2018 (53.6)	1838 (51.9)	4848 (58.3)	3825 (58.5)
Yes	1237 (37.8)	1582 (41.1)	1749 (46.4)	1703 (48.1)	3471 (41.7)	2709 (41.5)
Experienced early childbearing						
No	997 (23.5)	1280 (26.2)	1301 (26.4)	1436 (31.1)	3308 (31.2)	2977 (32.4)
Yes	3246 (76.5)	3606 (73.8)	3635 (73.6)	3186 (68.9)	7638 (69.8)	6160 (67.4)
Desire more children						
Want another	2453 (71.5)	3976 (68.6)	3616 (63.3)	3013 (57.6)	7514 (61.0)	6192 (59.3)
Want no more	829 (24.2)	1622 (28.0)	1960 (34.3)	1841 (35.2)	4173 (33.9)	3655 (35.0)
Undecided	148 (4.3)	197 (3.4)	137 (2.4)	377 (7.2)	628 (5.1)	592 (5.7)
Experienced child mortality						
No	4096 (80.7)	4701 (81.1)	4791 (83.6)	4516 (86.2)	10811 (87.5)	9036 (86.6)
Yes	980 (19.3)	1097 (18.9)	941 (16.4)	724 (13.8)	1545 (12.5)	1402 (13.4)

Note: (-) means data for the variable was not collected in the respective DHS year. Table is based on weighted counts

4.5.1 Total Fertility Rate

In figure 4.1, the trend in total fertility rate (TFR) among women in Zambia at the national and rural-urban residence has been presented for the period 1992 to 2018. The trend show that TFR has been resilient in Zambia for a long period in Zambia, especially in rural areas. The TFR in Zambia has shown a declining trend by almost two children between 1992 and 2018 (from 6.5 children to 4.7 children per woman). TFR declines in Zambia have been higher during the period 2007 to 2018, from 6.2 children per woman to 4.7 children per woman. The period 1992 to 2001 showed that the fertility rate was statistic in Zambia, ranging from 6.5 children per woman to 6.2 children per woman. In rural areas, TFR trend show a decline from an average of 7 children per woman to 6 children per woman.

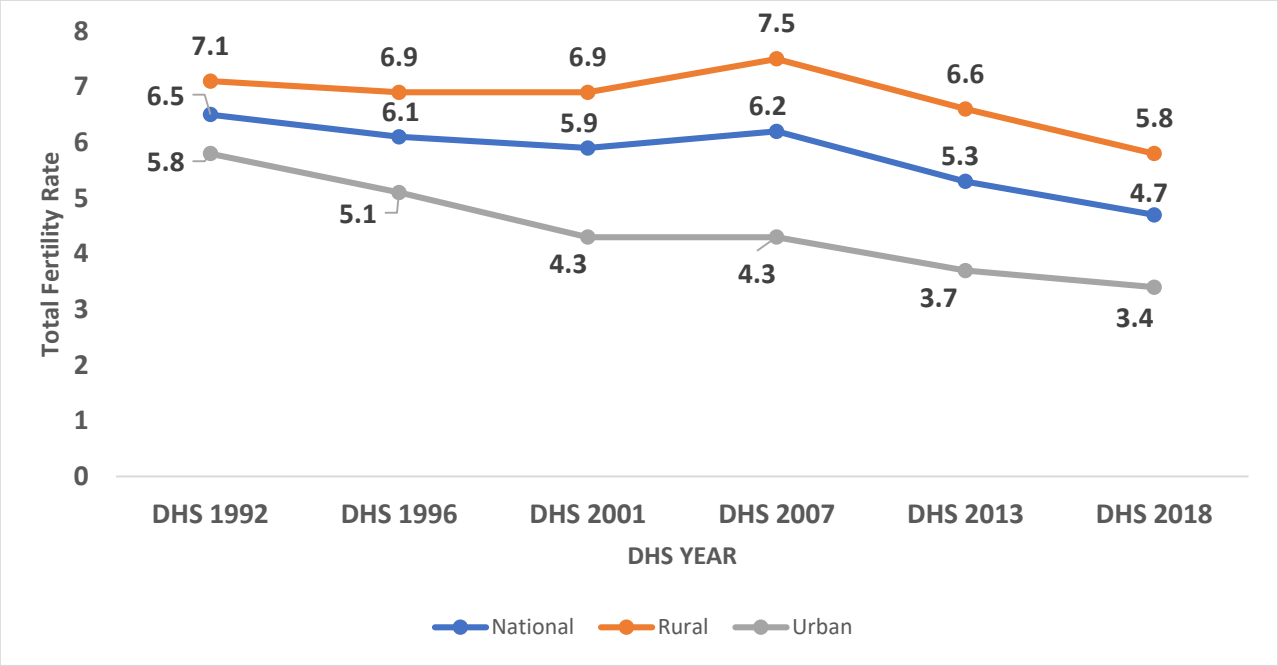


Figure 4.1:Trend in Total fertility rate in Zambia, 1992 – 2018; source: DHS report 2018

4.5.2 Average number of children ever born

In figure 4.2, the trend in the average number of children ever among sexually active women in Zambia have been presented for the period 1992 to 2018. Statistics show that average parity has

declined over time from an average of 3.5 children in 1992 to an average of 3.2 children in 2018. The trend shows that there was average parity showed a decline by a margin 0.1 between 1992 and 1996 (3.5 children to 3.4 children). Average parity then increased between from 3.4 in 1996 to 3.5 in 2001. Between 2007 and 2018, the average parity declined from 3.5 children to 3.2 children.

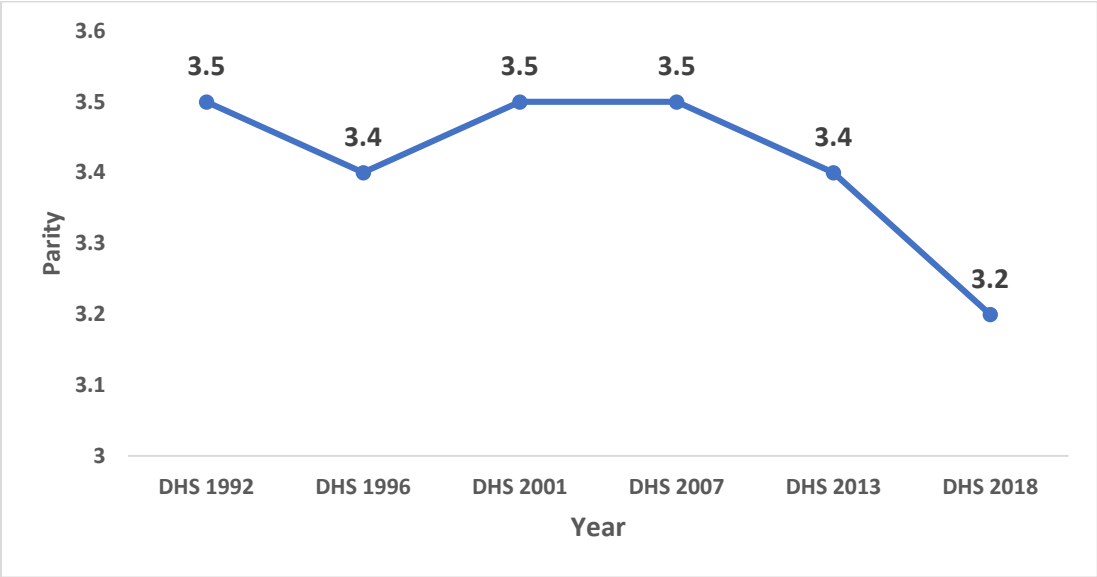


Figure 4.2:Trend in average number of children ever born among women in Zambia, 1992 - 2018

4.5.3 Birth interval

Figure 4.3 presents the trends in birth interval among women of childbearing age in Zambia during the period 1992 to 2018. The trend results show that the proportion of women having birth intervals considered as short interval is declining in Zambia from 49% in 1992 to 32.5% in 2018. On the other hand, the proportion of women having short birth intervals considered as long interval has increased from 51.0% in 1992 to 67.5% in 2018. The decline in the trend of short birth interval was more pronounced between the period 2007 (42.8%) and 2018 (32,5%). The same was the case for long birth interval, it increased by a bigger margin during the period 2007 and 2018 (from 57.2% to 67.5%).

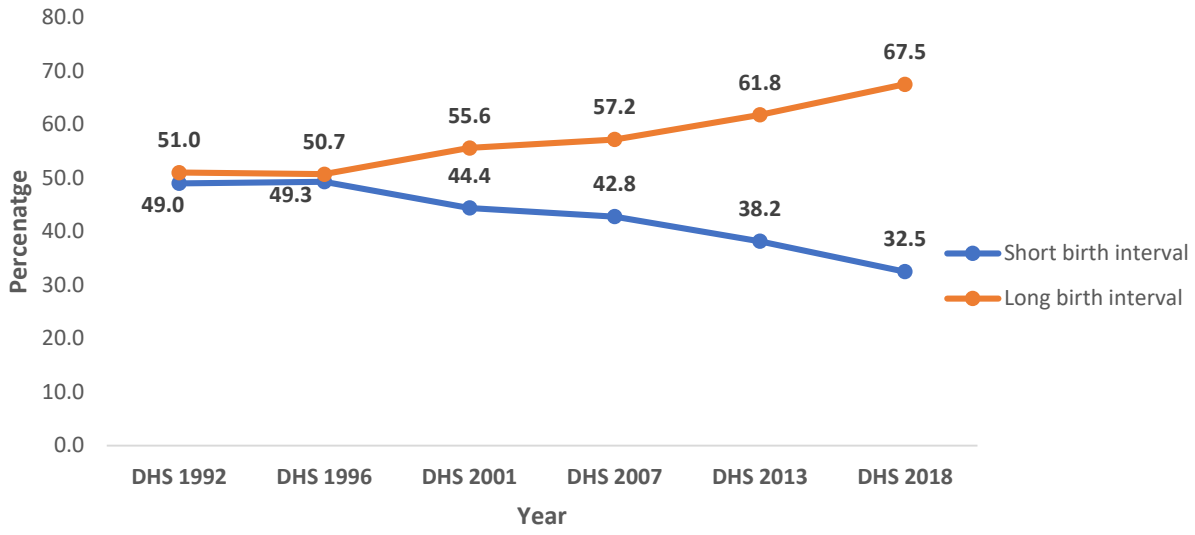


Figure 4.3: Trend in birth interval of sexually active women in Zambia, 1992 - 2018

4.6 Contraceptive use transition in Zambia

Results in figure 4.4 show that overall, during the 26-year period, the country has recorded a steady and progressive increase in the contraceptive prevalence rate (CPR). Trend in the utilisation of contraceptive methods among sexually active reproductive-aged women showed an increase from 14.2% in 1992 to 45.0% in 2018. At the national level, the major increase happened between 1992 and 2001 (14.2% to 30.9%). In urban areas, the prevalence in use increased from 17.5% in 1992 to 37.1% in 2001 and them from 40.6% in 2007 to 45.6% in 2018. (Figure 4.4).

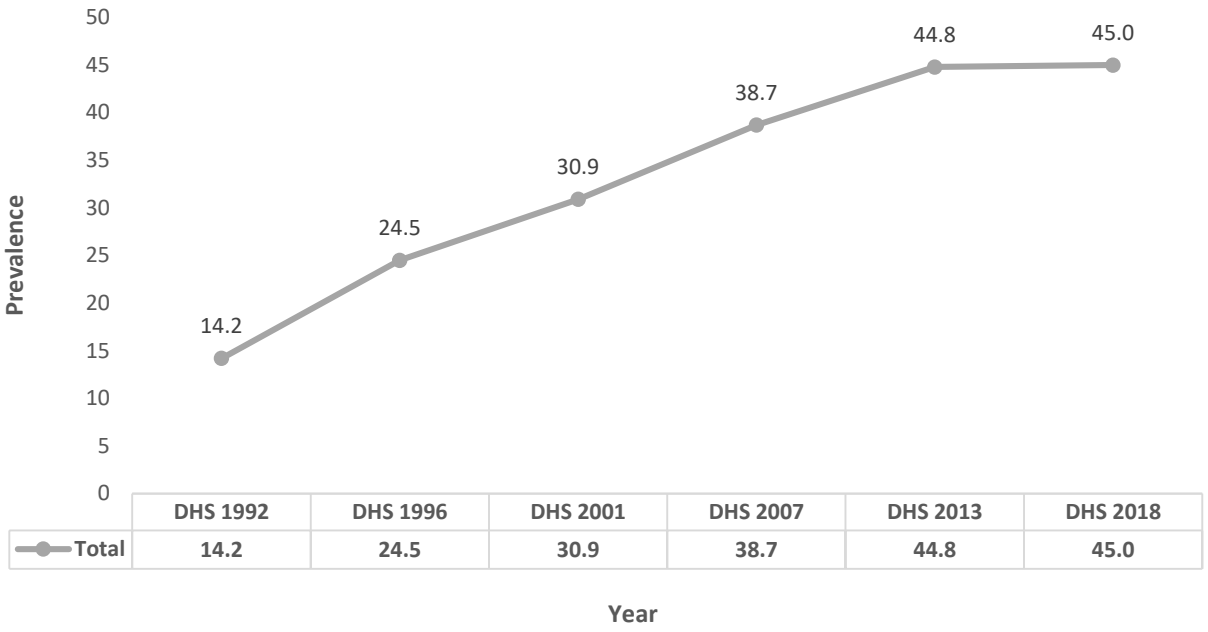


Figure 4.4:Trend in contraceptive use prevalence among sexually active women 15-49 years by residence, Zambia DHS 1992-2018

Figure 4.5 shows the trend in utilisation of contraceptive methods among sexually active women by age group in Zambia. Age is considered being one of the important determinants of contraceptive use among women in sub-Saharan Africa. Trend results show that contraceptive use in Zambia has been consistently higher in women aged 25-29 years during the period 1992 to 2018. Contraceptive utilisation increased from 18.8% in 1992 to 54.0% in 2018. The prevalence of contraceptive use in adolescents and young women age group 15-24 increased from 13.5% to 24.2% in 2001 and then increased from 32.4% in 2007 to 41.8% in 2018. Contraceptive use prevalence was lowest in all the surveys among adolescents aged 15-19 years. Use of contraceptives in sexually active adolescents increased from 6.9% in 1992 to 20.7% in 2001 and then increased from 24.4% in 2007 to 28.6% in 2018. For the older women aged 35-49 years, utilisation of contraceptive methods increased from 20.9% in 1992 to 38.8% in 2018.

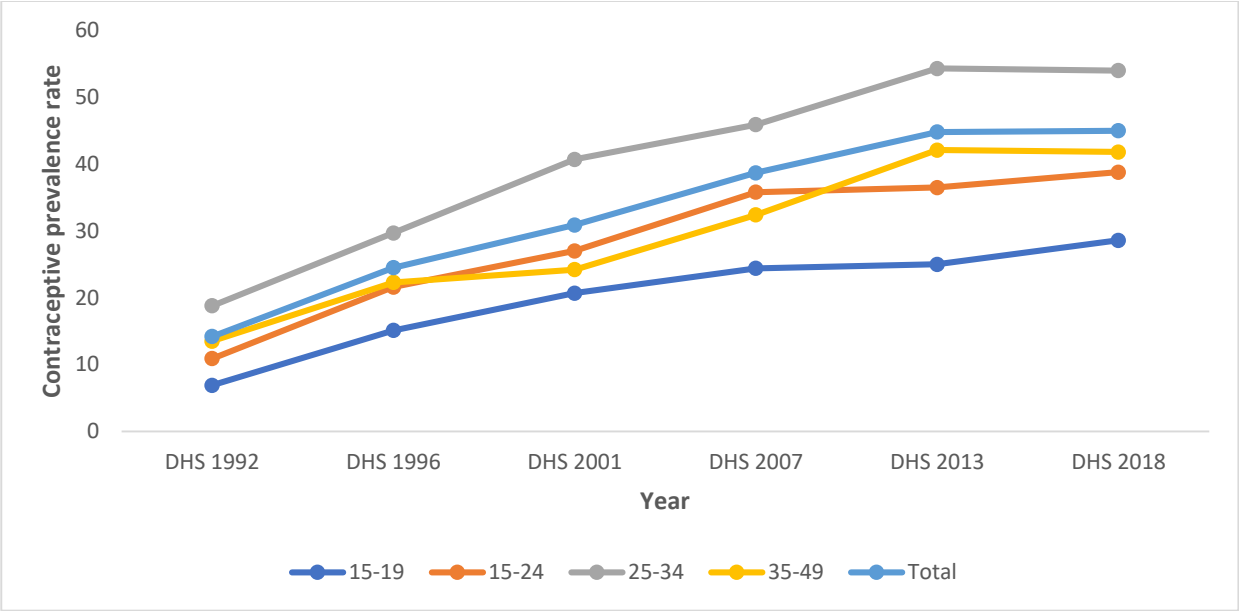


Figure 4.5:Trends in contraceptive use prevalence among sexually active women by age, Zambia DHS 1992-2018

Contraceptive use transition analysis by education level show that women with higher-level education in Zambia have consistently been having high levels of use in all the DHS years except for 2018 DHS. In the 2018 DHS, sexually active women with secondary level of education had a slightly higher utilisation rate than those with tertiary education. The prevalence among women with tertiary education was highest in 1996 (55%) and then slightly reduced 43.3% in 2007 and slightly increased to 46.6% in 2018. Utilisation of contraceptive methods among women with secondary level of education increased considerably from 22.2% in 1992 to 38.5% in 2001. The prevalence further increased from 39.9% in 2007 to 54.9% in 2018. Although the prevalence of contraceptive use among women with no formal education has been lowest when compared to other education categories, it increased considerably, from 7.8% in 1992 to 21.4% in 2001. Between 2007 and 2018, the use of contraceptive methods in women with no education increased from 33.7% to 35.9%. On the other hand, those with a primary level of education showed an increase from 22.4% in 1992 to 46.1% in 2018 (Figure 4.6).

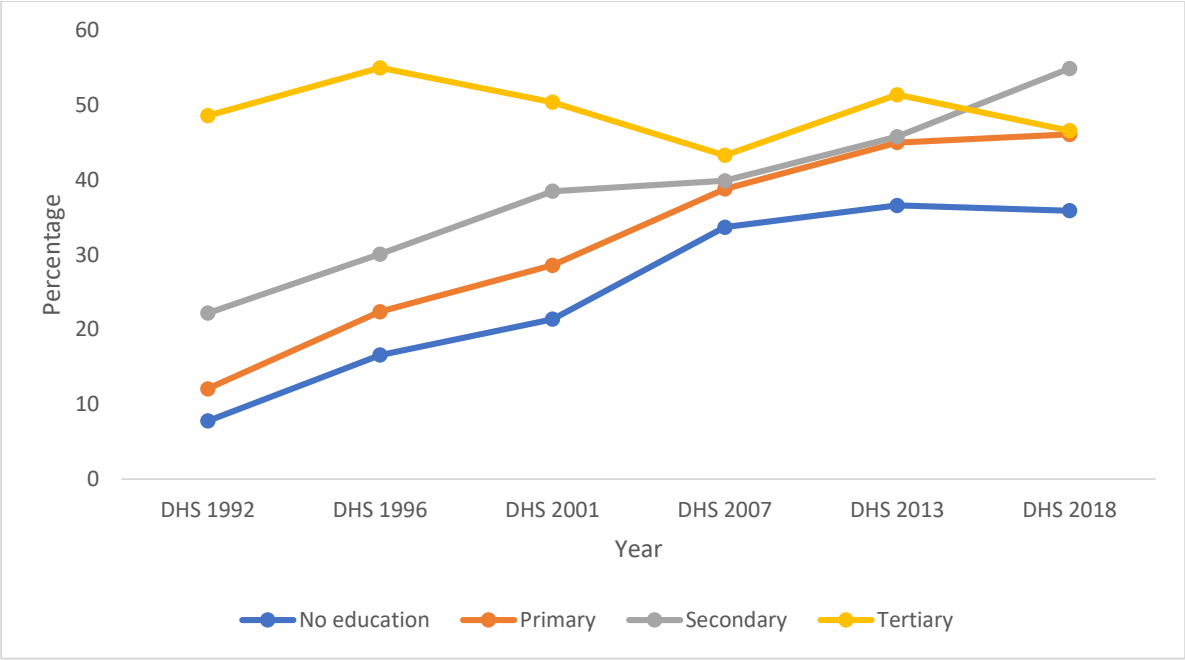


Figure 4.6:Trends in contraceptive use prevalence among sexually active women by education level, Zambia DHS 1992-2018

Results in figure 4.7 show the trend in use of modern and traditional methods among sexually active women in Zambia. Overall, the trend in utilisation of modern contraceptive methods among sexually active women in Zambia has shown a significant increase. Between 1992 and 2018, the utilisation of modern contraceptive methods rose from 7.8% to 43.3%. The larger share of the increase in utilisation of modern contraceptive methods occurred during the phase 1992 to 2007 (7.8% to 23.1%). On the other hand, utilisation of traditional methods among women in Zambia has been on the reducing trajectory. In 1992, 6.4% of the women were using traditional contraceptive methods. The proportion increased to 11.0% in 1996, then later dropped 7.7% in 2001 before finally declining to 1.7% in 2018.

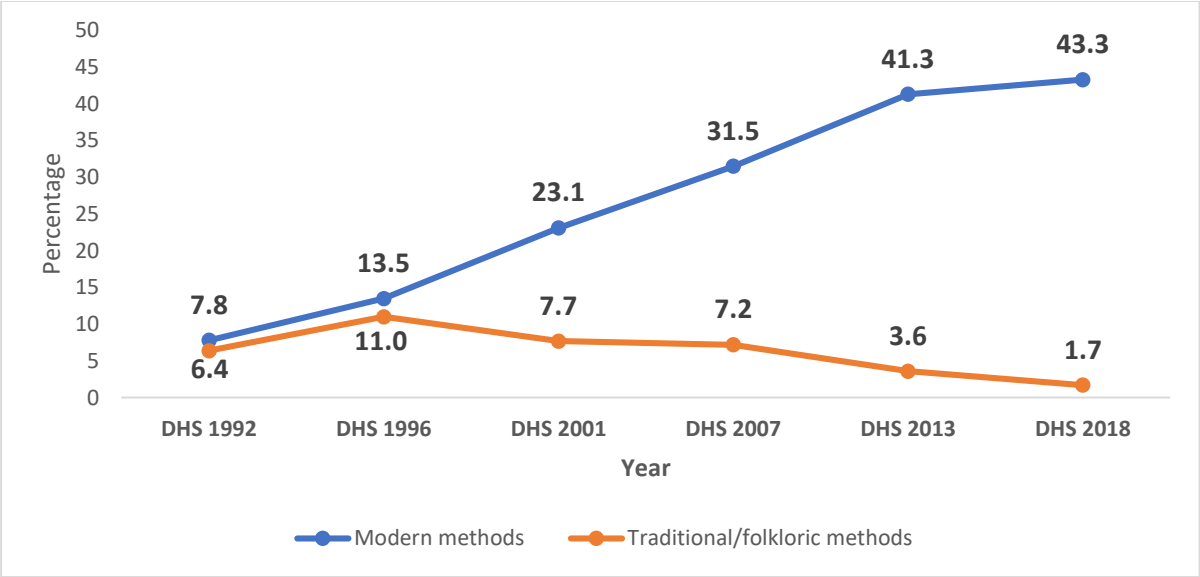


Figure 4.7:Trends in contraceptive method use among sexually active women by education level, Zambia DHS 1992-2018

Results in figure 4.8 show the trend in utilisation of short-acting methods and that of injections or long-acting methods among women in Zambia. Overall, the trend in use of short-acting contraceptive methods in Zambia has been on the declining trajectory over the past 26 years, while that of injections or long-acting methods has been on the increasing trajectory in the same period. In 1992, 94.4% of women were using short-acting contraceptive method compared to 7.6% who were using injections or long-acting methods. During the period for this current analysis, the proportion of women who were using short-acting methods reduced from 92.4% in 1992 to 85.1% in 2001 and further reduced to 28.7% in 2018. On the other hand, the proportion of women who were utilising injections or long-acting methods increased from 7.6% to 14.9% between 1992 and 2001. The trend further increased from 22.9% in 2007 to 71.3% in 2018 (Figure 4.8).

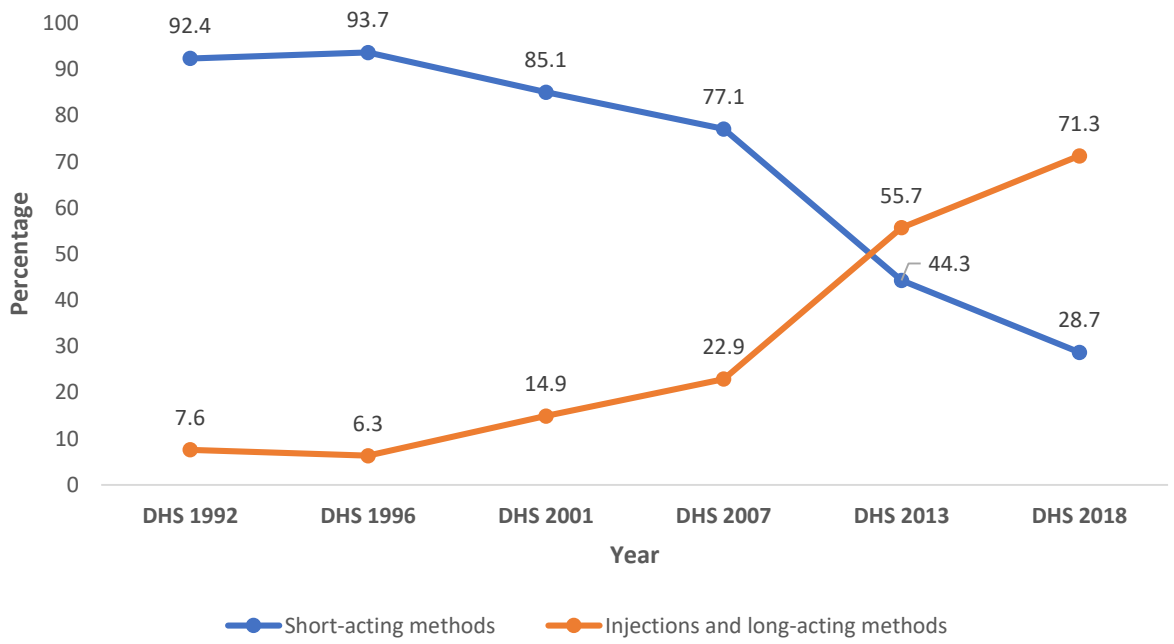


Figure 4.8:Trends in type of contraceptive method use among sexually active women in Zambia DHS 1992-2018

Results in figure 4.9 show the trends in utilisation of modern types of contraceptives among women in Zambia during the period 1992 to 2018. Overall, the trend show that use of Pills and Male condoms were the most contraceptive methods during the period 1992 to 2001. On the other hand, injections were the most used contraceptive methods beyond 2007. By 2018, the use of implants was more that of Pills or Male condoms. Intra-Uterine Device (IUD) has over the years shown the lowest percentage of use in Zambia. During the period 1992 and 2018, the use of the Pills dropped from 43.1% to 14.3%. Similarly, Male condoms utilisation dropped from 17.4% to 8.5% during the periods 1992 to 2018. Utilisation of injections increased from 1.1% in 1992 to 52.5% in 2018. Implants increased from 0% to 17.7% in the period 1992 to 2018. (Figure 4.9).

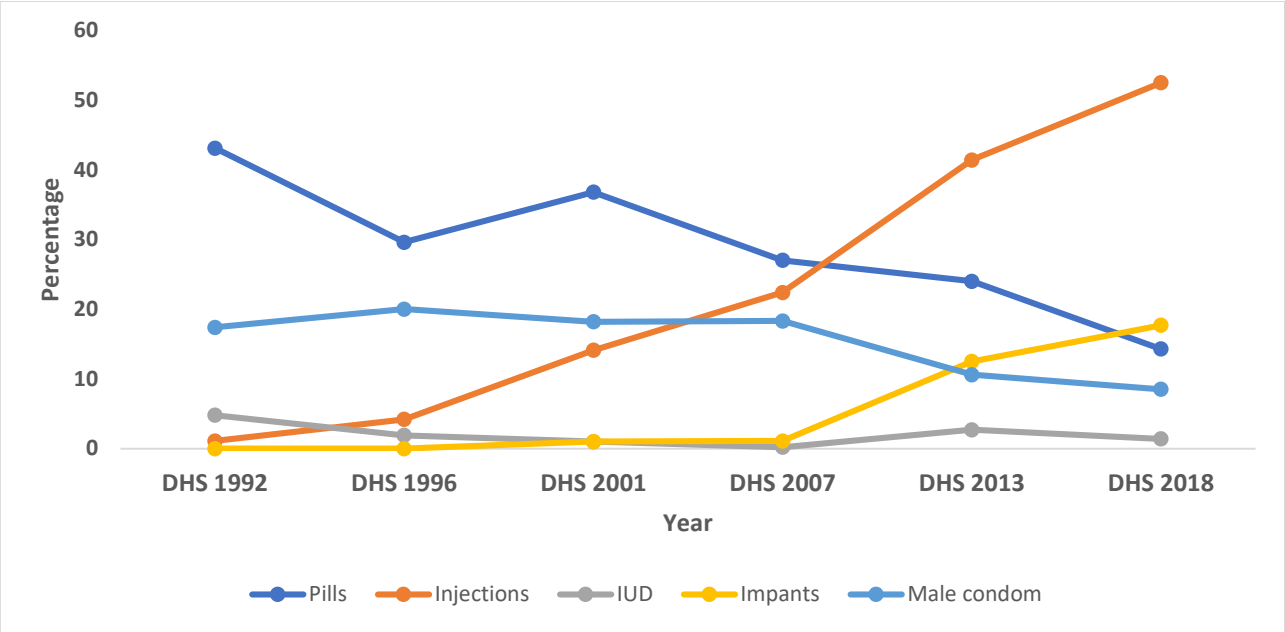


Figure 4.9:: Trends in type of modern contraceptive method use among sexually active women in Zambia DHS 1992-2018

4.7 Summary of the chapter

The distribution of the background characteristics of the survey population has been presented in this chapter. In terms of age the distribution shows that most surveyed women were in the age group 15 to 25 years in the first three DHSs 1992 to 2001 while for the last three DHS, most surveyed participants and in the age range 25-34 year. In all the survey years, a high proportion of the surveyed women had a primary level of education. Over half the women in all the six DHSs were employed. Furthermore, women who resided in rural areas were in the majority in the DHSs of 1992 to 2007, while those of 2013 and 2018 showed that women from rural areas comprised most of the sample. In terms of community education, most of the women came from a community that had a low level of education in all the survey years. Exposure to family planning programme access reveals that the proportion of women who had exposure to FP messages increased over the year. The same was the case with exposure to listening to radio and watching television while exposure to reading newspapers had declined with time. Fertility and maternal health outcome indicators showed an improvement in

terms of the trends. Total fertility rate has shown a declining trajectory of the 26-year period. Experience of pregnancy loss and experience of child mortality declined during the period 1992 to 2018. Trend in contraceptive use has shown that the prevalence has been increasing steadily in Zambia over the period 1992 to 2018.

CHAPTER 5 : CONTRACEPTIVE USE TRANSITION IN ZAMBIA

5.1 Introduction

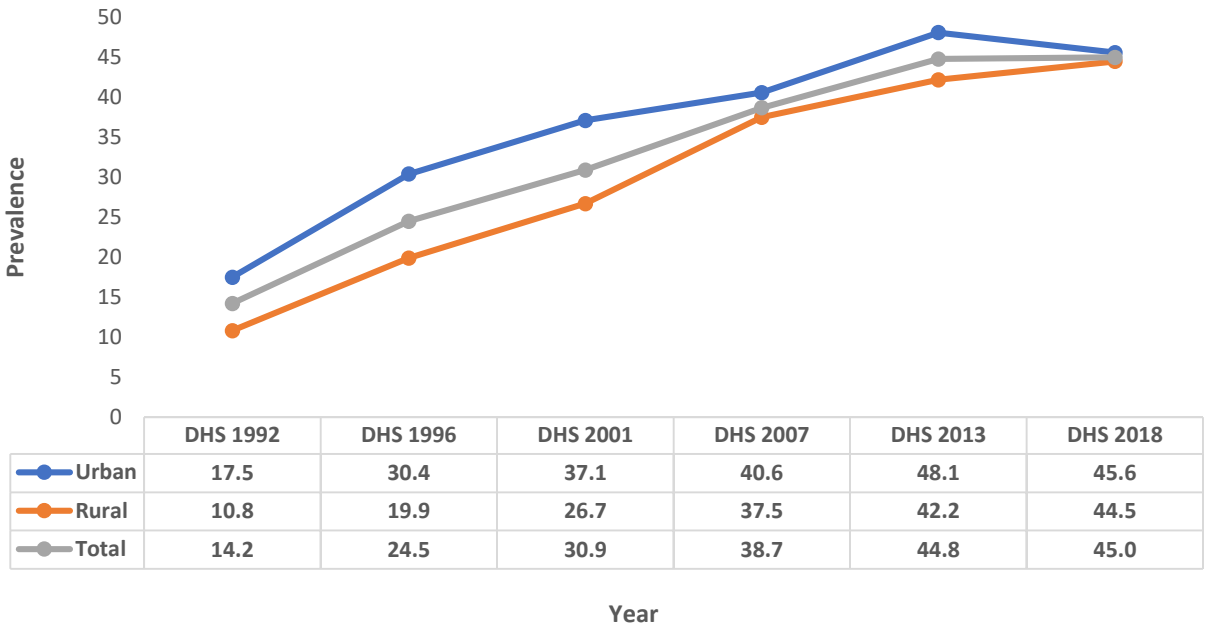
This chapter presents the results of the levels, trends and patterns of contraceptive use among sexually active women in Zambia during the period 1992 to 2018. The results were obtained through application of the methods described in detail in Chapter 3. Quantitative results presented here were derived from the Zambia Demographic and Health Survey data collected between 1992 and 2018. Levels, trends and patterns of contraceptive use and contraceptive method use rates are presented at national, place of residence (rural-urban) and regional (provincial) levels in form of the prevalence among women of reproductive age (15-49 years) and further disaggregated as adolescent and young women, intermediate age group and older women as stated earlier. The chapter aims to describe how contraceptive use has changed in Zambia over time regarding levels, trends, and patterns addressing the first specific objective of the study. Further, qualitative findings are presented to explain some of the observations in the quantitative results.

The chapter starts with the presentation of the trend change in contraceptive use transition across the six ZDHSs. Section 5.2 presents the contraceptive use transition at at national, sub-national levels and by individual demographic and socio-economic characteristics of women. Trend change in contraceptive use transition in Zambia by socio-economic and demographic characteristics are presented in sections 5.3. Section 5.4 presents trends in Contraceptive use transition in Zambia by community-level characteristics. Section 5.5 presents transition in contraceptive method use. Trend in the Pattern of Contraceptive use transition in Zambia is presented in section 5.6. The summary of the chapter is presented in Section 5.7.

5.2 Trend in Contraceptive Use Transition

In this section, the transition in contraceptive use during the period 1992 - 2018 among women of reproductive-age women are described according to various socio-economic, demographic, reproductive health and maternal health factors at national and sub-national levels. The analysis was restricted to sexually active women in the age group of 15-49 years.

Results in figure 5.1 show that overall, during the 26-year period, the country has recorded a steady and progressive increase in the contraceptive prevalence rate (CPR) among sexually active women. Trend in the utilisation of contraceptive methods among sexually active reproductive-aged women showed an increase from 14.2% in 1992 to 45.0% in 2018. At the national level, the major increase happened between 1992 and 2001 (14.2% to 30.9%). In urban areas, the prevalence in use increased from 17.5% in 1992 to 37.1% in 2001 and them from 40.6% in 2007 to 45.6% in 2018. On the other hand, in rural areas, the increase was from 10.8% to 26.7% between 1992 and 2001. Then, from 2007 to 2018, the prevalence increased from 37.5% to 44.5% (Figure 4.4). The findings of this current analysis show that the bigger share of contraceptive use increase in Zambia happened during the phase 1992 to 2007 (Figure 5.1).



	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
Urban	17.5	30.4	37.1	40.6	48.1	45.6
Rural	10.8	19.9	26.7	37.5	42.2	44.5
Total	14.2	24.5	30.9	38.7	44.8	45.0

Figure 5.1:Trend in contraceptive use prevalence among sexually active women 15-49 years by residence, Zambia DHS 1992-2018

5.2.1 Trend in rate of change in contraceptive use transition among sexually active women (15-49) years

Figure 5.1 shows the trend percentage rate of change in contraceptive use at national and rural-urban level across all the DHS phases. Overall, the findings show that during the period 1992 to 2018, contraceptive use in Zambia increased by 30.8%. The biggest contribution to change in contraceptive use between 1992 and 2018 occurred in rural areas (33.7%). Contraceptive use transition associated with urban areas during the same period was 28.1%. The greatest amount of change in rural areas happened during the period 2001 to 2007 (10.8%). On the other hand, the largest change in urban areas took place during the period 1992 to 1996 (12.9%). At the national level, the highest change occurred during the period 1992 to 1996 (10.3%). The smallest improvement in contraceptive use among sexually active women for both national and sub-national level happened during the period 2013 to 2018. During the whole period 1992 to 2018, the percentage change at national level ranged between 0.2% (2013-2018) to 10.3% (1992-1996).

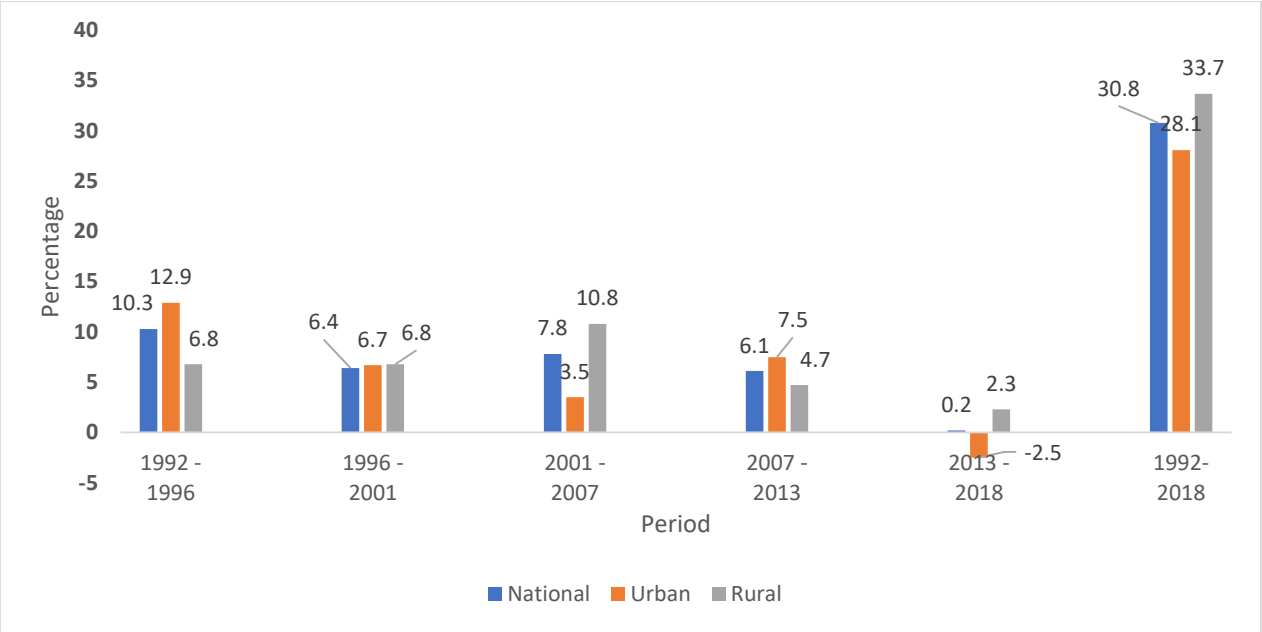


Figure 5.2:Trend in rate of change in contraceptive use among sexually active women, Zambia DHS 1992-2018

The desire to space or limit children, the availability and accessibility of contraceptive methods, peer influence, and the ability to control their reproductive health emerged as among the main reasons from qualitative analysis as to why more women are now using contraceptive methods in Zambia. These highlighted factors could have contributed to increased acceptance of contraceptive method among women, hence contributing to the observed contraceptive use transition during the period 1992-2018. Further, women recognise the benefits of spacing their pregnancies and having the ability to plan when to have children because information about family planning is widely available.

"Efforts by organizations like UNFPA and the Ministry of Health to procure and deliver family planning commodities have ensured that contraceptives are available and accessible to women across the country. The involvement of the private sector in delivering family planning services has also expanded access to contraceptives, particularly for those who may prefer private facilities over public health facilities". (IDI Respondent, Lusaka).

"Women now understand that using contraceptives allows them to have a rest period after pregnancy and to ensure that they can provide for and take care of their families". (FGD woman, Lusaka)

"Family planning information is easily accessible to the public, except on holidays and weekends. Community health workers and community-based volunteers are playing a vital role in door-to-door dissemination of family planning information and services". (IDI, Family Planning Provider, Chongwe)

Figure 5.2 shows the results of trend change in the prevalence of contraceptive use according to age across the DHS phases. The highest increase in the prevalence of contraceptive use among sexually active women in Zambia during the period 1992 and 2018 occurred among women aged 25-34 years (35.2%). This was followed by those aged 35-49 years (28.3%). The least increase was recorded among women age 15-24 years (27.9%). The greatest amount of change during the DHS phases in all the age groups happened during the period 1992 to 1996. For age group 15-24 years, the amount of change was 10.7%; age group 25-34 years recorded the change was 10.9%. On the other hand, the proportion of change for the age group 35-49 was 8.8%. The least change in contraceptive use in all age groups was recorded during the period 2013 to 2018. Findings from qualitative analysis show that young women continue having low contraceptive use rates because they face challenges with access to contraceptive method, especially in public health facilities. Challenges emanate from the country's family planning policy-level barriers, such as the Child Protection Act, which requires parental consent for adolescents to access FP services in the health facility.

"The requirement for parental consent is a significant barrier to contraceptive use among adolescents in Zambia. To address this barrier, the government should revise its policies to allow adolescents to access contraceptives without parental consent. Youth-friendly spaces should provide contraceptives without barriers" (IDI Respondent, Lusaka)

"Adolescents may face self-stigma and discomfort when accessing family planning services, which could deter them from seeking contraception. This discomfort may continue into adulthood, contributing to lower utilization among older women". (IDI, Health Staff, Chongwe)

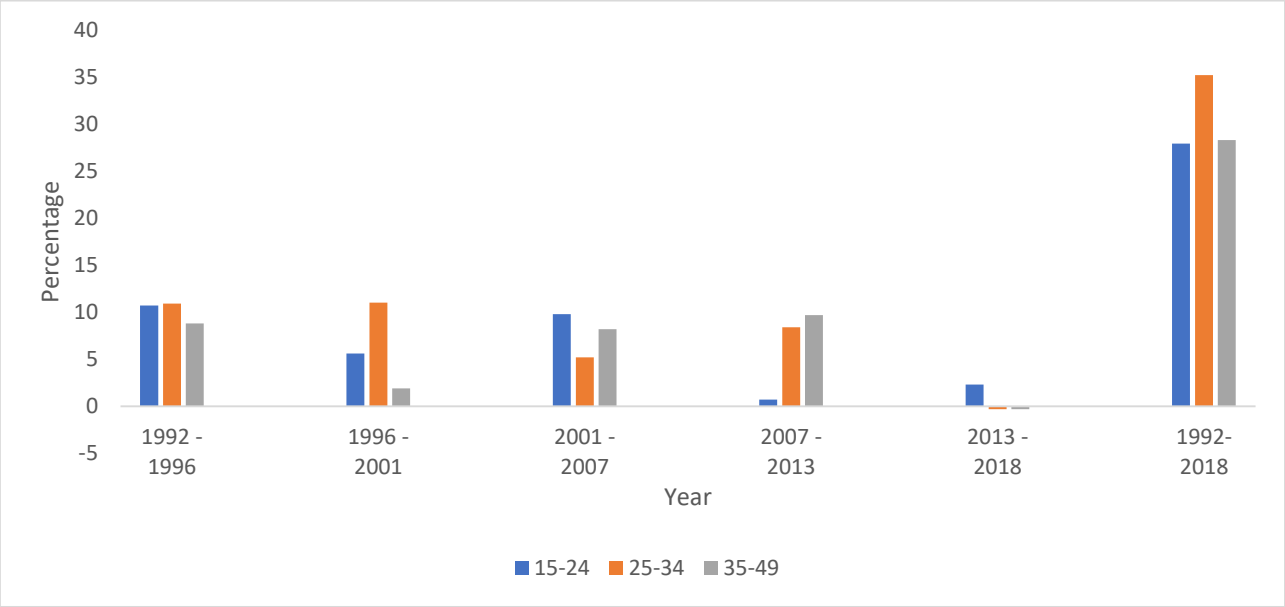


Figure 5.3: Trend in rate of change in contraceptive use among sexually active women by age, Zambia DHS 1992-2018

Figure 5.3 shows the results of trend change in the prevalence of contraceptive use according to education level across the DHS phases. The highest increase in the prevalence of contraceptive use occurred among sexually active women who had primary level education (34.8%). This was followed by those who had no education (27.9%). The least increase was recorded among women with tertiary education (4.0%). The greatest amount of change among women with no education happened during the period 2001-2007 (12.3%). For women with primary education, the largest increase was observed during the period 1992-1996 (10.3%). On the other hand, women with secondary education showed the largest increase during the period 1996-2001 (8.4%). For women with higher-level education, the most increase was noted during the period 2007-2013 (8.1%). Excerpts from qualitative data reveal that women are getting well informed about family planning through community-based volunteers and community health facilities. Mostly, the community based family planning programmes are targeting women with low levels of education to help them with information so that they understand the benefits of family planning.

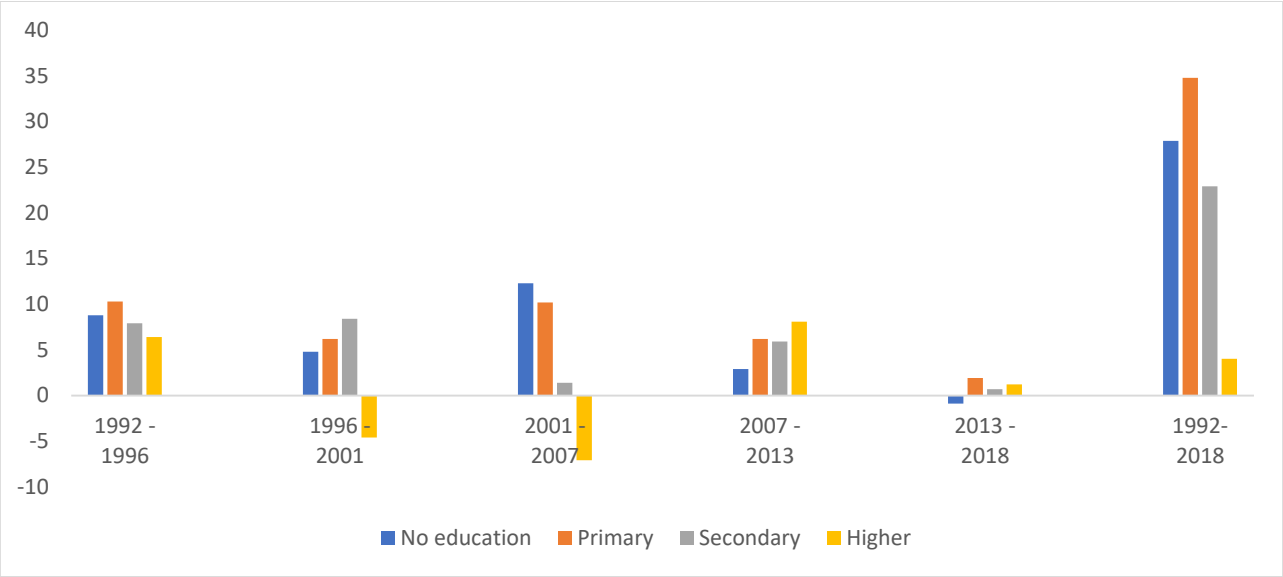


Figure 5.4: Trend in rate of change in contraceptive use among sexually active women by education level, Zambia DHS 1992-2018

5.2.2 Trend analysis of contraceptive use transition between 1992 and 2018

Table 5.1 shows the trend change analysis in contraceptive use for each of the five phases of the DHS waves conducted in Zambia during the period 1992 and 2018. The analysis was conducted to find out the level of significance for the change in contraceptive use between the years in each analysis phase. The results show that overall, during the period 1992 and 2018, contraceptive use among sexually active women in Zambia increased significantly from 14.2% (95% CI: 12.9, 15.6) to 45.0% (95% CI: 43.6, 46.4). Furthermore, changes in contraceptive use were significant in the phases 1992 to 1996, 14.2% (95% CI: 12.8, 15.6) to 24.5% (95% CI: 23.6, 26.1); 1996 to 2001, 24.5% (95% CI: 22.9, 26.2) to 30.9% (95% CI: 29.2, 32.5); 2001 to 2007, 30.9% (95% CI: 29.5, 32.2) to 38.7% (95% CI: 37.0, 40.5) and 2007 to 2013, 38.7% (95% CI: 36.9, 40.6) to 44.8% (95% CI: 43.5, 46.1). The trend change in contraceptive use was not significant during the phase 2013 to 2018.

Table 5.1:Trend analysis in contraceptive use of among sexually active women (15-49 years) during the period, 1992 - 2018, Zambia

DHS year	Contraceptive prevalence rate in phase 1		Contraceptive prevalence rate in phase 2		Chi-square test	
	N (%)	95% CI	N (%)	95 % CI	χ2	p-value
1992 – 1996	720 (14.2)	(12.8, 15.6)	1419 (24.5)	(23.0, 26.1)	182.09	0.000
1996 – 2001	1419 (24.5)	(22.9, 26.2)	1769 (30.9)	(29.2, 32.5)	58.96	0.000
2001 – 2007	1769 (30.9)	(29.5, 32.2)	2029 (38.7)	(37.0, 40.5)	74.92	0.000
2007 – 2013	2029 (38.7)	(36.9, 40.6)	5539 (44.8)	(43.5, 46.1)	56.03	0.000
2013 – 2018	5539 (44.8)	(43.5, 46.1)	4697 (45.0)	43.6, 46.4)	0.07	0.867
1992- 2018	720 (14.2)	(12.9, 15.6)	4697 (45.0)	(43.6, 46.4)	1427.92	0.000

Note: Table is based on weighted counts

5.3 Trend in contraceptive use transition in Zambia by socio-economic and demographic characteristics

Trend change in contraceptive use among sexually active reproductive aged women in Zambia varied with background during the period 1992 to 2018. The prevalence of contraceptive use increased in most of the categories that were analysed in this study (Table 5.2). Overall, the prevalence of contraceptive use in Zambia increased by 30.8% among sexually active women during the period 1992 to 2018. Based on age, the most increase in contraceptive use was observed among women aged 25-34 years, which increased by a 35.2 percentage points in the same period 1992 to 2018. In terms of residence, women living in rural areas showed the most improvement in percentage change of contraceptive use (33.7% compared to 28.1% in urban areas). Regional variations were observed in terms of contraceptive use transition over time in Zambia. The most increase in contraceptive by region during the period 1992 to 2018 was observed in Eastern province (42.5%) and the lowest increase was observed among women in Western province (18.3%). Findings from qualitative interviews show that women in rural areas are still having lower rates of contraceptive method utilisation because they are still experiencing barriers from cultural and religious beliefs and the

limited availability of youth-friendly spaces. Distance to health facilities is still a significant challenge for many women in rural.

"Rural communities are lack of comprehensive sexuality education in schools and have limited availability of youth-friendly spaces, these contribute to limiting access to family planning information and services for young people". (IDI Respondent, Chongwe).

In terms of education, those with a primary level of education recoded the most increase in utilisation of contraceptive methods (34.8%) while those with tertiary education recoded a minor increase in use of contraceptives (4.0%). Women who were in employment recorded an increase of 28.4% in prevalence of contraceptive use (Table 5.1). According to the number of living children, women who had 2-3 children recorded the highest increase in percentage of contraceptive use (36.2%) and the lowest increase was observed among those with 0-1 child (22.0%). Women who had 4-5 children ever born showed the highest increase in utilisation of contraceptive methods among women (25.1%). On the other hand, those with 0-1 child showed the least increase (14.4%) (Table 5.2).

Table 5.2: Percent distribution of contraceptive use among sexually active women (15-49 years) by background characteristics, DHS 1992 - 2018, Zambia

Background Characteristics	DHS 1992 (N=5,090)	DHS 1996 (N=5,827)	DHS 2001 (N=5,736)	DHS 2007 (N=5,253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage of contraceptive use transition 1992 to 2018
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Age	***	***	***	***	***	***	
15 – 24	230 (10.9)	518 (21.6)	598 (27.0)	607 (35.8)	1422 (36.5)	1337 (38.8)	27.9
25 – 34	321 (18.8)	580 (29.7)	793 (40.7	934 (45.9)	2478 (54.3)	1934 (54.0)	35.2
35 – 49	169 (13.5)	321 (22.3)	378 (24.2)	488 (32.4)	1638 (42.1)	1426 (41.8)	27.5
Residence	***	***	***		***		
Urban	453 (17.5)	775 (30.4)	850 (37.1)	865 (40.6)	2654 (48.1)	2196 (45.6)	28.1
Rural	268 (10.8)	644 (19.9)	919 (26.7)	1164 (37.5)	2884 (42.2)	2501 (44.5)	33.7
Province	***	***	***	***	***	***	
Central	43 (9.4)	85 (17.9)	95 (23.4)	156 (31.7)	448 (39.9)	409 (46.6	37.2
Copperbelt	196 (16.2)	272 (25.0)	400 (36.4)	360 (40.9)	910 (46.3)	728 (44.8)	28.6
Eastern	56 (10.1)	173 (21.3)	191 (27.0)	395 (53.4)	746 (50.0)	657 (52.6)	42.5
Luapula	27 (9.3)	45 (8.9)	134 (30.8)	60 (16.1)	290 (33.4)	289 (36.2)	26.9
Lusaka	183 (20)	350 (34.4)	368 (41.6)	334 (39.4)	1202 (50.2)	1006 (47.6)	27.6
Muchinga	-	-	-	-	271 (43.1)	297 (52.8)	52.8
Northern	74 (17.5)	183 (30.1)	212 (28.8)	252 (36.0)	411 (45.2)	322 (40.9)	23.4
North-western	12 (8.9)	85 (40.6)	70 (25.9)	90 (33.8)	192 (34.3)	234 (42.9)	34.0
Southern	74 (9.6)	141 (23.2)	189 (29.5)	248 (45.1)	797 (50.6)	526 (42.9)	33.3
Western	55 (16.6)	85 (17.8)	111 (20.1)	134 (34.4)	274 (32.4)	231 (34.9)	18.3
Education level	***	***		*	***	***	
None	68 (7.8)	131 (16.6)	160 (21.4)	204 (33.7)	412 (36.6)	305 (35.7)	27.9
Primary	367 (12.1)	769 (22.4)	960 (28.6)	1136 (38.8)	2734 (45.0)	2215 (46.9)	34.8

Secondary	239 (22.2)	422 (30.1)	558 (38.5)	564 (39.9)	2058 (45.8)	1916 (45.1)	22.9
Higher	46 (48.6)	97 (55.0)	91 (50.4)	126 (43.3)	334 (51.4)	261 (52.6)	4.0
Marital Status	***	***	***	***	***	***	
Never married	60 (6.9)	155 (15.1)	151 (16.6)	170 (20.4)	449 (20.3)	541 (23.6)	16.7
Married	580 (16.9)	1163 (30.5)	1504 (39.2)	1707 (47.4)	4639 (55.8)	3666 (56.3)	39.4
Formerly married	80 (10.4)	102 (10.6)	114 (11.6)	153 (18.8)	450 (24.7)	491 (30.1)	19.7
Partners education level	***	***	***	***	***	**	
None	30 (7.2)	64 (17.7)	67 (18.3)	89 (29.7)	241 (39.6)	186 (51.4)	44.2
Primary	236 (12.1)	472 (22.7)	629 (29.6)	795 (41.9)	1767 (47.5)	1236 (53.7)	41.6
Secondary	316 (20.3)	550 (29.3)	718 (38.4)	716 (43.1)	2425 (52.7)	1780 (59.0)	38.7
Higher	75 (37.7)	163 (45.6)	190 (52.5)	231 (53.0)	533 (59.8)	339 (57.0)	19.3
Religion			*		*		
Catholic	209 (15.0)	352 (25.1)	410 (31.4)	418 (39.2)	971 (44.4)	774 (43.4)	28.4
Protestant	489 (13.9)	1044 (24.3)	1336 (31.1)	1576 (38.6)	4510 (45.1)	3838 (45.3	31.4
Other	22 (13.4)	23 (22.7)	23 (19.0)	35 (38.2)	57 (32.9)	84 (47.1	33.7
Wealth status		***	***	***	***	**	
Poor	-	445 (19.9)	476 (22.4)	735 (38.3)	1781 (39.6)	1595 (42.5)	22.3
Moderate	-	198 (19.3)	339 (29.4)	314 (32.8)	1140 (47.1)	926 (48.2)	28.9
Rich	-	776 (30.7)	955 (38.8)	981 (41.5)	2618 (48.3)	2177 (45.7)	15.0
Employment status							
Unemployed	227 (9.5)	641 (22.0)	710 (29.4)	942 (38.2)	2448 (44.10	2219 (43.1)	33.6
Employed	493 (18.4)	777 (27.0)	1058 (31.9)	1084 (39.2)	3066 (45.4)	2478 (46.8)	28.4
Age at first sex	*	**	**	*	***	**	
Less than 15 years	106 (11.6)	242 (20.6)	249 (26.2)	207 (34.2)	464 (39.0)	838 (45.0)	33.4
15 - 19 years	289 (13.7)	646 (24.5)	901 (31.7)	1016 (39.7)	2701 (43.7)	3402 (45.9)	32.2
20+ years	325 (15.9)	531 (26.8)	619 (31.9)	806 (38.8)	2373 (47.6)	457 (39.4)	23.5
Living children	***	***	***	***	***	***	
0-1	163 (8.1)	357 (15.9)	439 (20.9)	438 (26.3)	1050 (29.9)	1052 (30.0)	22.0
2-3	228 (17.7)	505 (30.9)	616 (36.1)	766 (46.2)	2039 (54.0)	1720 (53.9)	36.2
4-5	166 (19.7)	281 (27.5)	411 (41.0)	479 (44.1)	1427 (52.6)	1160 (53.8)	34.1
6+	164 (17.7)	276 (31.1)	303 (33.1)	346 (41.7)	1022 (48.6)	765 (48.2)	30.5
Children ever born	***	***	***	***	***	***	
0-1	138 (7.9)	305 (15.6)	381 (20.9)	381 (25.8)	960 (27.7)	987 (30.0)	14.4
2-3	214 (17.4)	447 (30.0)	550 (35.3)	676 (46.3)	1920 (54.1)	1643 (53.7)	23.7
4-5	145 (17.6)	294 (29.1)	412 (39.8)	512 (45.4)	1345 (52.4)	1131 (54.2)	25.1
6+	223 (17.4)	373 (27.6)	427 (32.4)	460 (39.2)	1314 (47.4)	936 (46.9)	19.3

Note: (-) means data for the variable was not collected in the respective DHS year; *=p<0.05; **=p<0.01; ***p=0.001; Table is based on weighted counts

Trend changes in contraceptive use were also analysed according to factors related to fertility preferences, family planning access variables, and maternal health characteristics. In terms of family size concordance, the most increase in contraceptive use rates was observed among women whose partners wanted fewer children than the woman (44.0%). Women whose ideal number of children was 4-5 or 6+ recorded the highest increase in contraceptive use rates (31.8% and 32.7%, respectively). In terms of exposure to family planning information and access to health facility in the last 12 months, women who received family planning information from the health facility recorded an increase in use of contraceptive methods of (17.3%) between 1996 and 2018. On the other hand, those visited the health facility in the last 12 months saw an improvement of (21.4%) during the same

period. Similarly, the women who were visited by community health workers recorded an increase in use of contraceptives by 19.2% during the period 1996 to 2018.

Women who wanted no more children recorded at increase in contraceptive use of (25.6%). Those who experienced pregnancy loss recorded an increase of 12.3% while those who experienced unplanned birth were observed to have an increase of 33.4%. Women who experienced child mortality had an increase in contraceptive of 9.4 percentage points during the phase 1992 to 2018. Women who had exposure to radio, television and newspapers also recorded improvements in utilisation of contraceptive methods by 19.5%, 22.7% and 11.6%, respectively (Table 5.2).

Table 5.2 Continued

Background Characteristics	DHS 1992 (N=5,090)	DHS 1996 (N=5,827)	DHS 2001 (N=5,736)	DHS 2007 (N=5,253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage point change in use of contraceptives 1992 to 2018
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Family Size Concordance	***	***	***	***	***	***	
Both want same	241 (21.8)	508 (36.9)	739 (46.4)	726 (54.3)	2059 (61.0)	1589 (59.9)	38.1
Husband want more	141 (18.7)	316 (30.5)	314 (39.1)	352 (44.8)	1139 (56.8)	890 (56.8)	38.1
Husband want less	68 (18.2)	116 (34.4)	145 (44.3)	127 (56.4)	323 (62.4)	356 (62.2)	44.0
Don't know	127 (10.7)	221 (20.8)	306 (27.6)	496 (40.0)	1101 (46.1)	830 (48.3)	37.6
Ideal Number of children	***	***	***		**	***	
0-3	104 (20.6)	224 (27.3)	415 (32.1)	444 (38.5)	1092 (42.0)	940 (39.8)	19.2
4-5	293 (16.1)	631 (27.0)	820 (34.1)	868 (38.6)	2609 (47.0)	2330 (47.9)	31.8
6+	323 (11.7)	565 (21.3)	534 (26.3)	718 (39.1)	1837 (43.7)	1427 (44.4)	32.7
Exposure to radio	***	***	***	***	***	***	
No	209 (9.5)	496 (19.4)	616 (25.2)	547 (34.5)	1954 (41.2)	2273 (42.2)	22.8
Yes	509 (17.7)	920 (28.5)	1153 (35.1)	1480 (40.5)	3582 (47.1)	2424 (48.0)	19.5
Exposure to television	***	***	***	*	***		
No	486 (12.0)	879 (20.9)	1079 (26.7)	1277 (37.5)	2957 (42.3)	2675 (44.5)	23.6
Yes	234 (23.0)	540 (34.1)	688 (40.2)	751 (41.0)	2580 (48.2)	2022 (45.7)	22.7
Exposure to newspaper	***	***	***	***			
No	320 (10.7)	937 (21.3)	1265 (28.5)	1294 (36.8)	3642 (44.6)	3698 (44.7)	23.4
Yes	397 (19.2)	480 (34.6)	502 (39.3)	734 (42.8)	1883 (45.4)	999 (46.2)	11.6
Exposure to media FP messages	***	***	***	**	***		
No	630 (13.3)	894 (20.9)	1142 (27.4)	1504 (37.6)	4146 (43.2)	4002 (45.1)	31.8
Yes	90 (26.3)	525 (34.8)	627 (40.3)	526 (42.4)	1393 (50.3)	695 (44.6)	18.3
Told about FP at health facility		***	***	***	***	***	
No	-	417 (19.0)	774 (29.7)	499 (39.0)	1621 (41.0)	1592 (42.9)	23.9
Yes	-	645 (38.1)	636 (45.6)	747 (55.5)	2090 (59.4)	1754 (55.4)	17.3
Visited health facility in last 12 months		***	***	***	***	***	
No	-	356 (18.7)	359 (20.8)	778 (29.9)	1825 (37.5)	1351 (37.9)	19.2
Yes	-	1063 (27.3)	1410 (35.2)	1250 (47.52)	3712 (49.6)	3346 (48.7)	21.4
Visited by a community health worker			**	***	***	**	
No	-	1335 (24.2)	1556 (30.2)	1827 (37.5)	4823 (43.9)	3975 (44.3)	20.1
Yes	-	83.7 (29.9)	214 (36.6)	200 (55.0)	713 (52.7)	722 (49.1)	19.2

Decision making autonomy		*		***	***	***	
Low	_	164 (25.3)	1162 (31.3)	788 (45.5)	1567 (53.2)	1189 (52.5)	27.2
High	_	558 (29.8)	607 (30.0)	1242 (35.4)	3971 (42.2)	3508 (42.9)	13.1
Fertility preference	**				***	**	
Want another child	372 (15.1)	931 (23.4)	1067 (29.5)	1176 (39.0)	3230 (43.0)	2719 (43.9)	28.8
Want no more children	181 (21.8)	453 (27.9)	669 (34.2)	708 (38.5)	2025 (48.5)	1733 (47.4)	25.6
Undecided	26 (17.7)	35 (17.8)	29 (21.2)	141 (37.3)	268 (42.6)	245 (41.5)	23.8
Experienced pregnancy loss							
No	-	-	1436 (30.9)	1721 (38.5)	4949 (45.1)	4246 (45.0)	14.1
Yes	-	-	333 (30.9)	308 (40.1)	590 (42.6)	451 (43.2)	12.3
Experienced unplanned birth			***	*	**		
No	348 (17.1)	690 (30.5)	786 (39.0)	882 (48.0)	2681 (55.3)	2141 (56.0)	38.9
Yes	252 (20.4)	495 (31.3)	672 (38.4)	798 (46.9)	1845 (53.1)	1467 (54.2)	33.4
Experienced child mortality	***	***	***	***	***	***	
No	681 (16.6)	1299 (27.6)	1652 (34.5)	1906 (42.2)	5372 (49.7)	4512 (49.9)	33.3
Yes	39 (4.0)	120 (10.9)	117 (12.4)	123 (17.0)	167 (10.8)	184 (13.2)	9.2
Total	**14.2**	**24.5**	**30.9**	**38.7**	**44.8**	**45.0**	**30.8**

Note: (-) means data for the variable was not collected in the respective DHS year; *=p<0.05; **=p<0.01; ***p=0.001; Table is based on weighted counts

5.4 Trend in Contraceptive use transition in Zambia by Community-level characteristics

Trend changes in contraceptive use were also analysed according to community-level factors such as community education, wealth, employment status, desired family size and community exposure to FP messages. In terms of community education, the most increase in contraceptive use rates between 1992 and 2018 were observed among women from communities with low education (31.2%) while communities with high education level showed an increase of (30.3%). Similarly, during the period 1996 to 2018women low wealth status showed an increase of 21.4% in the utilisation of contraceptive methods while those from communities with high wealth status showed an increase of 20.2%.

Contraceptive use transition in terms of community employment status showed that the prevalence increased by 34.3% among the women from communities with low employment status. Women from communities with high proportion of employment status showed an increase of 27.7 percentage points. Women from communities with a high proportion of decision-making autonomy showed an increase in the prevalence of contraceptive methods use of 29.7% while those from communities with low decision-making autonomy recorded an increase of 30.6% during the same period.

Women from communities with high access to community health worker home visit showed the most increase in contraceptive use (35.0%). Those from communities with low access to CHW home visits showed the lowest increase in contraceptive method use (27.1%) during the analysis period 1992 to 2018. Women from communities where desire for large family size was high showed an increase of 30.6% in prevalence of contraceptive use. Furthermore, women from communities where the proportion of women who had unplanned birth was high showed an increase of 31.9% in the prevalence of contraceptive use. Additionally, women from communities where exposure to mass-media FP messages was high showed the lowest increase in the prevalence of contraceptive use (27.6%).

Table 5.3:Percent distribution of contraceptive use among sexually active women (15-49 years) by community-level characteristics, DHS 1992 - 2018, Zambia

Background Characteristics	DHS 1992 (N=5,090)	DHS 1996 (N=5,827)	DHS 2001 (N=5,736)	DHS 2007 (N=5,253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage point difference in use of contraceptives 1992 to 2018
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Community education		*			*		
Low	357 (12.8)	769 (22.5)	846 (28.5)	1031 (38.2)	2471 (43.3)	1976 (44.0)	31.2
Medium	257 (15.6)	395 (27.8)	542 (31.5)	586 (40.3)	1190 (47.7)	1068 (43.7)	28.1
High	106 (16.9)	256 (26.8)	381 (36.6)	412 (38.1)	1878 (45.2)	1653 (47.2	30.3
Community wealth							
Low	_	712 (22.7)	741 (26.8)	1010 (39.3)	2539 (43.1)	1982 (44.2)	21.4
Medium	_	362 (26.0)	564 (34.3)	525 (38.1)	1210 (46.4)	1187 (43.5)	17.5
High	_	346 (27.2)	465 (35.0)	495 (38.4)	1790 (46.3)	1527 (47.4)	20.2
Community employment	***				***		
Low	301 (11.5)	804 (24.7)	977 (33.22)	1156 (40.7)	2942 (47.4)	2359 (45.8)	34.3
Medium	262 (17.8)	347 (23.6)	469 (29.3)	495 (36.4)	1142 (42.4)	1159 (44.8)	27.0
High	157 (15.9)	268 (24.9)	324 (27.1)	379 (36.3)	1454 (42.1)	1179 (43.6)	27.7
Community woman decision making autonomy						*	
Low	406 (13.5)	879 (24.6)	1044 (29.7)	1167 (39.7)	2160 (44.8)	1892 (44.1)	30.6
Medium	216 (14.4)	394 (24.5)	496 (30.9)	596 (37.6)	1121 (45.1)	1030 (42.9)	28.5
High	99 (17.7)	147 (23.3)	229 (37.2)	266 (37.0)	2257 (44.7)	1775 (47.4)	29.7
Community access to CHW visits						***	
Low	400 (15.1)	773 (24.5)	1007 (31.6)	1068 (37.8)	2594 (44.6)	2178 (42.2)	27.1
Medium	187 (13.3)	381 (24.6)	437 (29.4)	520 (38.3)	1233 (44.0)	1143 (46.5)	33.2
High	**133 (13.2)**	266 (24.4)	325 (30.9)	442 (41.8)	1712 (45.9)	1375 (48.2)	35.0
Community desire for large family size	*	**	*		**		
Low	351 (16.6)	714 (27.5)	974 (33.1)	1067 (38.7)	3178 (46.11)	2711 (46.1)	29.5
Medium	204 (12.9)	348 (23.2)	446 (29.9)	528 (41.5)	1251 (46.0)	1088 (44.4)	31.5
High	165 (12.0)	358 (21.0)	350 (27.0)	434 (35.9)	1110 (40.5)	898 (42.6)	30.6
Community unplanned birth							
Low	356 (13.4)	623 (23.2)	841 (30.0)	967 (39.5)	2827 (45.4)	2168 (44.3)	30.9
Medium	209 (15.8)	433 (25.5)	495 (31.3)	532 (36.0)	1149 (44.0)	1269 (45.3)	29.5
High	155 (14.1)	363 (25.7)	433 (31.3)	531 (40.5)	1562 (44.5)	1260 (46.0)	31.9
Community exposure to FP messages	*	*					
Low	333 (12.8)	605 (22.0)	661 (25.9)	910 (38.8)	2811 (44.0)	2238 (44.9)	32.1
Medium	218 (14.0)	437 (26.3)	467 (31.0)	498 (38.9)	1115 (48.1)	1080 (44.1)	30.1
High	169 (18.4)	377 (27.4)	642 (38.3)	622 (38.5)	1612 (44.3)	1379 (46.0)	27.6
Total	**14.2**	**24.5**	**30.9**	**38.7**	**44.8**	**45.0**	**30.8**

Note: (-) means data for the variable was not collected in the respective DHS year; *=p<0.05; **=p<0.01; ***p=0.001; Table is based on weighted counts

5.5 Pattern of Contraceptive Use Transition in Zambia

The pattern of use in contraceptive methods has shown to vary widely depending on factors such as women's age, level of education attained, wealth status, place of residence cultural and religious beliefs, and access to healthcare. In some cases, certain types of contraceptive methods may be more widely utilised than other methods because of preference, availability, access and costs associated.

5.5.1 Contraceptive use transition pattern by age

Results in figure 5.8 show that overall, utilisation of contraceptive methods among sexually active women in Zambia has been generally low among adolescents aged 15-19 years in all the survey years. Utilisation increases with an increase in age and reaches a peak among women in the age 30-34 years. The prevalence dropped and reached low levels among women aged 45-49 years. Although the pattern in use has remained the same over time, the prevalence of contraceptive use has been on the increasing trajectory in all age groups. Trend use in contraceptive methods among adolescents increased from 6.9% 1992 to 28.6% in 2018. The most increase in contraceptive use by age pattern was observed among women in the age group 25-29 year (8.0 in 1992 to 54.1% in 2018). Women in age groups 40-44 and 45-49 recorded contraceptive use increases from 12.0% to 38.8% and 6.4 to 28.6% between 1992 and 2018, respectively (Figure 5.7).

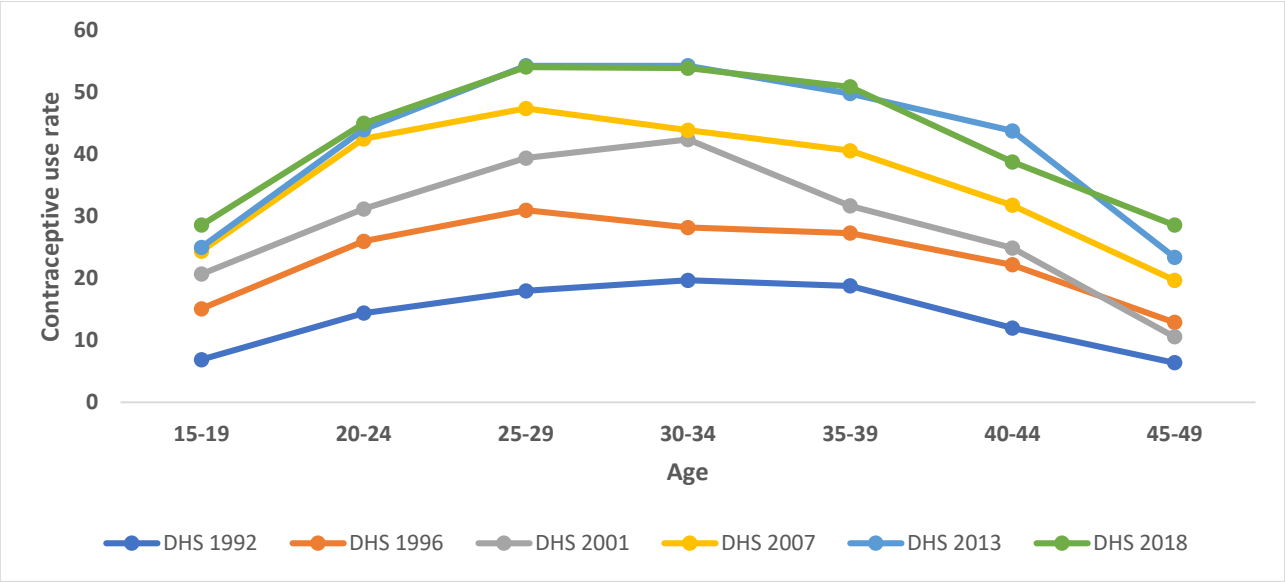


Figure 5.5: Trend in pattern of contraceptive use among sexually active women by age, Zambia DHS 1992-2018

5.5.2 Contraceptive use transition pattern by education level

Results in figure 5.9 show that overall, pattern of utilisation of contraceptive methods among sexually active women in Zambia has been low among women with no formal education in all the survey years. Utilisation of contraceptive methods usually increases with an increase in the level of education among women. The findings in figure 5.8 show that expected pattern of contraceptive use and education level was observed during the period 1992 to 2013. The 2018 DHS has a slide change in the pattern contraceptive use by education level with women who attained a tertiary level of education, recording a lower proportion of use compared to those who attained a secondary level of education. Contraceptive use among women with no formal education increased from 7.8% in 1992 to 35.8% in 2018. In 1992, the proportion of women using contraceptives methods ranged between 7.8% (women with no education) and 48.6% (women with tertiary education). The gap in contraceptive use between women with no education and those with secondary or tertiary education has narrowed over the years in Zambia. By 2018, the proportion of women with no education using contraceptive methods was 35.9% compared to 46.6% of those with tertiary education (Figure 5.9).

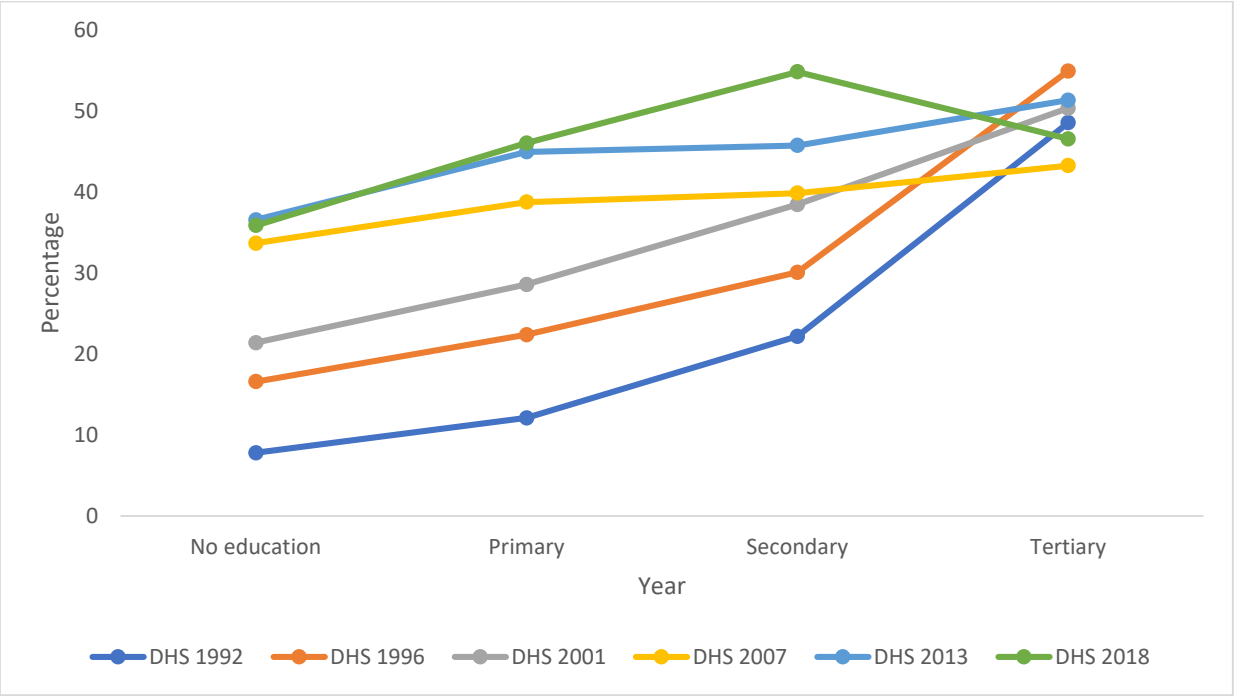


Figure 5.6: Trend in pattern of contraceptive use among sexually active women by education, Zambia DHS 1992-2018

5.5.3 Contraceptive use transition pattern by household wealth status

Results in figure 5.10 present results showing contraceptive use pattern by household wealth status. The pattern of utilisation of contraceptive methods is has been lower among women who belong to poor household and higher among women who belong to households classified as rich. In Zambia, contraceptive use among sexually active women in Zambia has been generally low in women who belong to poor or moderate households. Utilisation of contraceptive methods usually increases with an increase in the wealth status of women. The findings in figure 5.9 show that expected pattern of contraceptive use and wealth status was observed during the period 1996 to 2013. The 2018 DHS had a slide change in the pattern contraceptive use wealth status of women, such that women belonged to moderate households recorded a higher proportion of use compared to those who belonged to rich households. Contraceptive use among women who belonged to rich households significantly increased from 19.8% in 1996 to 42.5% in 2018. In 1996, the proportion of women using

contraceptives methods ranged between 19.9% (women with no education) and 30.7% (women with tertiary education). The gap in contraceptive use between women with who belonged to poor households, and those who belonged to rich has narrowed over the years in Zambia. By 2018, the proportion of women belonging to poor households who were using contraceptive methods was 42.5% compared to those who belonged to rich households 45.7% (Figure 5.9).

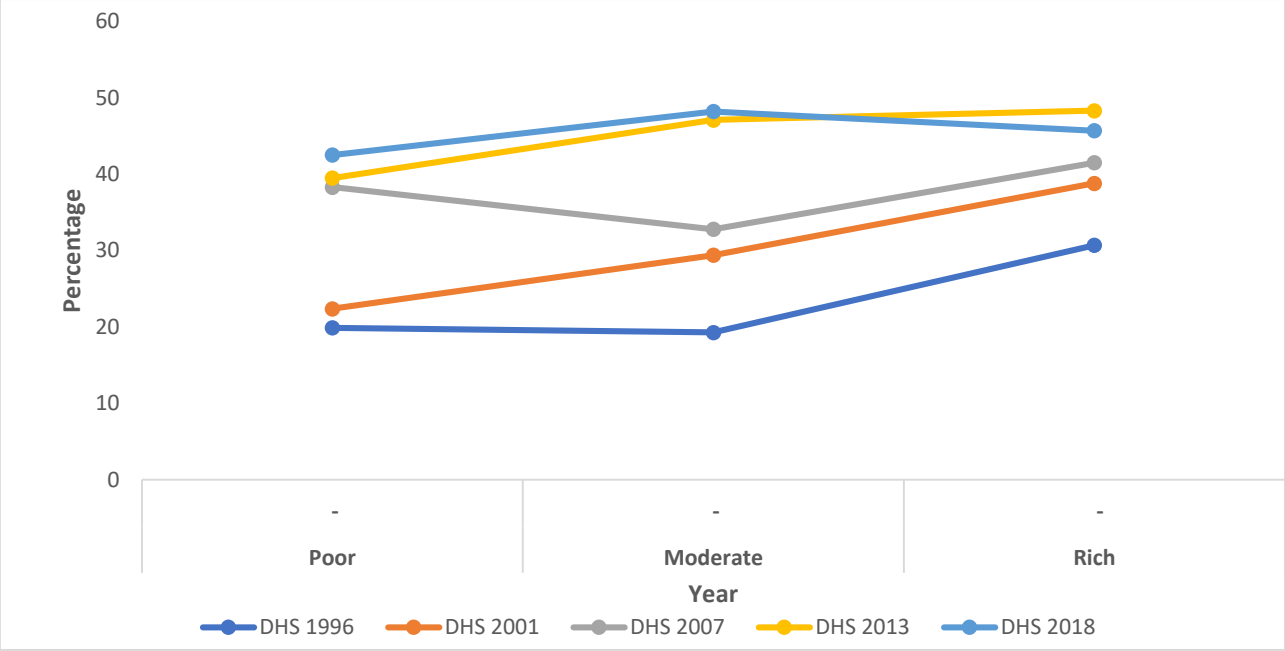


Figure 5.7:Trends in pattern of contraceptive use among sexually active women by wealth, Zambia DHS 1992-2018

5.6 Summary of chapter

Overall, the contraceptive prevalence rate has changed by 30.8 percentage points in Zambia during the analysis period. This increase in utilisation of contraceptive methods in women is translated to an average of 1.2% annually. The major share of contraceptive use increase in Zambia happened between 1992 and 2001 (16.7%). Although the gap between urban and rural areas has narrowed over time, there are still rural-urban variations in contraceptive use among women in Zambia (45.6% versus 44.5%). There were observed differences in terms of change in contraceptive use in Zambia by place of residence. Women living in rural areas showed the most improvement in

percentage change of contraceptive use (33.7% compared to 28.1% in rural areas). Regional variations were observed in terms of contraceptive use transition over time in Zambia. The most increase in contraceptive by region during the period 1992 to 2018 was observed in Eastern province (42.5%) and the lowest increase was observed among women in Western province (18.3%). Differences in the prevalence between Eastern province and Wstern province could be attributed to a complex interplay of socio-economic disparities, and healthcare-related factors. Western province is considered as the poorest province in the Zambia. Therefore, the low economic opportunities in Western province could impact access to education and healthcare services, affecting individuals' knowledge about and ability to obtain contraceptives. In terms of a pattern of use, results show that over the years, use of contraceptive use has followed a similar pattern. The least amount of change was observed among adolescents and young women, while high amount of change was observed among women aged 25-34 years. Utilisation of injections or long-acting contraceptive use methods recorded an improvement of 73.7% during the periods 1992 to 2018. The chapter has confirmed what has been reviewed in the literature that contraceptive use has changed significantly in Zambia during the period 1992 to 2018, despite the variations that still exist in terms of region, place of residence and socio-economic characteristics.

CHAPTER 6 : DRIVERS OF CONTRACEPTIVE USE TRANSITION IN ZAMBIA

6.1 Introduction

Chapter 6 broadly highlights the drivers of contraceptive use transition in Zambia during the period 1992 to 2018. The chapter builds on the contraceptive trend change analysis carried out in chapter 5 to conduct a multilevel analysis of how social context influenced current contraceptive use in Zambia. The chapter further presents the results of a multivariate decomposition analysis to determine the factors that contributed to change in contraceptive use prevalence among sexually active women in Zambia during the period 1992-2018.

The chapter first present results of both unadjusted and multivariable statistical regression models examining the association of both the individual and community-level factors associated with current contraception use among sexually active women in Zambia. This analysis was performed because increasing evidence in the literature has shown that both individual and community-level factors are important in influencing contraceptive use. At the individual level, the multilevel analysis included the following factors, age of a woman, level of education, wealth quintile, employment status, age at first sex, marital status, parity, desire for children, ideal family size, distance to health facility, woman decision making autonomy, experience of pregnancy loss, experience of unplanned, exposure to mass-media and child mortality experience.

Then the chapters continue with the presentation of the results of the community-level factors that were considered in a multilevel analysis of contraceptive use among sexually active women: place of residence, community education, community wealth, community employment status, community woman's empowerment, community young age at first marriage, community access to community health workers, community family size desire and community access to media-based

family planning messages. The conceptual definitions and measurement of community-level variables are described in the methodology section presented in chapter 3.

Furthermore, multivariable decomposition analysis technique was conducted to delineate social determinants of contraceptive use transition in Zambia. Decomposition analyses results are presented at two levels. First, results are presented for contraceptive use transition during the period 1992 to 2018 at the national level and rural-urban residence. Second, the results are presented for the contraceptive use transition during the most recent period, 2007 to 2018.

6.2 Determinants of current contraceptive use in Zambia

Multilevel multivariable logistic regression analysis models were used to explore the factors that influence current use of contraceptives methods among women in Zambia. The conceptual framework, which is covered in the literature review section in Chapter 2 served as the basis for the identification and incorporation of variables to be included in the regression models. Analysis was done in two steps. In step one, unadjusted logistic regression models were performed to examine the association between each independent factor with contraceptive use. In step two, multivariable logistic regression models were performed formed for the empty model, individual-level factors, community level factors and full model, which comprised both individual and community level factors.

6.2.1 Stepwise regression model of determinants of current contraceptive use in Zambia

6.2.2 Individual-level factors

Table 6.1 shows the results of the associations between independent factors and contraceptive use in Zambia using unadjusted odds ratios of the bivariate logistic regression. Specific significant associations of individual-level factors and current contraceptive use in Zambia have been revealed. First, education has a long history of influencing women's health behaviors. As expected, the analysis has revealed that age of a woman is associated with use of contraceptive methods. Women aged 25-34 years [aOR = 1.85, 95% CI = 1.67–2.05] and those aged 35-49 years [aOR = 1.13, 95% CI = 1.01–1.28] were more likely to use contraceptives than women aged 15-24 years. A woman's level of education is associated with contraceptive use. Women with primary education [aOR = 1.60, 95% CI = 1.34–1.90], secondary education [aOR = 1.48, 95% CI = 1.23–1.79] and those with tertiary education [aOR = 1.32, 95% CI = 1.05–1.67] had higher odds of utilising contraceptive methods compared to those with no formal education.

Household wealth status has also been found to be an important predictor of contraceptive use among women. In this study, it has been established that women who belonged to households classified as moderate [aOR = 1.26, 95% CI = 1.09–1.45] or rich [aOR = 1.14, 95% CI = 1.01–1.29] were more likely to utilise contraceptive methods compared to women who belonged to poor households. It was found that women were working [aOR = 1.16, 95% CI = 1.05–1.28] had higher odds of using contraceptive methods than those who were not working.

Married women had higher odds of using modern contraception [aOR = 4.17, 95% CI = 3.62–4.82] compared with those who were never married. Similarly, women who were formerly married were more likely to use contraceptive methods than women who were never married [aOR = 1.39, 95% CI = 1.17–1.65]. In terms of children ever born to a woman, the findings show that increasing

parity was associated with an increasing probability of using contraceptive methods among sexually active women in Zambia. Women with 2-3 children [aOR = 2.71, 95% CI = 2.38–3.09], 4-5 children [aOR = 2.76, 95% CI = 2.36–3.26] and 6 or more children [aOR = 2.07, 95% CI = 1.81–2.36] exhibited higher odds of contraception than those with 0 or 1 child. Conversely, women whose desired ideal number of children was 6 or more children [aOR = 0.98, 95% CI = 0.64–1.48] were less likely to use contraceptive methods compared to those whose desired number of children was zero or 1 child, although the results were not statistically significant.

The results of this current study showed that decision-making autonomy in women was found to be an important factor in influencing women's contraceptive behaviour. At the individual level, women who had high decision-making autonomy were found to have higher odds of contraception [aOR = 1.68, 95% CI = 1.60–1.77] compared to those who had low decision-making autonomy. Furthermore, women who received information about FP from the health facility [aOR = 1.65, 95% CI = 1.45–1.87], those who were visited by a community health worker [aOR = 1.21, 95% CI = 1.06–1.38] and those who visited the health facility in the last 12 months [aOR = 1.55, 95% CI = 1.38–1.74] were more likely to use contraceptive methods.

Exposure to information and communication technologies can enhance access to maternal health and family planning information, which can lead to increased utilisation of contraception in women. This study has showed that women who were exposed to radio had higher odds of contraception [aOR = 1.27, 95% CI = 1.15–1.40] than those with no exposure to listening to radio. Similarly, women who owned a mobile phone [aOR = 1.18, 95% CI = 1.07–1.31] were more likely to use contraceptive methods than their counterparts who did not own a mobile phone. Although the results showed to be non-significant, women who had exposure to watching television [aOR = 1.05, 95% CI = 0.95–1.16] and reading newspapers [aOR = 1.06, 95% CI = 0.94–1.21] had higher odds of

using contraception compared to women with no exposure to watching television and to reading newspapers. Women who experienced death of a child were less likely to adopt contraception compared to women who had not experienced child death. Additionally, findings show that experience of child death was associated with a 7% reduced likelihood of using contraceptive methods compared to those without such an experience.

Table 6.1: Stepwise logistic regression parameter estimates of individual level determinants of contraceptive use among sexually active women

	Contraceptive use			Model 1	Model 2	Model 3	Model 4
Variables	**Number**	**Percentage**	**χ2**	**OR(95%CI)**	**OR (95%CI)**	**OR (95%CI)**	**OR (95%CI)**
Socio-demographic Individual level factors							
Age			184.8***				
15 – 24	1337	38.8		1			
25 – 34	1934	54		1.85***(1.67,2.05)			
35 – 49	1426	41.8		1.13* (1.01,1.28)			
Education level			39.2***				
None	305	35.7		1			
Primary	2115	46.9		1.60***(1.34,1.90)			
Secondary	1916	45.1		1.48***(1.23,1.79)			
Higher	261	42.3		1.32*(1.05,1.67)			
Wealth status			18.2**				
Poor	1595	42.5		1			
Moderate	926	48.2		1.26***(1.09,1.45)			
Rich	2177	45.7		1.14**(1.01,1.29)			
Employment status			14.4**				
Not working	2219	43.1		1			
Working	2478	46.8		1.16**(1.05,1.28)			
Marital status			909***				
Never married	541	23.6		1			
Married	3666	56.3		4.17***(3.62,4.82)			
Formerly married	491	30		1.39***(1.17,1.65)			
Religion							
Catholic	774	43.4		1			
Protestant	3838	45.3		1.08 (0.96,1.26)			
Other	85	47.1		1.16 (0.80,1.69)			
Woman decision making autonomy			66.1***				
Low	1189	42.9		1			
High	3508	52.5		1.68***(1.60,1.77)			
Fertility experience factors							
Age at first sex			16.9**				
Less than 15	838	45			1		
15-19	3402	45.9			1.04(0.92,1.16)		
20+	457	39.4			0.80*(0.66,0.96)		
Living children			469***				
0 -1	987	30			1		
2-3	1643	53.7			2.71***(2.38,3.09)		
4-5	1131	54.2			2.76***(2.36,3.26)		
6+	936	46.9			2.07***(1.81,2.36)		

Table 6.1 continued

	Contraceptive use			Model 1	Model 2	Model 3	Model 4
Variables	**Number**	**Percentage**	**χ2**	**OR(95%CI)**	**OR (95%CI)**	**OR (95%CI)**	**OR (95%CI)**
Fertility experience factors							
Experienced pregnancy loss			1.6				
No	4246	45.2			1		
Yes	**451**	43.2			0.92(0.78,1.08)		
Experienced unplanned birth			2.1				
No	2141	56.0			1		
Yes	**1467**	54.2			0.93 (0.82,1.05)		
Experienced child mortality			664***				
No	4512	49.9				1	
Yes	184	13.2				0.15*** (0,12,0.20)	
Reproductive health goals							
Desire for children			14.5**				
Want another	2719	43.9				1	
Want no more	1733	47.4				1.15**(1.04,1.27)	
Undecided	245	41.5				0.90(0.73,1.12)	
Ideal number of children			45.0***				
0 -1	95	45				1	
2-3	845	39.2				0.78(0.52,1.20)	
4-5	2330	47.9				1.12(0.73,1.72)	
6+	1427	44.4				0.98(0.64,1.48)	
FP Access factors							
Distance to health facility			1.1				
A big problem	1345	44.2					1
Not a big problem	3352	45.3					1.05(0.94,1.17)
Told about FP at health facility			107.7***				
No	1592	42.9					1
Yes	1754	55.4					1.65***(1.45,1.87)
Visited by community health worker			11.5**				
No	3975	44.3					1
Yes	722	49.1					1.21**(1.06,1.38)
Visited health facility in last 12 months			109.3***				
No	1351	37.9					1
Yes	3346	48.7					1.55***(1.38,1.74)
Exposure to listening radio			36.4***				
No	**2273**	42.2					1
Yes	2424	48					1.27***(1.15,1.40)
Exposure of watching television			1.5				
No	2675	44.5					1
Yes	2022	45.7					1.05(0.95,1.16)
Exposure to reading newspaper							
No	3698	44.7	1.5				1
Yes	999	46.2					1.06(0.94,1.21)
Ownership of mobile phone			18**				
No	1920	42.6					1
Yes	2777	46.8					1.18**(1.07,1.31)
Exposure to media FP messages			0.1				
No	4002	45.1					1
Yes	695	44.6					0.98(0.86,1.12)

* = $p < 0.05$; **= p<0.01; ***p<0.001; 1=Reference Category; OR unadjusted adjusted odds ratio, CI confidence internal; χ2 = Chi-square; table is based on weigthed counts

6.2.3 Community-level factors

In terms of the distribution of women between urban and rural areas, results show area disadvantage in contraceptive use. Women living in rural areas were 5% less likely to use contraceptive methods than women living in urban areas, although this result was not signficant. The study has identified regional variations in the utilisation of contraceptive methods among sexually active women. Women from Luapula [aOR=0.62, 95% CI=0.50-0.78], Northern [aOR=0.76, 95% CI=0.67-0.98] and Western provinces [aOR=0.59, 95% CI=0.43-0.80] were less likely to use contraceptives in comparison to women from Lusaka province. Although not significant, women living in Eastern province [aOR=1.22, 95% CI=1.00-1.50] or Muchinga province [aOR=1.23, 95% CI=0.97-1.56] were more likely to use contraceptives than those from Lusaka province.

The study established significant community variations in terms of the association between community education, community wealth, community woman decision making autonomy, community fertility preference, early childbearing status and access to family planning information through community health worker home visits and contraceptive uptake among women in Zambia. Specifically, women who belonged to communities with high education level [aOR=1.23, 95% CI=0.97-1.56] and those from communities with high household wealth studies [aOR=1.23, 95% CI=0.97-1.56] had higher odds of using contraceptive methods than those who belonged to communities with low education level and wealth status.

The findings further show that women who belonged to communities with high woman decision-making autonomy [aOR=1.14, 95% CI=1.01-1.30] had higher odds of using contraceptive methods than those who belonged to communities with low woman-decision making autonomy. Similarly, communities with high access to community health worker home visits [aOR=1.31, 95% CI=1.16-1.49] had higher odds of utilising contraceptive methods than communities that had low

access to community health worker home visits. Conversely, sexually active women who belonged to communities that had a high percentage of women who desired a large family size [aOR=0.87, 95% CI=0.75-0.99] were less likely to use contraceptive methods compared to those who belong to communities with low fertility desire. Similarly, women from communities that had a high proportion of early childbearing [aOR=0.87, 95% CI=0.75-0.98].

Table 6.2: Bivariate logistic regression parameter estimates of community-level determinants of contraceptive use among sexually active women

	Contraceptive use			
Variables	**Number**	**Percent**	**χ2**	**UOR(95%CI)**
Contextual-level factors				
Residence			1.4	
Urban	2196	45.6		1
Rural	2501	44.5		0.95 (0.85,1.07)
Region			110.6***	
Lusaka	1006	47.6		1
Central	409	46.6		0.96(0.77,1.20)
Copperbelt	728	44.8		0.89(0.72,1.11)
Eastern	657	52.6		1.22(1.00,1.50)
Luapula	289	36.2		0.62**(0.50,0.78)
Muchinga	297	52.8		1.23(0.97,1.56)
Northern	322	40.9		0.76*(0.67,0.98)
North-western	234	42.9		0.83(0.67,1.01)
Southern	526	42.9		0.83(0.65,1.05)
Western	231	34.9		0.59**(0.43,0.80)
Community education			10.1*	
Low	1976	44		1
Medium	1068	43.7		0.99(0.86,1.13)
High	1653	47.2		1.14*(0.99,1.30)
Community wealth			10.9*	
Low	1982	44.4		1
Medium	1187	43.5		0.97(0.85,1.18)
High	1527	47.4		1.14*(0.99,1.31)
Community employment			3.5	
Low	2359	45.8		1
Medium	1159	44.8		0.96(0.84,1.10)
High	1179	43.6		0.91(0.79,1.06)
Community woman decision making autonomy			13.9*	
Low	1892	44.1		1
Medium	1030	42.9		0.95(0.82,1.12)
High	1775	47.4		1.14*(1.01,1.30)
Community access to CHW visits			35.0***	
Low	2178	42.2		1
Medium	1143	46.5		1.19*(1.02,1.39)
High	1375	48.8		1.31***(1.16,1.49)
Community family size desire			8.2	
Low	2711	46.1		1
Medium	1088	44.4		0.93(0.80,1.08)
High	898	42.6		0.87*(0.75,0.99)
Community young age at first birth			9.0	
Low	2607	45.9		1

Medium	1008	45.7		0.99(0.86,1.15)
High	1082	42.4		0.87*(0.75,1.00)
Community media FP access			2.1	
Low	2238	44.9		1
Medium	1080	44.1		0.97(0.844,1.11)
High	1379	46.0		1.04(0.90,1.21)

*=p<0.05; **=p<0.01; ***p=0.001; 1=Reference Category; UOR unadjusted adjusted odds ratio, CI confidence internal; χ2 = Chi-square, table is based on weighted counts

6.3 Multivariable multilevel analysis of Individual and community-level determinants of current contraceptive use in Zambia

An overview of studies on contraception use in sub-Saharan Africa shows that a woman's decision can also be influenced by community level norms, values and culture. Thus examining factors influencing maternal health seeking behavior based solely on individual characteristics may not be sufficient to promote maternal health behaviour change. There is thus the need to examine more dynamic, collective and interactive elements of communities that may influence contraceptive usage among women in sub-Saharan Africa. Similarly, other studies conducted in SSA have emphasized the need to examine the influence of contextual factors and social environment on health behaviour. In a country like Zambia, which is known for its regional, socioeconomic, and cultural diversity and where contraceptive use is still low, it is crucial to comprehend how social context influences contraceptive utilisation of among women of childbearing age. Individual and community level determinants of contraceptive use were explored using multilevel binary logistic regression models. Including variables in multilevel modelling was based on study's conceptual framework, which has been discussed in detail earlier.

6.3.1 Model building for multivariable multilevel logistic regression analysis

A two-level multilevel binary (hierarchical) logistic regression with a random intercept at the cluster (or community) level was conducted. The predictor variables of current use of contraceptive methods were selected based on their previously proven theoretical value in the literature. This was done in accordance with the conceptual framework of the study, which was described in detail in chapter 2,

section 2.4, and the hypotheses of the study, which were highlighted in section 2.5 in Chapter 2. As a result, the sample comprised all women between the ages of 15 and 49 who had ever engaged in sexual activity. All the explanatory variables that showed association with contraceptive use in bivariate analysis (section 6.2.1) and those that have been reported in literature to be associated with contraceptive use were fitted in multivariable analysis showed.

Based on the research methodology, a multilevel analytical strategy with four steps was utilised to examine determinants of contraceptive use, and adjusted odds ratios were computed in order to determine the relationships that exist between the various explanatory measure variables and utilisation of contraceptive methods. For the purpose of comparing the different models of multilevel analysis, that is (Models 0, 1, 2 and 3), logistic regressions with multilevel (random intercept) were developed. The results of Model 0 for the null model reveal that the community variance of 0.19, which is statistically significant at (95% confidence interval: 0.14-0.25). Thus suggesting that multilevel analysis should not be overlooked in favour of single-level models. The results of multilevel analysis models are presented in the follow up sections.

6.3.2 Individual-level determinants of contraceptive use in Zambia

Table 6.3 presents the findings of multilevel logistic regression analysis of fixed effects for modelling utilisation of contraceptive methods in sexually active women. To analyse the effect of individual and contextual-level factors on the utilisation of contraceptives, four models were utilised. While other models were intended for comparison, the comprehensive model (Model 3, which includes all individual- and community-level factors), yielded the most important findings. This section focuses on the results related to the associated between individual-level factors and contraceptive use.

Several individual-level factors emerged as significant predictors of contraceptive use among sexually active women. Although the multilevel multivariate analysis adjusted for several individual and community level factors, there are other factors which are important in influencing contraceptive behavior, such as access to family planning services, psychosocial factors, cultural factors, however, these were not considered in our current analysis due to the unavailability of such information in the DHS datasets. The individual-level factors that have been found to be associated with contraceptive use in Zambia have been reported using adjusted odds ratios with their associated 95% confidence intervals.

Specific significant associations of individual-level factors and contraceptive use in Zambia have been unveiled. First, education has a long history of influencing women's health behaviors. As expected, this study has revealed that a woman's level of education is positively associated with contraceptive use. Increasing level of education is associated with increased likelihood of using contraception among women. Women with primary education [aOR = 1.53, 95% CI = 1.26–1.86], secondary education [aOR = 1.58, 95% CI = 1.24–2.02] and those with tertiary education [aOR = 1.74, 95% CI = 1.21–2.50] had higher odds of utilising contraceptive methods compared to those with no formal education.

Household wealth status has also been found to be an important predictor of contraceptive use among women. In this study, it has been established that women who belonged to households classified as moderate [aOR = 1.26, 95% CI = 1.07–1.47] or rich [aOR = 1.20, 95% CI = 0.97–1.48] were more likely to utilise contraceptive methods compared to women who belonged to poor households. Although the finding was not significant, it was found that women were working [aOR = 1.11, 95% CI = 0.98–1.25] had higher odds of using contraceptive methods than those who were not working.

Married women had higher odds of using contraception [aOR = 2.78, 95% CI = 2.29–3.39] compared with those who were never married. On the other hand, women who were formerly married were not different from the never-married in their odds of using contraceptive methods. In terms of children ever born to a woman, the findings show that increasing parity was associated with an increasing probability of using contraceptive methods among sexually active women in Zambia. Women with 2-3 children [aOR = 1.67, 95% CI = 1.39–1.99], 4-5 children [aOR = 2.44, 95% CI = 1.95–3.04] and 6 or more children [aOR = 2.77, 95% CI = 2.14–3.58] exhibited higher odds of contraception than those with 0 or 1 child. Conversely, women whose desired ideal number of children was 6 or more children were less likely to use contraceptive methods compared to those whose desired number of children was zero or 1 child.

The results of the multilevel regression showed that decision-making autonomy in women was found to be an important factor in influencing women's contraceptive behaviour. At the individual level, women who had high decision-making autonomy were found to have higher odds of contraception [aOR = 1.18, 95% CI = 1.02–1.37] compared to those with low-decision making autonomy.

Experience of pregnancy loss was negatively associated with the use of contraceptive methods. There was a 17% decreased odds of utilisation of contraceptive methods among women who had experienced a pregnancy loss compared to those who did not experience pregnancy loss. Similarly, women who experienced death of a child were less likely to adopt contraception compared to women who had not experienced child death. Findings show that experience of child death was associated with a 75% reduced likelihood of using contraceptive methods compared to those without such an experience.

Exposure to information and communication technologies can enhance access to maternal health and family planning information, which can lead to increased utilisation of contraception in women. This study has showed that women who were exposed to radio had higher odds of contraception [aOR = 1.21, 95% CI = 1.04–1.37] than those with no exposure. Similarly, women who owned a mobile phone [aOR = 1.19, 95% CI = 1.04–1.37] were more likely to use contraceptive methods than their counterparts who did not own a mobile phone. Although the results showed to be non-significant, women who had exposure to reading newspaper had higher odds of using contraception [aOR = 1.13, 95% CI = 0.97–1.33] compared to women with no exposure to reading newspaper.

6.3.3 Community-level determinants of current contraceptive use in Zambia

Contraceptive use among sexually active women varied according to different socioeconomic, region and place of residence and other community variable, albeit the variation was not statistically significant for area of residence, community education and community wealth status. However, women from communities with higher levels of education and household wealth status had higher probabilities of using contraceptives than their counterparts from communities with low levels of education and poor household wealth status (Table 6.3).

In terms of the distribution of women between urban and rural areas, there was an area disadvantage in contraceptive use: women living in rural areas were 10% less likely to use contraceptive methods than women living in urban areas, net of other community factors. However, the variation in use by residence was not statistically different. The study has identified regional variations in the utilisation of contraceptive methods among sexually active women in Zambia. Women from Luapula [aOR=0.61, 95% CI=0.47-0.78], Northern [aOR=0.69, 95% CI=0.53-0.89], Southern [aOR=0.76, 95% CI=0.60-0.97] and Western provinces [aOR=0.62, 95% CI=0.47-0.83]

were less likely to use contraceptives in comparison to women from Lusaka province. Although not significant, women living in Eastern province [aOR=1.19, 95% CI=0.95-1.49] or Muchinga province [aOR=1.19, 95% CI=0.94-1.52] were more likely to use contraceptives than those from Lusaka province.

The study established significant community variations in terms of the association between community fertility preference, early childbearing status, and access to family planning information through community health worker visits and contraceptive uptake among women in Zambia. Specifically, the findings indicate that sexually active women who belonged to communities that had a high percentage of women who desired a large family size [aOR=0.80, 95% CI=0.65-0.97] were less likely to use contraceptive methods compared to those who belong to communities with low fertility desire. Similarly, women from communities that had a high proportion of early childbearing [aOR=0.86, 95% CI=0.75-0.99] were also less likely to adopt the use of contraception than those from communities with low proportion of early childbearing.

However, communities with high access to community health worker home visits [aOR=1.23, 95% CI=1.08-1.40] had higher odds of utilising contraceptive methods than communities that had low access to community health worker home visits. Although not statistically significant, women residing in communities with a high proportion of educated women [aOR=1.11, 95% CI=0.92-1.33] and those from communities with high household wealth status [aOR=1.07, 95% CI=0.75-1.11] were equally more likely to use contraceptive methods compared to those from communities with low proportion of educated women. Woman from communities that had high decision making autonomy were found to have a higher change of using contraceptive methods compared women from communities that had low decision-making autonomy.

6.3.4 Unobserved heterogeneity in contraceptive use at community level

Table 6.3 also presents adjusted odds ratios (aOR) and random effects for modelling contraceptive uptake using a two-level multilevel analysis. The random effects of modelling contraceptive use were determined using four analytic models. The random effects showed between-community variation in women's use of contraceptive methods using median odds ratios (MOR). In the null model, the clustering of the primary sampling units (PSUs) accounted for substantial variations in the odds of using modern contraceptives (σ^2 = 0.19, 95% CI 0.14– 0.25) and (MOR=1.51). Model 0 showed that 5.4% of the total variation in use of contraceptive methods in Zambia was attributed to the variance between clusters (ICC = 0.054). The between-cluster variance showed a decrease from 5.4% to 5.1% from Model 0 to Model 1 (individual-level factors only). From Model I, the ICC further reduced to 4.7% in Model II (model with community level factors only), and decreased further to 4.5% in the full model (Model III), where all the independent correlates and community level factors were considered. This indicates that differences in the clustering of the communities (primary sampling units) accounted for the contraceptive use variations among sexually active women in Zambia. Additionally, 21.1% of the variance in the odds of contraceptive use across communities were explained by both individual and community-level factors, as indicated by the PCV.

Furthermore, the median odds ratio (MOR) reduced from 1.51 (Model 0) to 1.46 (Model III), signifying that significant difference between communities in using contraceptive methods. This suggests that the full model still had some unexplained community variability in contraceptive use in Zambia. The model fitness statistics show Model III as the model of best fit (Log-likelihood = −6271.90 and AIC =12633.81).

Table 6.3: Multilevel parameter estimates and adjusted odds ratios of individual and community-level factors associated with contraceptive use among sexually active women in Zambia, 2018 DHS.

Variables	Model 0	Model I aOR(95%CI)	Model II aOR(95%CI)	Model III aOR(95%CI)
Individual level factors				
Age				
15 – 24		1		1
25 – 34		0.77** (0.66,0.90)		0.76** (0.65,0.90)
35 – 49		0.35*** (0.28,0.44)		0.35*** (0.28,0.44)
Education level				
None		1		1
Primary		1.54*** (1.27,1.88)		1.53*** (1.26,1.86)
Secondary		1.54***(1.26,2.04)		1.58***(1.24,2.02)
Higher		1.73**(1.21,2.48)		1.74**(1.21,2.50)
Wealth status				
Poor		1		1
Moderate		1.27**(1.08,1.48)		1.26**(1.07,1.47)
Rich		1.25*(1.06,1.49)		1.20 (0.97,1.48)
Employment status				
Working		1		1
Not working		1.09 (0.97, 1.24)		1.11 (0.98, 1.25)
Age at first sex				
Less than 15		1		1
15-19		1.05 (0.92,1.19)		1.05 (0.92,1.19)
20+		0.97 (0.78,1.21)		0.96 (0.77,1.19)
Marital status				
Never married		1		1
Married		2.76***(2.27,3.67)		2.78***(2.29,3.39)
Formerly married		0.97 (0.78,1.21)		0.97 (0.78,1.21)
Religion				
Catholic		1		1
Protestant		1.01 (0.87,1.16)		1.00 (0.87,1.14)
Other		1.10 (0.72,1.66)		102 (0.67,1.56)
Living children				
0 -1		1		1
2 -3		1.66***(1.39,1.99)		1.67***(1.39,1.99)
4 -5		2.44***(1.95,3.04)		2.44***(1.95,3.04)
6+		2.75*** (2.12,3.55)		2.77*** (2.14,3.58)
Ideal number of children				
0 -1		1		1
2 -3		0.78 (0.51,1.19)		0.79 (0.51,1.21)
4 -5		0.79 (0.51,1.24)		0.81 (0.52,1.25)
6+		0.61* (0.39,0.94)		0.62* (0.40,0.96)
Distance to health facility				
Not a big problem		1		1
A big problem		1.00 (0.89,1.13)		1.02 (0.90,1.14)
Visited by community health worker				
No		1		1
Yes		1.10 (0.94,1.28)		1.07 (0.92,1.25)
Woman decision making autonomy				
Low		1		1
High		1.17*(1.01,1.36)		1.18*(1.02,1.37)
Experienced pregnancy loss				
No		1		1
Yes		0.83*(0.70,0.98)		0.83*(0.70,0.98)
Exposure to listening radio				
No		1		1
Yes		1.20**(1.07,1.36)		1.21**(1.07,1.37)
Exposure of watching television				
No		1		1
Yes		0.95 (0.82,1.11)		0.95 (0.82,1.10)

Table 6.3 continued

Variables	Model 0	Model I aOR(95%CI)	Model II aOR(95%CI)	Model III aOR(95%CI)
Individual level factors				
Exposure to reading newspaper				
No		1		1
Yes		1.13 (0.97, 1.33)		1.13 (0.97, 1.33)
Ownership of mobile phone				
No		1		1
Yes		1.20* (1.04,1.38)		1.19* (1.04,1.37)
Exposure to media FP messages				
No		1		1
Yes		0.96 (0.81,1.14)		0.96 (0.81,1.15)
Experienced child mortality				
No		1		1
Yes		0.25***(0.18,0.33)		0.25***(0.19,0.33)
Contextual-level factors				
Residence				
Urban			1	1
Rural			0.97 (0.86,1.10)	0.90 (0.75,1.06)
Region				
Lusaka			1	1
Central			0.95 (0.77,1.17)	0.89 (0.72,1.11)
Copperbelt			0.90 (0.74,1.11)	0.91 (0.74,1.11)
Eastern			1.21 (0.98,1.50)	1.19 (0.95,1.49)
Luapula			0.62 (0.49,0.78)***	0.61 (0.47,0.78)***
Muchinga			1.16 (0.91,1.47)	1.19 (0.94,1.52)
Northern			0.75 (0.58,0.96)*	0.69 (0.53,0.89)*
North-western			0.81 (0.65,1.01)	0.90 (0.71,1.16)
Southern			0.82 (0.66,1.02)	0.76 (0.60,0.97)*
Western			0.53 (0.40,0.70)***	0.62 (0.47,0.83)**
Community education				
Low			1	1
Medium			1.03 (0.83,1.14)	0.96 (0.82,1.12)
High			1.04 (0.88,1.27)	1.11 (0.92,1.33)
Community wealth				
Low			1	1
Medium			0.98 (0.82,1.16)	0.87 (0.74,1.07)
High			1.08 (0.90,1.30)	1.07 (0.75,1.11)
Community employment				
Low			1	1
Medium			0.92 (0.82,1.05)	0.90 (0.79,1.03)
High			0.88 (0.76,1.01)	0.84 (0.72,0.97)
Community woman decision making autonomy				
Low			1	1
Medium			0.94 (0.82,1.04)	0.96 (0.82,1.13)
High			1.10 (0.76,1.00)	1.14* (1.07,1.33)
Community access to CHW home visits				
Low			1	1
Medium			1.16 (0.99,1.35)	1.11 (0.94,1.29)
High			1.30***(1.15,1.48)	1.23**(1.08,1.40)
Community family size desire				
Low			1	1
Medium			0.95 (0.82,1.11)	0.95 (0.78,1.08)
High			0.84*(0.69,0.91)	0.80**(0.65,0.97)
Community early childbearing				
Low			1	1
Medium			1.04 (0.91,1.20)	1.07 (0.76,1.06)
High			0.87*(0.75,0.99)	0.86*(0.75,0.99)
Community access to FP message				
Low			1	1
Medium			0.86 (0.74,1.00)	0.90 (0.76,1.06)
High			0.87 (0.75,1.05)	0.91 (0.76,1.09)

Table 6.3 continued

Variables	Model 0	Model I aOR(95%CI)	Model II aOR(95%CI)	Model III aOR(95%CI)
Random effects				
Variance (CI)	0.19 (0.14-0.25)	0.17 (0.13-0.25)	0.12 (0.09-0.18)	0.12 (0.08-0.18)
ICC (%)	5.4	5.1	3.6	3.5
PCV (%)	Ref	10.5	36.8	36.8
MOR	1.51**	1.49***	1.40***	1.40***
Wald Chi-square	Ref	948.85***	119.66***	1080.34***
Model fit statistics				
Log-likelihood	-7107.33***	-6288.97***	-7052.44***	-6243.07***
AIC	14218.67	12637.94	14160.88	12598.14
BIC	14233.17	12855.53	14363.96	13004.32
N	10,437	10,437	10,437	10,437

*=p<0.05; **=p<0.01; ***p=0.001; 1=Reference Category; Model 0 contains no explanatory variables; Model I includes individual-level factors only; Model II includes both individual-level and community-level factors; Model III includes community-level factors only aOR adjusted odds ratio, CI confidence internal, ICC intraclass correlation coefficient, PVC Proportional variance change, AIC Akaike information criterion, BIC Bayesian Information Criterion

6.4 Decomposition of determinants of contraceptive use transition in Zambia, 1992- 2018

Zambia has experienced a steady and progressive increase in utilisation of contraceptive methods among women of reproductive age over the last three decades. In 1992, only 14.2% of the sexually active women were using family planning methods and this prevalence had doubled to 30.9% in 2001. The trend continued on an increasing trajectory and by 2007, the country had achieved a contraceptive prevalence rate of 38.7%. By 2018, the prevalence increased by 6.3 percentage points to reach 45.0%. The increase appears to have slowed down between 2007 and 2018. Rural-urban trend in contraceptive use shows that women in urban areas have had consistent higher prevalence of contraceptive use than women from rural areas. In urban areas, contraceptive use increased from 17.55% in 1992 to 45.6% in 2018. On the other hand, in rural area contraceptive use increased from 10.8% in 1992 to 44.5% in 2018.

It is crucial for family planning programming strengthening purposes to determine what has caused the changes in contraceptive use over the past three decades (changes in compositional structure or changes in women's contraceptive behavior). Therefore, this study applied the decomposition analysis technique to examine the predictors of contraceptive use transition in Zambia. The decomposition analysis method breaks down the trend in using of contraception into temporal changes in population composition (compositional changes) and changes in the behaviours that lead

to the use of contraception (processual changes) between the first DHS (1992 DHS) and the most recent (2018 DHS). In the method portion of this study, a detailed description of the Blinder-Oaxaca Logit-based two-component decomposition approach used for analysis was provided. This section presents results obtained from the unadjusted and adjusted decomposition analysis at national and for rural-urban differentials.

6.4.1 Unadjusted analysis of determinants of contraceptive use transition in Zambia

Table 6.4 presents unadjusted coefficients of the decomposition analysis results of contraceptive use transition in Zambia, during the period 1992–2018. Several significant results have been unveiled in relation to effects of predictors of contraceptive use transition. Results show that change in contraceptive was influenced by different compositional and behavioural factors.

Unadjusted decomposition analysis results revealed that between 1992 and 2018: maternal education, partner's education, number of living children, age at first sex, fertility preference, experience of child mortality, community education, community decision-making autonomy, and access to CHW home visits were the major contributors of trend increase in contraceptive use among sexually active women in Zambia (Table 6.4).

The increment in the proportion of women with secondary level education showed a significant 5.85% contribution to the increase in contraceptive use. An increase in the composition of women who had higher level education contributed about 1% to the increase in contraceptive use in Zambia. On the other hand, an increase in the proportion of women whose partners had secondary or tertiary education showed a significant contribution of 4.02% to the increase in prevalence of contraceptive use. Furthermore, an increase in the proportion of women who initiated sexual debut at the age of 20 years or older showed a positive effect on the change in contraceptive use of 5.28%.

An increase in the proportion of women with 2-3 children led to a significant positive increase in the prevalence of contraceptive use of 4.05%. Furthermore, reduction in the proportion of women who desired 4-5 children and 6 or more children showed a positive contribution to the increase in contraceptive use by 0.96% and 0.43%, respectively. Additionally, an increase in the proportion of women who desired no more children showed a positive contribution of 1.19%. A contribution of 7.02 was as a result of the significant reduction in the proportion of women who experienced child mortality. (Table 6.4). An increase in the proportion of women with exposure to watching television made a contribution of 0.85% to the increase in contraceptive use during the analysis period.

Improvement in the proportion of women residing in communities with high education, high woman decision making autonomy and high access to community health worker home visits contributed 2.18%, 2.60% and 1.51% respectively to contraceptive use transition in Zambia. On the other hand, a reduction in the proportion of women living in communities with high desired family size showed a positive contribution of 0.80%. An improvement in access media-FP messages also made a positive contribution of 0.40%.

Differences due to effects of the coefficients (effects of contraceptive use behaviour) contributed the most to the increase in contraceptive use over the period 1992 to 2018. Positive contraceptive use behaviour of women living rural areas contributed, living in Central province, Eastern province, Southern province, those who belong to Protestant religious denomination, those who desired 4-5 or 6 or more children and those from communities that have high access to CHW home visits showed the major contribution effects to contraceptive use transition in Zambia. Of these factors, contraceptive use behaviour of women living in rural areas in rural areas (15.40%), Protestants (7.10%), those who desired 6 or more children (30.71%), those living in Eastern province (6.82%) and Southern province (6.35%) with and those from communities with high access to CHW

home visits (5.28%) were the most important contributors to trend change in contraceptives in Zambia (Table 6.4).

Table 6.4: Unadjusted analysis of contribution of explanatory variables to the difference in contraceptive use among sexually active women between 1992-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Unadjusted Coefficients	Percent	Unadjusted Coefficients	Percent
Age				
15 – 24	**Ref**		**Ref**	
25 – 34	0.00082***	0.26	-0.00134	-0.44
35 – 49	0.00245***	0.79	-0.00574	-1.86
Residence				
Urban	**Ref**		**Ref**	
Rural	-0.00058	-0.19	0.04756	15.4
Region				
Lusaka	**Ref**		**Ref**	
Central	0.00006	0.02	0.01440***	4.68
Copperbelt	0.00263	0.85	0.00748	2.43
Eastern	0.00054	0.18	0.02100***	6.82
Luapula	-0.00246	-0.80	0.00474	1.54
Northern	-0.0009	-0.73	0.00182	0.59
North-western	-0.00138	-0.29	0.00376**	1.22
Southern	0.0018	0.58	0.01957***	6.35
Western	0.00018	0.06	-0.00344	-1.12
Woman's education level				
None	**Ref**		**Ref**	
Primary	-0.01598***	-5.18	-0.00227	-0.74
Secondary	0.01802***	5.85	-0.03213***	-10.42
Higher	0.00266*	0.86	-0.00729***	-2.36
Partners education Level				
None	**Ref**		**Ref**	
Primary	-0.00358	-0.87	-0.04532*	-11.06
Secondary/Higher	0.01648*	4.02	-0.08695***	-21.22
Employment status				
Working	**Ref**		**Ref**	
Not working	-0.00075**	-0.24	-0.06126***	-19.88
Religion				
Catholic	**Ref**		**Ref**	
Protestant	0.00224	0.73	0.02188	7.10
Other	-0.00057	-0.19	0.00175	0.57
Age at first sex				
Less than 15	**Ref**		**Ref**	
15-19	0.00257	0.83	-0.01212	-3.93
20+	0.01627*	5.28	-0.04553***	-14.78
Age at first marriage				
Less than 15	**Ref**		**Ref**	
15-19	-0.00633***	-2.05	0.00566	1.84
20+	-0.01380***	-4.48	-0.02426*	-7.87
Number of living children				
0-1	**Ref**		**Ref**	
2-3	0.01249***	4.05	0.00495	1.61
4-5	0.00970***	3.15	-0.00074	-0.24
6+	-0.00565***	-1.83	-0.00404	-1.31
Children ever born				
0-1	**Ref**		**Ref**	
2-3	0.01236***	4.01	0.00429	1.39
4-5	0.00942***	3.06	0.00312	1.01
6+	-0.01074***	-3.49	-0.00821	-2.66
Family Size Concordance				
Both want same	**Ref**		**Ref**	
Husband want more	-0.00094	-0.24	0.00311	0.78
Husband want less	-0.00069	-0.17	0.00719	1.80
Don't know	0.01312***	3.29	0.02727**	6.84

Table 6.4 continued

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Unadjusted Coefficients	Percent	Unadjusted Coefficients	Percent
Ideal Number of children				
0-1	**Ref**		**Ref**	
2-3	-0.00630	-2.05	0.00098	0.32
4-5	0.00294	0.96	0.04660	15.13
6+	0.00132	0.43	0.09463*	30.71
Desire for more children				
Want another	**Ref**		**Ref**	
No more	0.00336*	1.19	-0.01466**	-5.21
Undecided	-0.00030	-0.11	-0.00248	-0.88
Exposure to listening radio				
No	**Ref**		**Ref**	
Yes	-0.00493***	-1.60	-0.05064***	-16.43
Exposure of watching television				
No	**Ref**		**Ref**	
Yes	0.00260	0.84	-0.02776***	-9.02
Exposure of reading newspaper				
No	**Ref**		**Ref**	
Yes	-0.00294	-0.95	-0.04827***	-15.66
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	-0.00036	-0.12	-0.01114***	-3.62
Experienced child mortality				
No	**Ref**		**Ref**	
Yes	0.02162***	7.02	-0.01100	-3.57
Community education				
Low	**Ref**		**Ref**	
Medium	0.00029	0.09	-0.01531*	-4.97
High	0.00671*	2.18	-0.00485	-1.57
Community employment				
Low	**Ref**		**Ref**	
Medium	0.00041	0.13	-0.03052***	-9.91
High	-0.00144	-0.47	-0.01724***	-5.60
Community woman decision making autonomy				
Low	**Ref**		**Ref**	
Medium	0.00082	0.27	-0.00712	-2.31
High	0.00802*	2.60	-0.00406	-1.32
Community access to CHW visits				
Low	**Ref**		**Ref**	
Medium	-0.00180**	-0.58	0.01702**	5.53
High	0.00467***	1.51	0.01628**	5.28
Community family size desire				
Low	**Ref**		**Ref**	
Medium	0.00133	0.43	0.0131*	4.25
High	0.00246*	0.80	0.0123*	3.99
Community young age at first birth				
Low	**Ref**		**Ref**	
Medium	0.00017	0.06	0.01849**	6.00
High	0.00034*	0.11	0.00089	0.29
Community media FP access				
Low	**Ref**		**Ref**	
Medium	0.00057	0.18	-0.00821	-2.66
High	0.00122	0.40	-0.01333**	-4.32

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

6.4.2 Multivariable decomposition analysis of the determinants of contraceptive use transition in Zambia 1992-2018

Table 6.5 presents adjusted decomposition analysis results of contraceptive use transition in Zambia, during the period 1992–2018. Overall, both changes in compositional structure and changes in women's contraceptive behaviour significantly contributed to the contraceptive use transition in Zambia between 1992 and 2018. The decomposition results showed that the increase in contraceptive use over time was explained by the difference in the selected women's characteristics and contraceptive behavioural changes between the two survey points. About 18% of the increase in the prevalence of contraceptive use was due to the differences in the composition of women's characteristics during the analysis period. On the other hand, the change due to the differences in the effect of the selected variables was 82% (Table 6.5).

Multivariate decomposition analysis of the determinants of change in contraceptive use has revealed that between 1992 and 2018: maternal education, parity, age at first sex, number of living children, fertility preference, exposure to watching television, exposure to media FP messages, experience of child mortality, community woman decision making autonomy, community access to CHW home visits were the major contributors to trend change in contraceptive use among sexually active women in Zambia (Table 6.5).

The increment in the proportion of women with secondary level education showed a significant positive contribution of 4.95% to the increase in contraceptive prevalence rate. An increase in the composition of women who had higher level education contributed about 1% to the increase in contraceptive use in Zambia. An increase in the proportion of women who initiated sexual debut in the age group 15-19 years showed a positive effect on the change in contraceptive use of 1.48% among sexually active women. An increase in the proportion of women who had 2-3 living

children contributed positively to the increase in contraceptive use by 1.85%. Similarly, a reduction in the proportion of women whose ideal number of children was 6 or more made a positive contribution of 5.63% to contraceptive use increase in Zambia. Furthermore, a reduction in the proportion of women who experienced child mortality contributed to a significant increase in the prevalence of contraceptive use by 7.70% (Table 6.7). An increase to proportion of women with exposure to watching television made a contribution of 0.68% to the increase to change in contraceptive use during the same period.

In the qualitative analysis, education emerged as the main factor which could have contributed to the observed increase in contraceptive use in Zambia. The interviews with the family planning providers and policy makers revealed that the country has seen improvements in access to education over the years. Therefore, there has been an increase in the number of women getting education especially in urban areas. Education helps women to have a better understanding of the use of contraceptives methods. It was indicated that sexuality education has also been integrated into the school curriculum, from primary to tertiary education, which has helped adolescents to understand the importance of family planning and the benefits of using contraceptives while they are still in school. Additionally, the women felt that there has been an increase in literacy rates in the country, this has helped women to read about the benefits of contraceptive methods even with basic education. With more family planning information being disseminated through community education programmes and outreach efforts by civil society organizations. The increased literacy among women has contributed to comprehending of the information being given to women, hence improving acceptance and use of contraceptives among women.

Another factor which came out during focus group discussions and in-depth interviews was that the availability of a wide range of contraceptive methods in government health facilities has

helped women access the methods of their choice. Therefore, increased access to family planning services and commodities has also played a role in the observed increased contraceptive prevalence rate.

Furthermore, the qualitative results suggest that the increased contraceptive use could also be attributed to the widely provision of FP information and health education to women during their visits to maternal health clinics. The healthcare providers in most government and private health facilities conduct weekly counseling sessions with women. Additionally, policy makers indicated that organisations such as PPAZ, Marrie Stopes and others have been key in dissrmination family planning information to remote areas of the country. The organisations are also engaging men in their community outreach activities. These initiatives give women the opportunity to get more information about benefits and side effects of contraceptive methods. Thus, the information provided to them helps them to make informed choices. This platform has increased women's awareness and knowledge about the benefits of contraception thus, contributing to its acceptance and increased use.

"Educated women are challenging these beliefs and norms that hinder women from accessing contraceptives and realizing the importance of family planning in their lives. They understand that contraceptives can help them plan their families, space their children, and improve their overall well-being". (IDI Respondent Civil Society Organisation)

"Education has empowered women to seek out information about family planning and access services in their communities. They are aware of the different contraceptive methods available and can make informed choices based on their individual needs and preferences". (Family Planning Provider, Lusaka)

"We need more support from our men because when you are alone in this, you cannot achieve but if men are able to support the women to use contraceptive it will be a good thing" (FGD, woman, Lusaka).

"Women with higher education have a better understanding of the different types of contraceptives, their available and the benefits. This has helped them to have positive behavior towards using them" (Health Policy Staff"

Differences due to effects of the coefficients (effects of contraceptive use behaviour) were observed to have contributed the most to the increase in contraceptive use over the period 1992 to 2018. Positive contraceptive use behaviour of women living in urban areas contributed 4.33% to the increase in contraceptive use. Positive contraceptive behaviour of women with primary level of education contributed 2.22%. Furthermore, positive behaviour towards contraceptive use among women who started sexual debut during adolescence age contributed 3.45%. Women who got married during adolescence age also make a positive contribution of 4.10% to contraceptive use.

Positive contraceptive use behaviour of women whose desired number of children was 4-5 and 6 or more contributed 5.37% and 12.69%, respectively, to the increase in contraceptive use prevalence in Zambia. Contraceptive behaviour of women from communities that had high education and those from communities which had high access to CHW home visits contributed 2.02% and 4.05%, respectively (Table 6.5).

Table 6.5: Contribution of explanatory variables to the difference in contraceptive use among sexually active women between 1992-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	Percent	Coefficients	Percent
Age				
15 – 24	**Ref**		**Ref**	
25 – 34	-0.00044***	-0.11	0.01121	2.81
35 – 49	-0.02426***	-6.09	0.01034	2.59
Residence				
Urban	-0.00177	-0.45	0.01725	4.33
Rural	**Ref**		**Ref**	
Region				
Lusaka	**Ref**		**Ref**	
Central	0.00001	0.01	0.01320**	3.31
Copperbelt	0.00143	0.36	0.01062	2.67
Eastern	0.00037	0.09	0.00616	1.55
Luapula	-0.00138***	-0.35	0.00474	0.24
Northern	-0.00093	-0.23	-0.00513	-1.29
North-western	-0.00123*	-0.31	0.00175	0.44
Southern	0.00177*	0.44	0.00005	0.01
Western	0.00053***	0.13	-0.01384***	-3.47
Woman's education level				
None	**Ref**		**Ref**	
Primary	-0.01012 ***	-2.54	0.00884	2.22
Secondary	0.02074***	5.20	-0.0114	-2.86
Higher	0.00295*	0.74	-0.00502**	-1.26
Partners education Level				
None	**Ref**		**Ref**	
Primary	-0.00072	-0.18	-0.03118	-7.82
Secondary/Higher	0.00146	0.37	-0.04691*	-11.77
Employment status				
Working	**Ref**		**Ref**	
Not working	-0.00021	-0.05	-0.02752*	-6.91
Religion				
Catholic	**Ref**		**Ref**	
Protestant	-0.00642	-0.12	-0.00642	-1.61
Other	-0.00024	-0.06	0.00033	0.08
Age at first sex				
Less than 15	**Ref**		**Ref**	
15-19	0.00588	1.48	0.01375	3.45
20+	-0.00539	-1.35	-0.00399	-1.00
Age at first marriage				
Less than 15	**Ref**		**Ref**	
15-19	-0.00472**	-2.05	0.01634	4.10
20+	-0.01380***	-1.19	0.00221	0.55
Number of living children				
0-1	**Ref**		**Ref**	
2-3	0.00735***	1.85	-0.00189	-0.48
4-5	0.01352***	3.39	-0.00336	-0.84
6+	-0.00773***	-1.94	-0.01357	-3.40
Family Size Concordance				
Both want same	**Ref**		**Ref**	
Husband want more	-0.00030	-0.08	-0.00365	-0.92
Husband want less	-0.00026	-0.07	0.00371	0.93
Don't know	0.00449**	1.13	-0.00391	-0.98
Ideal Number of children				
0-1	**Ref**		**Ref**	
2-3	-0.00215	-0.54	0.00261	0.65
4-5	-0.00416	-1.05	0.02139	5.37
6+	0.02241*	5.63	0.05056	12.69

Table 6.5 continued

Desire for more children				
Want another	**Ref**		**Ref**	
No more	0.00132	0.33	-0.00874	-2.19
Undecided	-0.00008	-0.02	-0.00013	-0.03
Exposure to listening radio				
No	**Ref**		**Ref**	
Yes	-0.00175*	-0.44	-0.01557	-3.91
Exposure of watching television				
No	**Ref**		**Ref**	
Yes	0.00272	0.68	-0.01047*	-2.63
Exposure of reading newspaper				
No	**Ref**		**Ref**	
Yes	-0.00226	-0.57	-0.00511	-1.28
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	0.00060	0.15	-0.00133	-0.33
Experienced child mortality				
No	**Ref**		**Ref**	
Yes	0.03068***	7.70	-0.00459	-1.15
Community education				
Low	**Ref**		**Ref**	
Medium	0.00237	0.60	0.00373	0.94
High	-0.00354	-0.89	0.00805	2.02
Community employment status				
Low	**Ref**		**Ref**	
Medium	-0.00015	-0.04	-0.01903*	-4.77
High	-0.00241**	-0.61	-0.01501*	-3.77
Community woman decision making autonomy				
Low	**Ref**		**Ref**	
Medium	0.00074	0.19	-0.01199	-3.01
High	0.01327**	3.33	-0.00131	-0.33
Community access to CHW visits				
Low	**Ref**		**Ref**	
Medium	-0.00109*	-0.27	0.01133	2.84
High	0.00369**	0.93	0.01615**	4.05
Community desired family size				
Low	**Ref**		**Ref**	
Medium	0.00035	0.09	0.00373	0.94
High	-0.00007	-0.02	-0.00048	-0.12
Community early childbearing				
Low	**Ref**		**Ref**	
Medium	-0.00204	-0.51	0.01215	3.05
High	0.00033**	0.08	-0.01086	-2.72
Community access to media FP messages				
Low	**Ref**		**Ref**	
Medium	0.00031	0.08	-0.00865	-2.17
High	-0.00007	-0.02	-0.01054*	-2.64
Constant			0.37846**	94.98
Total	0.07001 ***	17.57	0.32844 ***	82.43

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

6.5 Summary of chapter

The chapter examined the determinants of transition in contraceptive use prevalence in Zambia. To achieve this, a two-step analysis was conducted. In step one, current determinants of contraceptive

use were analysed using multivariable multilevel logistic regression modelling. Multilevel regression model allowed for examination of both individual and community-level variables. Step two involved conducting of multivariable decomposition analysis to delineate the contribution effects of various individual and community-level factors. Multilevel analysis also allowed for determination of intercepts of various demographic and socioeconomic factors to vary across communities. The results show that contraceptive use in Zambia varied across communities. Both individual and community level factors influenced contraceptive use in Zambia.

The multivariable decomposition analysis show that overall, both changes in compositional structure and changes in women's contraceptive behaviour significantly contributed to the contraceptive use transition in Zambia between 1992 and 2018. Further analysis of specific determinants of change in contraceptive use has revealed that between 1992 and 2018: maternal education, parity, age at first sex, number of living children, fertility preference, exposure to watching television, exposure to media FP messages, experience of child mortality, community woman decision making autonomy, community access to CHW home visits were the major contributors to the trend change in contraceptive use among sexually active women in Zambia. Further tests implied that various individual and community-level contexts significantly influenced transition in contraceptive use in Zambia.

CHAPTER 7 : EFFECT OF CONTRACEPTIVE USE TRANSITION ON FERTILITY DYNAMICS IN ZAMBIA

7.1 Introduction

This chapter presents the results relating to specific Objective 3, which examined the extent to which contraceptive use transition among sexually active women of reproductive age in Zambia has affected lifetime fertility change and teenage pregnancy. Fertility dynamics was measured using changes in the number of children ever born to a women and experience of teenage pregnancy during the study period. To examine the effects of contraceptive use transition on fertility and reproductive health outcomes in Zambia, multivariate Blinder-Oaxaca decomposition regression analysis models were utilised.

Section 7.2 describes the results of decomposition analysis examining the effects contraceptive use transition on lifetime fertility reduction while controlling for individual and contextual level variables (education, marital status and place of residence) as well as intermediate variables such as age at first marriage, age at first sex, desired family size and section 7.3 present results of the effect of an increase in the contraceptive use on the prevalence of teenage pregnancies. The summary of this chapter is presented in section 7.4.

7.2 Decomposing the effect of contraceptive use transition on fertility decline in Zambia 1992 and 2018

Many studies have documented the effect of contraceptive use transition on fertility decline in SSA and elsewhere (Ariho & Kabagenyi, 2020; Bongaarts, 2017b, 2020; Garenne, 2018; May, 2017; Sarnak et al., 2021). Women who have access to and utilise contraception have more control over their reproductive options. Contraceptives have made it easy for women or couples to delay or space out their pregnancies in order to reduce family sizes by preventing unplanned pregnancies (Alkema

et al., 2013; Bongaarts, 2017b; Masiano et al., 2019a; Nanvubya et al., 2022). Contraceptives have also given women more freedom by enabling them to further their education, enter the workforce, and make educated choices regarding their reproductive health. The outcome has been improved maternal and child health, expanded economic prospects, and greater general well-being for families and societies. As a result, increased contraceptive use has helped to lower fertility rates (Ahmed et al., 2019; Anderson & Leah, 2019; Bongaarts, 2014).

The multivariable decomposition results show that the observed change in fertility between 1992 and 2018 among women in Zambia can be attributed to both the changes in compositional characteristics of women and changes in fertility behaviour of women. The results presented in Table 7.1 show that 68.98% of the reduction in fertility was due to changes in the characteristics of the women. On the other hand, the remaining 30.02% of the reduction in fertility rate was attributed to the change in the effects of the characteristics, that is the change in women's fertility behaviour.

The results show that the observed change in fertility is associated with changes in education level of women, marital status, contraceptive use, age at first marriage, and age at first sexual and desired family size preferences. On the other hand, the change in fertility behaviour of women using contraceptive methods, living in urban areas and those who started sexual debut during the age of 15-19 years had a significant positive contribution to the reduction in fertility as evidenced by the decomposition analysis.

The analysis shows the observed increase in contraceptive use in Zambia during the period 1992-2018 accounted for 17.67% of the reduction in the fertility rate in Zambia. The negative percentage in table 7.1 indicates the expected increase in the fertility rate if there was no increase in contraceptive use in Zambia. Furthermore, secondary education accounted for 33.80% of the observed reduction in fertility rate. This shows that the difference in fertility rate would increase by

33.80% if the proportion of women who had attained at least a secondary level of education in 2018 was the same as that of 1992. Similarly, an increase in the proportion of women who attained tertiary education between 1992 and 2018 contributed 4.57% to the observed reduction in fertility. The reduction in the proportion of women who were married accounted for a reduction in fertility rate by 15.95%.

Table 7.1 further indicates that the increase in the proportion of women who were married at age 20 or older contributed 33.72% to the reduction in fertility rate. Similarly, the increase in the proportion of women who initiated sexual debut at age 20 or older contributed 13.10% to the reduction in fertility rate. Additionally, the reduction in the proportion of women who desired a family size of 6 or more children contributed to the reduction of 43.14% to the fertility rate.

Regarding the effects of the coefficients, the findings in Table 7.1 show that change in fertility behaviour resulting from place of residence, education, marital status, contraceptive use and age at first sexual debut significantly contributed to the reduction in fertility during the period 1992 to 2018.

In terms of percentage contributions, leaving other factors constant, the change in fertility behavioral change of married women contributed the most to the reduction in fertility rate (67.87%). Fertility behaviour change resulting from women living in urban areas accounted for 18.37 to reduction in fertility rate. The change in fertility behaviour of women with secondary and tertiary level of education accounted for 2.92% and 2.87%, respectively. On the other hand, change in fertility behaviour of women using contraceptive methods accounted for 22.68% reduction to fertility rate while that of women who initiated first sexual debut during the age group 15-9 years accounted for 18.51 percentage reduction in fertility rate (Table 7.1).

Table 7.1: Contribution of explanatory variables to the difference fertility in Zambia during the period 1992-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	Percent	Coefficients	Percent
Residence				
Rural	**Ref**		**Ref**	
Urban	0.00359 (-0.00775, 0.01492)	0.71	0.11993** (0.04865, 0.19122)	18.37
Contraceptive use				
No	**Ref**		**Ref**	
Yes	-0.11538** (-0.19848, -0.03228)	-17.67	0.17572*** (0.05548, 0.24065)	22.68
Woman's education level				
None	**Ref**		**Ref**	
Primary	-0.07063*** (-0.08852, -0.0527)	-10.82	-0.15299** (-0.26219, -0.04379)	-23.43
Secondary	0.22064*** (0.17206, 0.26922)	33.80	0.01905 (-0.06823, 0.10633)	2.92
Higher	0.02986** (0.01171, 0.04800)	4.57	0.01876 -0.00507, 0.04258)	2.87
Marital status				
Never married	**Ref**		**Ref**	
Married	0.10416*** 0.08537, 0.12295)	15.95	0.57366*** (-0.26219, -0.04379)	67.87
Formerly married	-0.06068*** (-0.07374, -0.04762)	-9.29	0.13649** (-0.06823, 0.10633)	20.91
Age at first marriage				
Less than 15 years	**Ref**		**Ref**	
15 - 19 years	-0.17887** (-0.04985, -0.02540)	-5.76	-0.17887** (-0.29619, -0.06155)	-27.40
20+ years	-0.15451** (0.17514, 0.26512)	33.72	-0.15451** (-0.24442, -0.06460)	-23.67
Age at first sex				
Less than 15 years	**Ref**		Ref	
15 - 19 years	0.12953* (0.02943, 0.22962)	-9.84	0.12084 (-0.69543, 0.93712)	18.51
20+ years	0.25529*** (0.15651, 0.35408	13.10	-0.08254 (-0.61804, 0.45296)	-12.64
Desired number of children				
0-3	**Ref**		**Ref**	
4-5	0.00933 (-0.06082, 0.07949)	1.43	-0.09003 (-0.27564, 0.04054)	-18.01
6+	0.28167*** (0.18956, 0.37377)	43.14	-0.15115* (-0.30514, -0.04535)	-26.84
Constant			0.48513* (0.07977, 0.89050)	74.31
Total	0.44519*** (0.38139, 0.50899)	68.98	0.20766 *** (0.11969, 0.29563)	30.02

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

Table 7.2 shows results of the decomposition analysis that was conducted using a model that did not include place of residence and education level. The results showed both endowments and coefficients were significant in contributing to fertility reduction. Change in fertility due to endowments decreased to 56.92% while that associated with the coefficients component increased to 43.08%. Furthermore, the detailed decomposition results revealed that changes in the proportion of women married, marrying at later age, initiating sexual debut late and those desiring large family size made the most contribution to the reduction in the fertility rate in Zambia. The increase in proportion of women using contraception contributed 10.28% to the reduction in fertility rate. The results of the

coefficients showed that the change in fertility behaviour of women who were using contraceptives significantly contributed 22.40% to the reduction in fertility rate.

Table 7.2: Contribution of explanatory variables to the difference fertility in Zambia during the period 1992-2018, ZDHS (excluding place of residence education)

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients (95% CI)	Percent	Coefficients	Percent
Contraceptive use				
No	**Ref**		**Ref**	
Yes	-0.06727 (-0.14853, 0.01399)	-10.28	0.14703** (0.04592, 0.24815)	22.40
Marital status				
Never married	**Ref**		**Ref**	
Married	0.10781*** (0.08760, 0.12802)	16.47	0.71283*** (0.39233, 1.03332)	69.90
Formerly married	-0.06286*** (-0.07672, -0.04900)	-9.60	0.16693** (-0.06823, 0.10633)	25.50
Age at first marriage				
Less than 15 years	**Ref**		**Ref**	
15 - 19 years	-0.04649*** (-0.05912, -0.03385)	-7.10	-0.18600** (-0.31779, -0.05421)	-2.40
20+ years	0.254011*** (0.20902, 0.29900)	38.80	-0.11107 * (-0.20870, -0.01344)	-23.67
Age at first sex				
Less than 15 years	**Ref**		Ref	
15 - 19 years	**0.17348** (0.07419, 0.27278)**	**26.50**	0.00569 (-0.13305, 0.14444)	0.87
20+ years	**0.28994*** (0.19066, 0.38921)**	**44.29**	-0.08254 (-0.31252, 0.28744)	-1.92
Ideal number of children				
0-3	**Ref**		**Ref**	
4-5	0.00932 (-0.06183, 0.08047)	1.42	-0.14906 (-0.32648, 0.02837)	-22.77
6+	0.31851*** (0.22742, 0.40960)	48.66	-0.15115* (-0.41009, -0.12921)	-41.19
Constant			0.58589** (0.17040, 1.00138)	89.51
Total	0.37259*** (0.22742, 0.40960)	56.92	0.28199*** (0.19552, 0.36846)	43.08

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

7.3 Decomposing the effect contraceptive use transition on prevalence of teenage pregnancy in Zambia, 1992 to 2018

Teenage pregnancy can have significant health impact on the adolescent's course of life (Imamura et al., 2007; Jonas et al., 2016; Wall-Wieler et al., 2016). Studies show that pregnancy rates can be significantly reduced by the usage of contraceptive methods among teenagers (Chandra-Mouli et al., 2014; Chandra-Mouli & Akwara, 2020; Tripp & Viner, 2005). Teenagers who have access to and properly utilise contraceptives can avoid unintended pregnancies and subsequently lower the prevalence of teenage childbirth (Chandra-Mouli & Akwara, 2020; Jonas et al., 2016). Teenage pregnancy or early birth can have several detrimental effects on both the teen and their baby. Teenage pregnancy or early childbearing can be linked to greater rates of school dropout, fewer prospects for

higher education and employment which can lead to a higher likelihood of falling into poverty, and worse health outcomes for both the mother and the child (Aderibigbe et al., 2011; Jonas et al., 2016; Odimegwu & Mkwananzi, 2016). Teenagers who use contraceptive methods can have more control over their reproductive decisions and put off having children until they are financially and emotionally ready. Trend change in the prevalence of teenage pregnancy in Zambia shows a reduced from 33.8% to 29.2% between 1992 and 2018 (Figure 7.1).

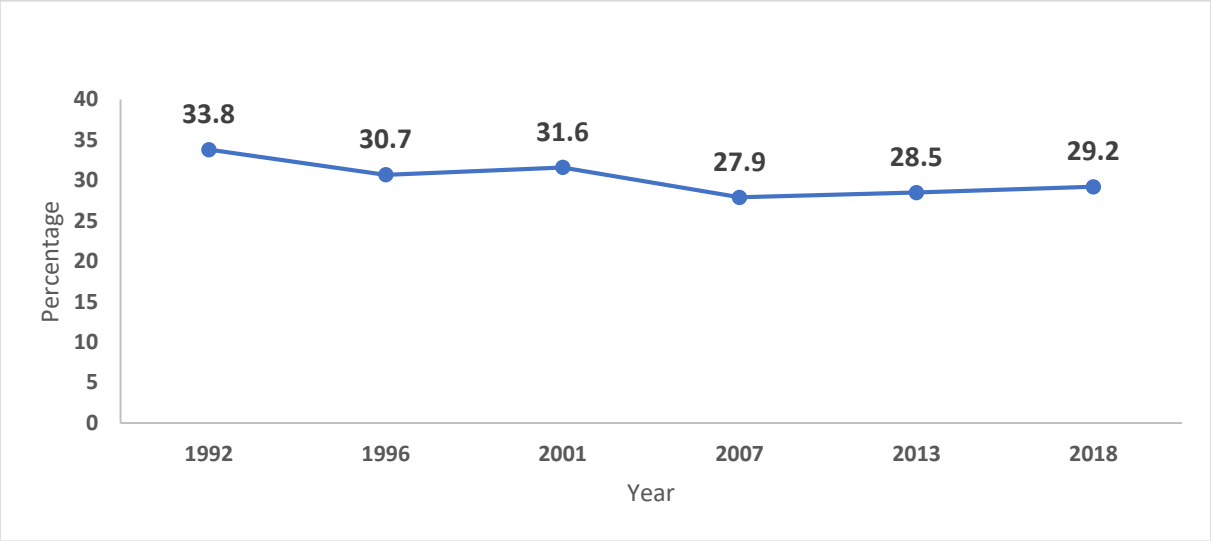


Figure 7.1: Trend in teenage pregnancy rates in Zambia during the period 1992-2018, DHS

Blinder Oaxaca-type decomposition results of the change in teenage pregnancy in Zambia between two time periods of 1992 and 2018 are presented Table 7.3. The analysis presented examined the contribution effect of contraceptive use transition among teenagers and other predictors on the reduction of teenage pregnancy rates in Zambia. The findings show that the reduction in the prevalence of teenage pregnancy in Zambia was more attributed to the change in the characteristics of teenagers than their reproductive behaviour. Sixty-four percent and 36% of the change in prevalence of teenage pregnancy was as a result of the change in compositional factors and change in reproductive behaviour, respectively.

Over the study period, the largest contributors to the reduction of teenage pregnancy in Zambia were attaining secondary or tertiary level of education, contraceptive use, delay in stating sexual debut and working status. Specifically, the increase in contraceptive use among teenagers significantly contributed to the reduction in teenage pregnancy by 54.84%. The negative percentage indicates that if contraceptive use did not increase, the prevalence of teenage pregnancy prevalence would have been higher by 54.84%. The results also show that the observed reduction in the prevalence of teenage pregnancy was explained by the change in the proportion of adolescents attaining secondary or tertiary level of education (87.15%). Similarly, the increase in the proportion of adolescents who were working significantly contributed 21.19% to the reduction in teenage pregnancy rates.

An increase in the proportion of adolescents who delayed initiating sexual debut made a significant positive contribution of 30.08% to the reduction in teenage pregnancy rates. On the other hand, change in reproductive behaviour of teenager who were living in urban areas, who had a primary level of education and those were exposed to mass-media family planning messages positively contributed to the reduction in teenage pregnancy. In terms of percentage contributions, change in reproductive behaviour among teenager residing in urban areas contributed 21.44%, those with primary education contributed 29.98% and those who were exposed to media family planning messages contributed 7.69%.

Table 7.3: Contribution of explanatory variables to the difference in prevalence of teenage pregnancy among adolescent girls during the period 1992-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	%	Coefficients	%
Contraceptive use				
No	**Ref**		**Ref**	
Yes	0.02483***	-54.84	0.00309	-6.83
Residence				
Rural	**Ref**		**Ref**	
Urban	0.00485**	-10.71	-0.00971	21.44
Region				
Lusaka	**Ref**		**Ref**	
Central	0.00177*	-3.91	0.00335	-7.39
Copperbelt	-0.00750*	16.56	0.01392	-30.75

Eastern	0.00103*	-2.29	0.00344	-7.60
Luapula	0.00087	-1.92	0.00097	-2.14
Northern	0.00250*	-5.52	0.00615	-13.59
North-western	0.00272*	-6.01	0.00172	-3.79
Southern	-0.00621**	13.71	0.01592*	-35.15
Western	0.00232***	-5.12	0.00567	-12.52
Religion				
Catholoc	**Ref**		**Ref**	
Protestant	-0.00045	1.00	-0.00565	12.48
Other	-0.00001	0.02	-0.00047	1.04
Early sexual debut				
No	**Ref**		**Ref**	
Yes	-0.01362***	30.08	-0.01228	27.12
Woman's education level				
None	**Ref**		**Ref**	
Primary	0.01162	-25.67	-0.01357	29.98
Secondary/higher	-0.03946**	87.15	-0.00395	8.72
Employment status				
Not working	**Ref**		**Ref**	
Working	**-0.00959*** **	**21.19**	0.00305	-6.74
Ideal number of children				
0-3	**Ref**		**Ref**	2
4-5	0.00000	0.00	0.00071	-1.57
6+	-0.00121	2.67	0.00765	-16.90
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	-0.00346*	7.65	-0.00348	7.69
Constant			**-0.03281**	**72.46**
Total	**-0.02900***	**64.04**	**-0.01628**	**35.96**

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

7.4 Summary of chapter

The chapter applied a multivariable decomposition regression technique to examine the effect of contraceptive use transition on the fertility dynamics in Zambia during the study period using available demographic and health survey data. Fertility dynamics was measured using the variables children ever born and teenage pregnancy. Although fertility rates remain high in Zambia, the empirical findings indicate that the observed increase in contraceptive use among sexually active women has had a positive effect on fertility decline in Zambia. Furthermore, there is evidence that contraceptive use transition in Zambia has helped to avert teenage pregnancies over time. This is despite the prevalence of teenage pregnancies rates still being high in Zambia. The results further revealed that attaining secondary or tertiary education, delaying initiation of sexual debut and delaying first marriage contributed positively to the reduction in fertility and teenage pregnancy rates in Zambia.

CHAPTER 8 : EFFECT OF CONTRACEPTIVE USE TRANISTION ON REPRODUCTIVE HEALTH OUTCOMES IN ZAMBIA

8.1 Introduction

This chapter presents the results relating to the second part of specific objective 3, which examined the extent to which contraceptive use transition among sexually active women of reproductive age in Zambia has impacted maternal health outcomes. Maternal health outcomes were measured using the variables, experience of unintended birth, birth interval and pregnancy loss. To examine the effects of contraceptive use transition on reproductive health outcomes in Zambia, multivariable Blinder-Oaxaca decomposition analysis regression models were utilised.

Section 8.2 describes the results of decomposition analysis examining the effects contraceptive use transition on the prevalence of pregnancy loss. In Section 8.3, the results of decomposition analysis measuring the effects contraceptive increase on change in birth interval have been presented. Section 8.4 looks at the effect of contraceptive use transition on the change in prevalence of unplanned births. Section 8.5 presents the results of hypothesis testing. The summary of this chapter is presented in section 8.6.

8.2 Decomposing the effect of contraceptive use transition on the prevalence of pregnancy loss in Zambia, 2001 to 2018

Many studies have documented the effect of contraceptive use on pregnancy loss SSA and elsewhere. The utilisation of contraceptives plays a pivotal role in reducing the prevalence of pregnancy loss by empowering individuals to plan and space pregnancies according to their preferences (Adde et al., 2021; Cornford et al., 2015; Dahlbäck et al., 2010; Joham et al., 2014). Access to and consistent use of contraceptives contribute to preventing unintended pregnancies, which are associated with a higher risk of adverse outcomes, including spontaneous miscarriages and stillbirths. By providing

individuals with the means to control their fertility, contraceptives effectively reduce the incidence of unplanned pregnancies, promoting maternal and fetal health. This, in turn, positively impacts overall reproductive well-being and contributes to a decline in the prevalence of pregnancy loss, underscoring the importance of comprehensive family planning programs in public health initiatives aimed at reducing adverse pregnancy outcomes.

The multivariable decomposition results show that the observed change in the prevalence of pregnancy loss between 2001 and 2018 among women in Zambia can be attributed to both the changes in their compositional characteristics of women and changes in fertility behaviour of women. The results presented in Table 8.2 show that 13.66% of the reduction in the prevalence of pregnancy loss was due to changes in the characteristics of the women. On the other hand, the larger share 86.34% of the reduction was attributed to the change in the effects of the characteristics, that is the change in women's reproductive behaviour.

The results show that the observed reduction in the prevalence of pregnancy loss was driven by improvement in women's level of education, household wealth status, employment status and exposure to listening to radio. The improvement in the prevalence of contraceptive use among women made a positive contribution of 1.41% to the reduction in prevalence of pregnancy loss.

Regarding the effects of the coefficients, the findings in Table 8.2 show that change in reproductive behaviour of resulting from women using contraceptive methods positively contributed to the reduction in the prevalence of pregnancy loss by 7.77%.

Table 8.1: **Contribution of explanatory variables to the difference the prevalence of pregnancy loss in Zambia during the period 1992-2018, ZDHS**

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	%	Coefficients	%
Residence				
Rural	**Ref**		**Ref**	
Urban	-0.0004	0.46	-0.00137	1.55
Contraceptive use				
No	**Ref**		**Ref**	
Yes	-0.00125	1.41	-0.00686	7.77
Woman's education level				
None	**Ref**		**Ref**	
Primary	0.00165	-1.87	-0.01128	12.8
Secondary	-0.00445*	5.04	0.00608	-6.9
Higher	0.00037	-0.42	0.00202	-2.29
Wealth status				
Poor	**Ref**		**Ref**	
Moderate	0.00042**	**-0.48**	-0.00913*	10.35
Rich	-0.00094**	1.07	-0.01787*	20.26
Working status				
Not working	Ref		Ref	
Working	-0.00193***	2.19	0.00229	-2.6
Age at first sex				
Less than 15 years	Ref		Ref	
15 - 19 years	-0.00163	1.85	0.00394	-4.47
20+ years	-0.00003	0.03	0.00975	-11.06
Woman decision making autonomy				
No	**Ref**		**Ref**	
Yes	-0.00345	3.92	-0.02270***	25.74
Exposure to listening to radio				
No	**Ref**		**Ref**	
Yes	-0.00234***	2.65	0.0111	-12.58
Exposure to watching television				
No	**Ref**		**Ref**	
Yes	0.00143	-1.62	0.00523	-5.93
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	0.00051	-0.57	-0.00024	0.27
Constant			**-0.04711**	**53.42**
Total	**-0.01205***	**13.66**	**-0.07614*****	**86.34**

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

8.3 Decomposing the effect of contraceptive use transition on birth interval in Zambia, 1992 to 2018.

Birth interval which refers to the time period between the birth of one child and the conception of the next, can be significantly affected by the use of contraception (Karra et al., 2022; Nausheen et al., 2021; Yeakey et al., 2009). A short birth interval is defined by the World Health Organization (WHO)

as a space of less than 33 months between two successive live births (WHO, 2005). Individuals and couples can purposefully space out their pregnancies and lengthen the time between births by utilising contraception. A shorter birth interval may have a number of effects on the health of the mother and her child. Having multiple pregnancies at close intervals can be physically and psychologically challenging for a mother (Damtie et al., 2021; Pimentel et al., 2020). Because of the possibility that the mother's body may not have fully recovered from the previous pregnancy and delivery.

Short birth interval may raise the chance of health problems for both mothers and newborns. Shorter time between births may also make it difficult for mothers to provide for and satisfy the demands of each child. Trend change in the prevalence short birth interval among of reproductive aged women in Zambia showed a reduction from 49.0% to 32.5% between 1992 and 2018.

Table 8.3 presents multivariable decomposition results of the effect of contraceptive use transition and other covariates on prevalence of short-birth interval among Zambian women during the period 1992 to 2018. The findings show that reduction in prevalence of short-birth interval was more attributed to changes in fertility behaviour of women than the change in the characteristics of women. About 31% and 61% of the change in prevalence of short-birth interval was because of the change in fertility bahaviour and change in compositional factors of women, respectively.

Specifically, the increase in contraceptive use significantly contributed 2.55% to the reduction in the prevalence of short-birth interval. The most contributing compositional factors to the reduction in the prevalence of short-birth interval in Zambia were the ideal number of children, number of children ever born, desire for more children. In terms of specific contributions, the reduction in the proportion of women desiring 6 or more children contributed 10.32% to the reduction in birth-interval prevalence. Furthermore, reduction in the proportion of women having 6 or more children contributed

4.80% 4.80% and the increase in the proportion women who desired no more children contributed 2.71% to the reduction in the prevalence of short-birth interval.

The results also show that the observed reduction in the prevalence of short-birth interval was explained by changes in fertility behavior of women living in rural areas, working women and those who were exposed to family planning messages. In terms of percentage contribution, fertility behaviour of women living in rural areas contributed 9.0%; women who were in employment contributed 3.51% and those exposed to family planning messages contributed 4.99%.

Table 8.2: Contribution of explanatory variables to the difference in short-birth interval among sexually active women between 1992-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	%	Coefficients	%
Contraceptive use				
No	**Ref**			
Yes	-0.00502	2.55	-0.0017	0.86
Age				
15 – 24	**Ref**		**Ref**	
25 – 34	-0.00078***	0.40	0.01411	-7.16
35 – 49	-0.02328***	11.81	0.01328	-6.74
Residence				
Urban	**Ref**		**Ref**	
Rural	0.00121	-0.62	-0.01773	9.0
Woman's education level				
None	**Ref**		**Ref**	
Primary	-0.00070	0.35	0.00025	-0.13
Secondary	-0.00015	0.08	0.00242	-1.23
Higher	-0.00028	0.14	-0.00111	0.56
Employment status				
Mot working	**Ref**		**Ref**	
Working	**0.00032**	**-0.16**	-0.00691	3.51
Children ever born				
0-3	**Ref**		**Ref**	
4-5	0.00157	-0.79	-0.00100	0.51
6+	**-0.00946*** **	**4.80**	**0.02266**	-11.50
Ideal Number of children				
0-3	0.00180	-0.91	0.01365	-6.93
4-5	0.00616	-3.13	0.08126	-41.22
6+	-0.02034	10.32	0.18052	-91.57
Desire for more children				
Want another	**Ref**		**Ref**	
No more	-0.00535	2.71	-0.00673	3.41
Undecided	-0.00007	0.04	0.00411	-2.09
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	0.00009	-0.05	-0.00984**	4.99
Constant			-0.34538	175.2
Total	-0.06089***	30.89	-0.13624***	61.11

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

8.4 Decomposing the effect contraceptive use transition on prevalence of unintended births in Zambia, 1992 to 2018

Unintended birth refers to births that happen when individuals or couples do not want or intend to have a child at that specific time (Guzzo & Hayford, 2011; Singh et al., 2010). Utilising contraceptives has the potential to significantly reduces the number of unintended births among women of childbearing age (Kallner & Danielsson, 2016; Khan & Islam, 2022). The number of undesired births can decrease when individuals and couples utilise contraceptives consistently and efficiently to help avoid unexpected pregnancies. Unplanned pregnancies can result in a number of negative outcomes, including financial pressure, emotional stress, a lack of educational and employment possibilities, and difficulties in providing the child with proper care (Bahk et al., 2015; Yazdkhasti et al., 2015). Contraception allows women to have more control over their reproductive decisions and prevent unplanned pregnancies. Trend change in the prevalence unintended birth among of reproductive aged women in Zambia showed a reduction from 46.4% to 41.5% between 2001 and 2018.

Table 8.4 presents multivariable decomposition results of the effect of contraceptive use transition and other covariates on prevalence of unintended birth among Zambian women of reproductive age during the period from 2001 to 2018. The findings show that reduction in prevalence of unintended birth was more attributed to changes in fertility behaviour of women than the change in the characteristics of women. About 23% and 77% of the change in prevalence of unintended birth was as a result of the change in fertility bahaviour and change in the compositional factors of women, respectively.

Specifically, the increase in contraceptive use positively contributed 5.12% to the reduction in the prevalence of uninteded birth in Zambia. The most contributing compositional factors to the reduction in the prevalence of unintended birth among Zambian women were age, education,

exposure to media FP messages, exposure radio, and exposure to television. In terms of specific percentage contributions, the increased in the proportion of women with tertiary education positively contributed 8.11% to the reduction in prevalence of unintended birth. Furthermore, reduction in the proportion of women aged 35-49 years contributed 11.81% while the increase in the proportion of women who had exposure to radio and media FP messages contributed 6.21% and 23.03%, respectively to the reduction in the prevalence of unintended birth.

The results also show that the observed reduction in the prevalence of short-birth interval was explained by changes in fertility behaviour of women living in urban areas, women who were working, women who received family planning information from the health facility, and those who received FP messages through community health worker visits. In terms of percentage contributions, fertility behaviour of women living in urban areas contributed 8.0%; fertility behaviour of women who were working contributed 41.23% and those who received family planning messages from health facility contributed 24.17%.

Table 8.3: Contribution of explanatory variables to the difference in prevalence of unintended birth among sexually active women between 2001-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	%	Coefficients	%
Contraceptive use				
No	Ref		Ref	
Yes	-0.00359	5.12	0.01011	-14.43
Age				
15-24	Ref		Ref	
25-34	0.00613	-8.76	-0.0465***	66.46
35-49	-0.00827	11.81	-0.0471***	67.25
Residence				
Rural	Ref		Ref	
Urban	-0.00019	0.28	-0.00569	8.12
Woman's education level				
None	Ref		Ref	
Primary	0.00403	-5.75	-0.04714	67.3
Secondary	0.00644	-9.19	-0.02087	29.8
Higher	-0.00568*	8.11	-0.00141	2.02
Wealth status				
Poor	Ref		Ref	
Moderate	-0.00098	1.4	0.00126	-1.79
Rich	-0.00208	2.97	-0.00772	11.02

Working status				
Not working	Ref		Ref	
Working	0.01271	-18.15	-0.02888	41.23
Age at first sex				
Less than 15 years	Ref		Ref	
15 - 19 years	-0.00142	2.03	-0.00774	11.06
20+ years	0.00603	-8.6	0.01031	-14.72
Told about FP at health facility				
No	Ref		Ref	
Yes	-0.0026	3.71	-0.01693*	24.17
Visited by CHW				
No	Ref		Ref	
Yes	-0.00069	0.99	-0.00329	4.69
Exposure to listening to radio				
No	Ref		Ref	
Yes	-0.00435	6.21	-0.01365	19.49
Exposure to watching television				
No	Ref		Ref	
Yes	-0.00402	5.74	-0.02418*	34.52
Exposure to media FP messages				
No	Ref		Ref	
Yes	-0.0161	23.03	0.02453	-35.02
Constant			**0.05308****	**-243.91**
Total	**-0.01594**	**22.76**	**-0.05411****	**77.24**

*=p<0.05; **=p<0.01; ***p=0.001; Ref=Reference Category

8.5 Hypotheses testing

This study's hypotheses are addressed in this section considering the assumptions presented in Chapter 2, under Section 2.5. The first hypothesis (**H_a**1) of this study stated that 'there has been a significant transition in contraceptive use among women of reproductive age in Zambia over period (1992 to 2018).' This hypothesis was based on the assumption that if a country is characterized by improvements in access to maternal healthcare, education, and women's employment opportunities and woman decision making autonomy, contraceptive use will increase. This increase can be attributed to factors such as increased awareness of family planning information, such as benefits of using contraceptives, improved access to contraceptives, and changing individual and societal attitudes towards family planning (Alabi et al., 2019; Boadu, 2022; Karaoğlan & Saracoglu, 2018; Mangimela-Mulundano et al., 2022).

In Zambia, the government, with support from the cooperating partners, has been implementing family planning aimed at increasing access to FP information, especially among marginalised communities. In 2013, the government development a comprehensive multi-sectoral family planning scale-up plan following the 2012 London summit on accelerating family planning utilization among women around globally. The strategy aimed to address the bottlenecks surrounding access and acceptance of modern family planning services in the country (Ministry of Community Development Mother and Child Health, 2013).

This study found that contraceptive use had increased significantly during the analysis period considered in this study. Trend analysis conducted on contraceptive use transition between 1992 and 2018 showed that utilisation of contraceptive methods increased significantly in Zambia at the national level as well as at rural-urban residence level ($p<0.05$). Therefore, the null hypothesis (**H_o**1) that contraceptive use increase in Zambia was not significant during the analysis period is rejected. The study's findings support the proposed assumption.

The second hypothesis (**H_a**2) states that 'contraceptive use increase in Zambia can be explained by changes in women's compositional characteristics.' This hypothesis is based on the premise that changes in women's factors such as education level, employment opportunities, household wealth, fertility preference and access to mass-media are key in changing contraceptive behaviour of women. This hypothesis was based on the assumption that if women have higher levels of education, are employed, have access to mass-media or belong to wealth households will have correct knowledge and autonomy to an make informed choice about family planning and the use of contraceptives methods (Alabi et al., 2019; Boadu, 2022; Kohan et al., 2014; Nadeem et al., 2021; Seidu et al., 2022; Tesfa et al., 2022).

Therefore, an increase in the proportion of women with secondary or tertiary education, employed women or who belong to rich households, is expected to contribute to the increase in contraceptive use. Whereas, on the other hand, a little or no change in the proportion of women with education or employed may pose challenges with access to family planning services or lead to low autonomy among women to make an informed decision regarding contraceptive use which eventually translates into low or no increase in contraceptive use rates. The study findings indicate that at the national level, the changes in the compositional factors of women significantly contributed to the increase in contraceptive use in Zambia ($p<0.05$). Compositional factors refer to the women's components or elements that contribute to the observed transition in contraceptive use. In this case compositional factors relate to women's education, age, wealth status, employment status, fertility experience and access variables.

Specifically, improvement in level of education ($p<0.05$); reduction in number of living children ($p<0.05$); reduction in desired family size ($p<0.05$); community decision making-autonomy ($p<0.05$) and reduction in experience of child mortality ($p<0.05$) were the major contributors to the increase in contraceptive use. Therefore, the null hypothesis (**H_o**2) that changes in compositional factors did not significantly contribute to the increase in contraceptive use in Zambia is rejected.

The third hypothesis (**H_a**3) speculated that 'the increase in contraceptive use is associated with a reduction in fertility and improvement in maternal health outcomes in Zambia.' Increased contraceptive use among women of reproductive age has the potential to lead to a reduction in fertility and improved maternal health outcomes such as a reduction in the prevalence of uintended births, reduction in short-birth interval and reduced risks of teenage pregnancy (Ahinkorah, 2020a; Chandra-Mouli & Akwara, 2020; Damtie et al., 2021; Khan & Islam, 2022; Yeakey et al., 2009). This can be achieved through women's ability to plan a pregnancy, ensuring timely access to family planning

services and empowering women to pursue educational and career opportunities. These factors, when achieved, can contribute to better maternal health which in turn can reduce fertility and maternal mortality.

The findings of this current study showed that the increase in contraceptive use in Zambia significantly contributed to the reduction in fertility rate during the period 1992 to 2018 ($p<0.05$). Furthermore, the results show that the increase in contraceptive use significantly contributed to the reduction in the prevalence of teenage pregnancy in Zambia ($p<0.05$). The findings on this hypothesis were significantly on two maternal outcomes (fertility rate and teenage pregnancy). This hypothesis could only be confirmed on the relationship between contraceptive use increase and reduction in fertility rate and teenage pregnancy ($p<0.05$). However, for the reduction in the prevalence of unintended births and short birth interval, we fail to reject the null (**H_o**3) hypothesis since the association was not significant on these two maternal indicators ($p>0.05$).

8.6 Summary of chapter

The chapter applied a multivariable decomposition analysis technique to examine the effect of contraceptive use transition on the reproductive health outcomes in Zambia during the analysis period, using available demographic and health survey data. Reproductive health outcomes were measured using the DHS variables pregnancy loss, short-birth interval, and unintended births. Although most reproductive health outcomes in Zambia are still of public health concern, the empirical findings indicate that the observed increase in contraceptive use among sexually active women has had an impact on improvement maternal health outcomes in Zambia. This is evidence is shown by the positive reduction in the prevalence of unintended births, pregnancy loss and short birth interval. This is despite the prevalence of unintended births rates still being high in Zambia. The results further revealed that attaining secondary or tertiary education, delaying initiation of sexual

debut, being in employment, and access to media family planning messages contributed positively to improving maternal health outcomes in Zambia.

CHAPTER 9 : DISCUSSION

9.1 Introduction

This chapter's aim is to discuss the study's findings considering the body of existing literature within the context of sub-Saharan Africa. The primary aim of this research was to examine the factors explaining contraceptive use transition in Zambia. The study, based on secondary and primary data, investigated and explored how changing social context has influenced contraceptive use transitions in the country over time. Social context is deemed important in understanding contraceptive use transition as evidence from other context proved it potential to inform women's behaviour change. Thus, this investigation was done to inform the necessity to improve family planning policy and programming with the view of further increasing contraceptive prevalence rate in the country. Furthermore, the study established how the observed contraceptive use transition has affected fertility dynamics and reproductive health outcomes in Zambia.

This study was important because it has helped to provide evidence of how investment in family planning programming has impacted to the national agenda to reduce fertility and improve maternal health in Zambia in the country and sub-Saharan Africa at large. The chapter is structured into five key sections: Trend change in contraceptive use in Zambia; social context and current contraceptive use; determinants of trend change in Zambia; effect of contraceptive use transition on fertility and maternal health outcomes for the country. The chapter further highlights the strengths and limitations of the study.

8.2 Contraceptive use transition in Zambia

This study revealed that transition in contraceptive use prevalence in Zambia showed a steady 30.2 percentage point increase between 1992 and 2018. This translates to a 1.2% increase annually. Furthermore, results show a recent increase of 6.6% between 2007 and 2018. The greatest amount of change in contraceptive use happened during the period 1992 to 2001 (16.7%). Although the prevalence showed a significant increase over time (1992-2018), the current rate of use is still low in Zambia (45.0%). The transition showed a higher rate of increase in rural areas compared to areas (33.7% versus 28.1%), although the rate of utilisation in urban areas is still higher compared to rural areas. This shows that there are still inequalities by place of residence in the utilisation of contraception among sexually active women in Zambia.

Furthermore, although all the provinces in the country showed an improvement in contraceptive use rates over the past 26 years, the improvement was not equally distributed across provinces. Only four provinces (Central, Eastern, Northern-Western and Southern provinces recorded an increase higher than the national average. On the other hand, Western province recorded the least amount of increase. This is evidence that regional disparities exist in terms of contraceptive use transition in Zambia. Whatever the causes, it is important to investigate these geographical disparities further in order to understand reasons behind the variations. What exactly is causing a slow change in contraceptive use in Western province remains to be further explored. However, the results have a significant implication for health professionals to consider designing family planning interventions that take into account regional context.

Differences in the prevalence between Western province and other provinces could be attributed to a complex interplay of socio-economic disparities, and healthcare-related inequalities. Western province is considered as the poorest province in the Zambia. Therefore, the low economic

opportunities in Western province could have impacted access to education and healthcare services, affecting individuals' knowledge about and ability to obtain contraceptives. Furthermore, the region could have the problem of gender dynamics and inequalities which may influence contraceptive decisions. In such societies where women have limited decision-making power or face opposition from their partners or families, contraceptive use tend to be lower. Further research can provide more detailed insights into the reasons behind low contraceptive use prevalence in Western region of Zambia.

The observed improvements in rates of contraceptive use at national and regional levels could be a reflective of government investments in public health interventions aimed at increasing availability and access to and demand for contraceptive methods among women in the country (Mbizvo et al., 2020; Ministry of Community Development Mother and Child Health, 2013; Ministry of Health, 2018; Ministry of Health (MOH), 2017; Silumbwe et al., 2018a). Findings from qualitative analysis suggest that the improvement in women accepting contraceptive methods is because of the availability and accessibility of services, the promotion of benefits, increased awareness and education, and the involvement of civil society organizations and partnerships. These factors have created an enabling environment for women to make informed choices about their reproductive health and to access the contraceptive methods that best suit their needs. These results have significant implications for strengthening reproductive health policy and programming to sustain and further increase contraceptive prevalence rate in Zambia.

Similar studies conducted in other countries in SSA also show that contraceptive use prevalence has been on the increasing trajectory (Beguy et al., 2017; Kalinda et al., 2022; Muhoza et al., 2016; Pillai & Teboh, 2010; Worku et al., 2015; Yussuf et al., 2020). A study in Rwanda showed that contraceptive use increase by 35% between 2005 and 2010 (Muhoza et al., 2016). Furthermore,

a recent study in Rwanda revealed that transition in contraceptive use improved by 12.4% between 2010 and 2019 (Kalinda et al., 2022). The observed improvements in family planning utilisation were attributed to positive political will supporting family planning programming in the country (Muhoza et al., 2016, 2018). Studies from Rwanda reported that the government with the support of USAID and UNFPA increased budgetary allocation to family planning programmes which helped to increase availability of contraceptive commodities and enhanced FP education campaigns which raised awareness about contraceptive use benefits among women and partners hence creating demand for family planning (Kalinda et al., 2022; Muhoza et al., 2016; National Institute of Statistics of Rwanda, Ministry of Health, and ICF, 2021; Ndaruhuye et al., 2009; Scanteianu et al., 2022; Schwandt et al., 2021).

Yussuf and others in 2020 found that transition in contraceptive use in Tanzania showed an increase of 11.3% between 2004 and 2016 (Yussuf et al., 2020). Similarly, a study in Cameroon showed that contraceptive use increased by 8.7% between 1991 and 2014 (Pillai & Teboh, 2010). These studies attributed the transition in utilisation of contraceptive methods to deliberate government public health interventions, which strengthened national family planning programming through heavy financial and human capital investments (Pillai & Teboh, 2010; Yussuf et al., 2020). The implementation of context specific FP programmes in Cameroon was noted to have created a conducive environment for positive contraceptive behaviour among women (Pillai & Teboh, 2010).

In Ethiopia, transition in contraceptive use increased by 30% between 2000 and 2011 (Worku et al., 2015). Similarly, an increasing trend was observed in Kenya, where contraceptive use among women improved by 19% during the period 2000 and 2012 (Beguy et al., 2017). In Kenya, it was reported that implementing of the National Reproductive Health Strategy 2009-2015 enhanced equitable access to high-quality reproductive health services, particularly for marginalized

populations. On the other hand, in Ethiopia, it was observed that transition in contraceptive use was partly attributed to the removal of taxes on importation of contraceptive commodities. This initiative led to increased access to contraceptive methods. Contraceptive methods were provided for free in public health facilities in Ethiopia, thus increasing access among vulnerable women (Akamike et al., 2019; Fekadu et al., 2020; Wado et al., 2019).

8.3 Drivers of contraceptive use transition in Zambia

The second objective of this study was to explore the social, economic, geographic and demographic factors that explain the contraceptive use transition in Zambia. Statistical analysis here was done in two steps. Step one involved examining the individual and community level-determinants of current contraceptive use by applying multilevel regression modelling on 2018 DHS data. The second step relied on the results from multilevel analysis to conduct a decomposition analysis to determine predictors of transition in contraceptive use in Zambia.

8.3.1 Social context and current contraceptive use in Zambia

Many studies in SSA have found that community contexts, such as community wealth, community education and community norms were associated with contraceptive use (Anwar, 2019; Ngome & Odimegwu, 2014; Ononokpono et al., 2020; Yaya et al., 2018; Zegeye et al., 2022). Although this evidence is overwhelming in SSA, most of the previous studies in Zambia have focused on examining individual and household determinants of current contraceptive use. Thus, the influence of social context (community context) on contraceptive use was less explored in the Zambian context.

This study established that several factors operating at both individual and contextual levels were significantly associated with contraceptive behaviour of sexually active women in Zambia. The persistent low prevalence of contraception use in Zambia remains a public health and social concern

to achievement of sustainable development goals on improving maternal and child health. These results suggest urgent attention for integrating community context when designing or strengthening family planning policies and programming in Zambia to improve acceptability and utilization, especially among marginalised communities.

The effects of community characteristics on contraceptive use among women of reproductive have been well-documented in other sub-Saharan Africa countries (Ahinkorah, Seidu, Appiah, et al., 2020a; Bolarinwa et al., 2021b; Dias & de Oliveira, 2015; Masiano et al., 2019b; Nyarko, 2020; Odimegwu & Chemhaka, 2021; Tsehay, 2022). Findings from this current study show that there are regional variations in contraceptive use in Zambia. Women from provinces such as Luapula, Northern, Southern and Western had a lower likelihood of using contraceptive methods in comparison with their counterparts living in Lusaka province. Similar findings have been reported by studies conducted in SSA countries (Dias & de Oliveira, 2015; Fenta & Gebremichael, 2021; Mulugeta et al., 2022; Zegeye et al., 2022). The probable reason for this result is that regions have variant socio-economic and cultural context which influence women's decision to utilise contraceptive methods.

Regarding place of residence, literature shows that women from rural areas are less likely to utilise contraceptives compared to their counterparts in living in urban areas (Abate & Tareke, 2019; Chola et al., 2020; Hailegebreal et al., 2021; Makupe et al., 2019; Mare et al., 2022). This observation is explained because women in rural areas are usually faced with challenges in access to health facilities. Even where access is not a problem, women in rural areas are usually faced with social and cultural norms that favour high fertility desire (Alemayehu et al., 2015; Lasong et al., 2020a; Moreira et al., 2019; Ndayizigiye et al., 2017). However, in Zambia, although the women living in Urban areas had higher odds of using contraceptive method, the rate of use was not different from though living in rural areas. This can be explained by strengthened family planning programming in rural

areas of Zambia (Mbizvo et al., 2020; Ministry of Community Development Mother and Child Health, 2013; Silumbwe et al., 2018a).

Findings from this current analysis revealed that women who belonged to communities that had a high percentage of women who desired a large family size were less likely to utilise contraceptive compared with their defined counterparts. This is because women who have a high fertility desire would want to achieve their reproductive goal by avoiding contraception use. Furthermore, women who have high fertility desire are expected to have inadequate contraceptive knowledge and are therefore rarely likely to access contraceptives (Ahinkorah, 2020b; Ahinkorah, Seidu, Appiah, et al., 2020b; Beekle & McCabe, 2006; Sangi-Haghpeykar et al., 2006).

In this study, there were differences in proportions of women using contraceptives by education level. This suggests that education impacts on contraceptive behaviour of sexually active in Zambia. The finding supports conclusions of earlier studies conducted in Ghana (Nyarko, 2020), Mali , Ethiopia (Tsehay, 2022), Nigeria (Bolarinwa et al., 2021b), Malawi (Masiano et al., 2019a), Eswatini (Odimegwu & Chemhaka, 2021) which reported education as a predictor of contraception use. Educated women. Several studies in different parts of the world have reported the association of education with maternal health seeking behaviour (Ahinkorah, Ameyaw, et al., 2021; Ewunetie et al., 2018; Roy et al., 2013; Say & Raine, 2007; Seidu, 2021). This suggests that increasing schooling opportunities for women have a significant bearing on improving maternal health. Although women from communities with high education exhibited high odds of using contraceptive methods, the results suggest that their usage was not significantly different from women coming from communities with low education.

Literature shows that women from household classified as moderately rich or rich are more likely to use contraceptive methods in comparison to those from poor households (Ahinkorah, Seidu,

Appiah, et al., 2020a; Odimegwu & Chemhaka, 2021; Tegegne et al., 2020; Zegeye et al., 2021, 2022). Similarly, prior studies have shown that women from communities with high wealth status showed high odds of contraceptive use (Alabi et al., 2019; Amara, 2015; Bolarinwa et al., 2021b; Wasswa et al., 2021). Women from rich households can overcome barriers to financial constraints, which can inhibit access to contraception. Sometimes, the cost of contraception, including the initial purchase and ongoing expenses, can be prohibitive for women from poor families who may have lower income levels and fewer economic opportunities (Alabi et al., 2019; Bolarinwa et al., 2021b; Wasswa et al., 2021).

This study, however, found that community wealth status and community employment status were not significantly associated with contraceptive use in Zambia. The findings could be explained by the fact that contraceptive methods are provided for free in all public health facilities, which makes the service easily accessible even to women with from low income status (Mbizvo et al., 2020; Ministry of Community Development Mother and Child Health, 2013; Silumbwe et al., 2018a).

The study has shown that women from communities with high decision making autonomy were more likely to use contraceptive methods. This finding is consistent with what has been found in prior studies conducted in Nigeria, Ethiopia, Mozambique, Mali, Democratic Republic of Congo and Uganda (Alabi et al., 2019; DeRose & Ezeh, 2010; Dias & Oliveira, 2015; Mare et al., 2022; Ononokpono et al., 2020; Whidden et al., 2021). The reason for this is that women's decision-making autonomy enables women to make an informed decision making their own health hence improving contraceptive use behaviour.

Additionally, women from communities with high access to FP messages through community health worker visits had an increased likelihood of using modern contraceptives compared to those from communities with which had low access. This shows that community health worker visits can

enhance contraceptive behavior, as women are more likely to accept or believe messages being shared by people who belong to their communities. This finding is consistent with prior studies conducted in Tanzania, Nigeria, Niger, Kenya, Malawi and Ethiopia (Anasel & Haisma, 2020; Brooks et al., 2019; Olaniran et al., 2019; OlaOlorun & Tsui, 2020; Wondimagegenhu, 2012). This implies that enhancing community health worker visits has the potential to improve contraceptive behaviour among women in Zambia.

Women from communities that had high a proportion of women who desired a high family size were less likely to use contraceptives compared to those from where family size desire was low. Women with a strong desire for more children may intentionally avoid using contraceptives to increase their chances of getting pregnant. They may prioritise their desire to conceive over preventing a pregnancy (Kimani et al., 2015; Speizer & Lance, 2015). This call for specific family planning interventions targeting women from communities with high fertility desires.

The study results show that communities that had a high proportion of women who experienced early childbearing were less likely to use contraceptive methods compared to their counterparts living in communities with low experienced of early childbearing. Women who experience early childbearing are more likely to drop out of school, hence they will have inadequate education to understand the benefits of contraception use (Chandra-Mouli & Akwara, 2020; Coles et al., 2011; Hofferth et al., 2001). This call for action to strengthen access and acceptance of contraceptives methods among adolescents.

Our study also found that married women were more likely to use contraceptive methods compared to the never-married women. This is because married women usually have a higher risk of failing pregnant because of coital frequency. This finding resonates with what has been previously reported in other studies (Debelew & Habte, 2021; Ebrahim et al., 2021; Fenta & Gebremichael,

2021; Ngome & Odimegwu, 2014). There is therefore a need to strengthen promotion interventions targeting at increasing contraception use among women in other marital groups.

The variations in utilisation of contraceptive utilisation according to different social-demographic and contextual factors observed in this study underscore the need to strengthen family planning intervention design and implementation. Family planning initiatives should aim at enhancing access and influencing reproductive behaviour, especially sexually active women from marginalized communities because they high risk of pregnancy. Enhancing family planning promotion messages via information communication technologies would be key in promoting the benefits of contraception as the study has shown that women who owned a mobile phone, and those who had exposure to radio or television were more likely to use contraceptives.

Differences in terms of how individual and contextual factors influence contraceptive use among sexually active women were observed, thus suggesting the need for contextually targeted interventions to address the problem of low CPR in Zambia. There were unobserved or unmeasured community factors that influenced contraceptive use behaviour. Therefore, the results suggest that there are factors operating at the community level, which were not included in the current analysis, which may be associated with contraceptive use behaviour in Zambia. These may include, but are not limited to socio-cultural differences between communities (that may ultimately influence women's contraceptive behaviour, community family planning outreach, and family planning mobilization efforts). Therefore, there is a need to strengthen community health structures that promote family planning programmes thorough community profiling, and community engagement approaches involving relevant stakeholders such as civic leader, traditional leaders, community leaders and religious institutions.

The study has provided useful findings to inform the need to integrate community context when designing SRH programmes. However, there is need for rigorous evaluation of existing family planning programmes to understand the supply and demand barriers associated with family planning programming in Zambia. Doing so will inform appropriate targeting of interventions aimed at scaling up uptake of contraceptive methods.

8.3.2 Determinants of contraceptive use transition in Zambia

Increasing utilisation of contraceptive methods is critical for improving maternal health in sub-Saharan Africa (Adane et al., 2020; Ahinkorah, Seidu, Appiah, et al., 2020a; Bongaarts, 2020; Bongaarts & Hardee, 2019; May & Rotenberg, 2020). Results from this study showed that contraceptive use increased significantly in Zambia during the analysis period. The increase was mainly as a result of changes in women's contraceptive behaviour than the change in compositional factors. The decomposition analysis show that about 18% of the overall increase in contraceptive use in Zambia was as a result of changes in women's compositional factors. On the other hand, 82% of the improvement in contraceptive use was explained by changes in women's contraceptive behaviour. Even though the change in contraceptive prevalence rate was largely due to behavioural factors, the changes in women's compositional factors were also key in driving contraceptive use transition in Zambia.

The change in women's contraceptive behaviour among women in Zambia may be attributed to government position to reposition family planning programming through implementation of favourable public sexual reproductive health policies and programmes. These included the Reproductive Health Policy launched in the year 2000, Family Planning Guidelines and Protocols developed in 2006; the Integrated Family Planning Scale-Up Plan 2013-2020 and the Adolescent Health Strategy 2017-2021 (Ministry of Community Development Mother and Child Health, 2013;

Ministry of Health, 2000; Ministry of Health (MOH), 2017; Ministry of Health, World Health Organization, United Nations Population Fund, United Nations Child Fund, Health System Support Program, 2006).

These strategies could have collectively strengthened family planning programmes through improved financial commitment to FP programming, which improved procurement of contraceptive commodities and addressed bottlenecks in the supply chain. This led to increased access to contraceptives among women in Zambia (Ministry of Community Development Mother and Child Health, 2013). Furthermore, family planning programmes increased community awareness on the benefits of modern contraceptives use and increased mass-media dissemination of information regarding sources of family planning services (Chola et al., 2020; L. Chola et al., 2015; Cordero et al., 2019; Ministry of Health, 2018; Nduku & Simo-Kengne, 2022; Silumbwe et al., 2018b). The study finding has significant policy implication for strengthening FP policy and programmes in order to achieve the FP2030 targets following failing to achieve the FP2020 target of modern contraceptive prevalence rate of 58%.

Consistent with prior studies conducted in Rwanda, Tanzania, Ethiopia, and Kenya (Beguy et al., 2017; Kalinda et al., 2022; Worku et al., 2015; Yussuf et al., 2020). This study showed that change in contraceptive use was mainly as a result of changes in women's contraceptive behavior. However, the finding that 18% of the increase in contraceptive use in Zambia was explained by differences in women's characteristics is lower compared to what was found in Ethiopia (34%), Cameroon (69%) and Rwanda (23%) (Kalinda et al., 2022; Pillai & Teboh, 2010; Worku et al., 2015). The variations in population structure and socio-economic characteristics of women in the study countries may account for the disparity in the observed changes in CPR across different counties. Despite the

country differences, the finding of this study imply that when the population structure of women changes in accordance with key determinants, a considerable change in CPR occurs.

This current study builds on the observations of earlier studies in Zambia, which revealed that various demographic and socio-economic factors relating to women influenced contraceptive use differently (Chola et al., 2020; Hancock, Chibwesha, et al., 2015; Lasong et al., 2020b; Mangimela-Mulundano et al., 2022; Nduku & Simo-Kengne, 2022; Pauline Bakibinga et al., 2019). The study provides an opportunity to understand the contribution effects of social factors to the increasing trend in contraception use among sexually active in Zambia. Understanding the factors that favorably affect changes in contraceptive use among women would give policymakers the information they need to improve the current family planning initiatives and create the appropriate adjustments to the interventions to maintain the upward trend.

Among the key factors influencing the rise in using of contraceptive methods in Zambia were compositional changes relating women's education (secondary or higher). Because of the apparent influence of women's education on contraception behaviour and fertility, the proportion of women with secondary education increased in the country during the analysis period and was accompanied by an increase in the usage of contraceptives over time. The improvement in the proportion of women attaining secondary education in Zambia could be attributed to the country's implementation of basic education policy, which enhanced access to education, especially for girls in rural areas (Hapompwe, 2020; Masaiti, 2019; McCadden, 2015). Findings from qualitative analysis acknowledges that education empowers women to make informed decisions about family size, as such women who prioritise educational goals make efforts to access information about family planning. By understanding the benefits of family planning and having the knowledge to make informed choices,

educated individuals are more likely to use contraceptives and plan their families according to their needs and aspirations.

The finding of this study, which show that education played a key role in contributing to the observed change in contraceptive use in Zambia resonates with what has been reported in prior studies conducted in Rwanda, Ethiopia, Kenya and Cameroon (Beguy et al., 2017; Kalinda et al., 2022; Pillai & Teboh, 2010; Wondimagegenhu, 2012; Worku et al., 2015). This observation potentially suggests that educated women are more likely to make informed decisions on their reproductive health by adopting contraceptive use. Furthermore, their informed decisions may be because of the known maternal health benefits which accrue from utilising contraceptive methods (Ahinkorah, Seidu, Appiah, et al., 2020b; Ntoimo & Chirwa-Banda, 2017; Simona et al., 2022). On the other hand, the finding of this study on the role of education on contraceptive use transition disagrees with the results of a study conducted by Yussuf and others in 2020, which reported no effect of education in driving contraceptive use transition in Tanzania (Yussuf et al., 2020). This finding from this current study showed that contraceptive behaviour change among women is facilitated by education in a significant way.

Although literature shows that women's empowerment through increased employment opportunities can make women to have financial power, which can increase the potential to access a wide range of contraceptive services and methods (Ahmed et al., 2010; Al Riyami et al., 2004; Baum et al., 2013; Fekadu et al., 2020; Karaoğlan & Saracoglu, 2018; Moursund & Kravdal, 2003), this study, on the other hand, has shown that employment had no significant effect on contraceptive use increase in Zambia. This finding could be attributed to the fact that there was an insignificant increase in the proportion of women who were working during the period 1992-2018. This is evidenced by the DHS report of 2018, which shows little increase in proportion of working women in Zambia

(Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). Similar findings were reported in Rwanda and Ethiopia (Kalinda et al., 2022; Worku et al., 2015). This finding implies the need to implement interventions that can increase employment opportunities for women in order for it to create an impact on contraceptive use increase.

The study also shed light on the role of age at first marriage and the number of living children in influencing contraceptive use transition. The results show that the increase in the proportion of women who got married at older ages significantly contributed to the rise in utilisation of contraceptive methods. Furthermore, the reduction in the proportion of women having a large family size also contributed to the contraceptive use transition in Zambia. These results show that implementing interventions that encourage women to desire small family would enhance contraceptive utilisation. Studies conducted elsewhere have also shown that reduction in family size among women was associated with enhanced utilisation of contraceptive methods to enable meet their reproductive goals of having a small family size (Ahinkorah, Seidu, Armah-Ansah, et al., 2020; Kalinda et al., 2022; Koenig et al., 1987; Srivastava et al., 2019).

Other compositional changes that also made contribution to the observed increase in contraceptive use increase were the reduction in proportion of women who desired to have 6 or more children and the reduction in the proportion of women who experienced child mortality. The observation that a decline in the percentage of women who experience child mortality is connected with increased contraceptive use lends credence to the idea that there is a replacement effect in the correlation between fertility and child survival. In other words, experience of death of a child can lead to woman abandoning contraceptive use in order to replace a dead child (Lloyd & Ivanov, 1988; Mensch, 1985; United Nations, 1996). This finding is consistent with what was found by studies conducted in Kenya and Ethiopia which reported that reduced experience of child death among

women had a compositional effect on changes in contraceptive use (Beguy et al., 2017; Wondimagegenhu, 2012). The finding of this study implies that improving child health strategies further, will help to accelerate on contraception uptake in the country.

This study also showed that compositional changes, such as the increase in proportion of women belonging to communities with high women's decision-making autonomy and women from communities that had high access to CHW visits had significantly contributed to the increase in contraceptive prevalence rate in Zambia. Decision-making autonomy among women has been described as a key ingredient of woman empowerment initiatives, which has a great potential to improve women's decision making choice to use contraceptive methods (Al Riyami et al., 2004; Alabi et al., 2019; Mare et al., 2022; Nadeem et al., 2021). Furthermore, access to family planning information through community health worker (CHW) visits has been reported by prior studies as a key strategy that has enhanced utilisation of contraceptives, especially among women in rural settings. Thus, enhancing CHW visits should be considered top priority strategy when implementing FP promotion messages targeting rural women.

Contrary to the expectation, the increase in proportion of women accessing family planning messages through media sources had no significant contribution effect to the contraceptive use increase in Zambia. This is despite many studies in SSA in showing evidence that women who accessed family planning message through mass-media had increased likelihood of using contraceptive methods (Ahmed & Seid, 2020; Babalola et al., 2017; Dwomoh et al., 2022; Glennerster et al., 2021; Igbinoba et al., 2020; Jacobs et al., 2017). A recent study in Rwanda also reported similar findings (Kalinda et al., 2022). On the other hand, Yussuf and others (2020) in Tanzania found that an increase in the proportion of women who heard family planning messages via

media channels had a significant positive contribution to contraceptive use transition (Yussuf et al., 2020).

There are two possible reasons to explain this unexpected finding. First, although the proportion of women who had access to FP messages via mass media increased between 1992 and 2018, the percentage is still low. By 2018, only two women out of ten reported having accessed FP messages via mass media. Thus, the increase may not have had a significant effect to stir contraceptive use transition. Second, the effectiveness of FP messages depends on their content, clarity, relevance as well as cultural sensitivity. If the messages do not adequately address the specific needs, concerns, and cultural contexts of the target audience, they may not lead to behaviour change or increased contraceptive use. The finding of this study could suggest the need to redesign media family planning messages to make them more effective.

This study showed significant behaviour effects on contraceptive use transition in Zambia. Behavioural changes about contraception of sexually women living in urban areas, with a primary level of education, those who got married in adolescence age group, those who desired a large family size, those belonging to communities with high education levels and those from communities that high access to CHW visits showed a positive contribution to the increase in contraceptive use. These findings suggest existence of robust family planning programme in the country. Further, it could explain why the effects of behaviour change on contraceptive use transition outweighed the effects of compositional changes in driving contraceptive use increase. The findings of this study are consistent with what other scholars have found (Kalinda et al., 2022; Muhoza et al., 2016, 2018; Wondimagegenhu, 2012; Worku et al., 2015; Yussuf et al., 2020).

These finding that contraceptive behaviour was the major determinant of change in contraceptive use may also explain why in Zambia women who were less educated (no education and

primary) showed the largest among of increase in utilisation of contraceptive methods over the study period, 1992-2018. Similarly, contraceptive use increased more among rural women than among urban women. This has contributed to narrowing the gap in utilisation between rural and urban women. Effective FP programme has the potential to increase knowledge and understanding about benefits of contraceptive use, especially among marginalised women (Bongaarts & Hardee, 2019; Dwomoh et al., 2022; Mutombo et al., 2014; Olubodun et al., 2020; Prata et al., 2017).

The findings of this study have implications for consideration to redesign the family planning communication campaigns in order to make them more effective. This is because health promotion campaigns have in other settings shown potential to enhance the self-esteem and authority of women to seek maternal health services. Furthermore, strategies that have proved to create an impact in influencing contraceptive use transition, need enhancement so they can create more impact.

8.4 Effect of contraceptive use transition on fertility dynamics

The third specific objective of this study was to examine how contraceptive use transition has affected fertility dynamics and reproductive health outcomes in Zambia. The analysis was conducted using multivariable decomposition analysis techniques. Population dynamic in this analysis referred to fertility change and was measured using the variable children even born to a woman. Maternal health outcomes were measured using three variables collected in the DHS; prevalence of unintended births, prevalence of short birth interval and teenage pregnancy.

Zambia, like many other countries in SSA, has undergone a fertility transition over the past three decades. Total fertility rate has reduced from an average of 7.2 children in 1980 to an average of 4.7 children in 2018 (Central Statistical Office, 2012; Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). The shift in levels of fertility is typically associated with social,

economic, and demographic changes that have happened in the country (Central Statistical Office, 2012; Chola & Michelo, 2016; Ministry of National Development Planning, 2019).

The period 1992–2018 presents a phase of nearly three decades in which Zambia's fertility has changed in observable ways, making it appropriate for analysis of fertility change. This made it possible for this study to not only observe changes in contraceptive behaviour, but also changes in the demographic composition of the population through examining fertility change. The period 1992–2018 was also characterized by major population policy shifts and family planning programme changes that may be associated with demographic changes in Zambia. During this period, Zambia's population policy (first formulated in 1989) then revised in 2007. The revised population policy of 2019 highlighted the importance of strengthening access to family planning and sexual reproductive health services to address persistent high fertility in Zambia (Ministry of National Development Planning, 2019). These changes may have come with some effects on fertility in Zambia.

The decomposition analysis showed that changes in women's compositions factors accounted for the largest share in contribution to the observed fertility change in Zambia. Nearly 70% of the change in reduction in fertility was due to differences in women's compositional factors during the analysis period. On the other hand, change in women's fertility behavior over the period 1992–2018 accounted for 30% of share to the observed reduction in fertility.

Prior studies conducted in other countries have affirmed that contraceptive use increase among fecund women has a negative effect on fertility rate (Bongaarts, 2017a; Ezeh et al., 2009; Garenne, 2018; Schoumaker, 2019; Westoff & Cross, 2006). This study found that the observed 30.8% increase in contraceptive use during the period 1992-2018 was associated with 17.76% of the decrease in fertility rate in Zambia.

This study's findings agree with what other scholars found about the positive effect of contraceptive use increase on fertility change (Ariho & Kabagenyi, 2020; Ezeh et al., 2009; Garenne, 2018; Majumder & Ram, 2015; Schoumaker, 2019). A study in Uganda found that contraceptive use increase contributed 8.2% to reduction in fertility rate during the period 2006-2006 (Ariho & Kabagenyi, 2020). Another study in Ethiopia reported that an 18.6 percentage increase in contraception recorded during the period 2000-2011 contributed 30% to decline in fertility during the same period (Wondimagegenhu, 2012). The finding of this current imply that increasing contraceptive use further among Zambian women is key to Zambia's population policy's goal of fertility reduction.

This study also highlights the importance of education, age at first marriage, age at first sex and the desired number of children in determining fertility trends. Results show that during the study period, there was an increase in the proportion of women attaining secondary education, those who reported the age at first marriage of 20 years or older and who initiated sexual debut at the age at 20 years or older.

This shows that age at first sexual encounter or first marriage is a key factor in achieving major fertility reductions. Hertrich (2017) and Casterline et al. (2017) researched the relationship between the age of the first marriage and the beginning of the fertility transition and claims that fertility transition is extremely improbable when women enter their first partnerships at very young ages. According to these scholars' findings (Casterline et al., 2017; Hertrich, 2017), a change in the age at first marriage was more of a sign of the beginning of fertility decrease than the change in contraception use for many countries in SSA. This conclusion is supported by the findings of this, study that have shown that delay in age at first marriage was one of the major contributors to fertility

change besides increased age at first sexual debut and reduced desire for a large family size. However, contraceptive use transition has equally played a key role in driving fertility change in Zambia.

8.5 Effect of contraceptive use transition on maternal health outcomes

This study also examined the effect of contraceptive use increase on maternal health outcomes in Zambia. The first analysis involved understanding the effect of contraceptive use transition on adolescent health. Adolescent analysis was measured using on the prevalence of teenage pregnancy. Teenage pregnancy remains a significant global public health issue (Imamura et al., 2007; World Health Organization, 2016; Yakubu & Salisu, 2018). In Zambia, teenage pregnancy rates in Zambia have been consistently high, though rates have slightly reduced from 34% in 1992 to 29% in 2018 (Phiri et al., 2023; Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF, 2019). Many studies have attributed low contraceptive use rates in adolescents as one of the major contributors to a high prevalence of teenage pregnancy in most sub-Saharan Africa countries (Ahinkorah, Kang, et al., 2021; Chandra-Mouli et al., 2014; Gunawardena et al., 2019; Iyanda et al., 2020; Machira & Palamuleni, 2017; Mardi et al., 2018).

The decomposition analysis showed that change in the compositional factors of adolescents was the major contributor to decline in teenage pregnancy in Zambia. Sixty-four percent and 35% of the decline in the prevalence of teenage pregnancy was as a result of differences in adolescents socio-demographic factors and reproductive behaviour, respectively. Furthermore, the findings show that an increase in contraceptive use by 21.7% during the period 1992 to 2018, averted teenage by 54.84%. This study's findings are in agreements with what has been reported in prior studies that increased usage of contraceptive method has the potential to reduce the risk of teenage pregnancy (Ahinkorah, 2020a; Chandra-Mouli & Akwara, 2020; Gunawardena et al., 2019; Iyanda et al., 2020; Mardi et al.,

2018). On the other hand, results of this study contradicts the findings of a study from Ghana, which reported that current use of contraceptive method was associated with a significantly increased risk of experiencing teenage pregnancy (Tetteh et al., 2022).

In Zambia, unintended births remain a significant concern, contributing to various social, economic, and health challenges among women and their families. The 2018 DHS showed that 38% of births were reported as unintended. This study also examined the effect of contraceptive use transition on the prevalence of unintended births and short birth interval. Although the results show that contraceptive use increase did not significantly contributed to the reduction in the prevalence of unintended births and short birth interval, some positive effects were noted. The decomposition analysis showed that the increase in contraceptive use between 1992 and 2018 positively contributed 5.12% to the reduction in the prevalence of unintended births.

Although though the effect was not statistically significant, this study results confers with results of previous research, which asserts that nonuse of contraception was associated with high unintended births (Blumenthal et al., 2011; Kallner & Danielsson, 2016; Serbanescu et al., 2010; Tanne, 2008). These findings imply that there need to further increase contraceptive prevalence in order for it to have a significant impact on reducing unintended births in the country, especially in rural settings. On the other hand, this study found that the increase in the proportion of women who attained secondary or tertiary level education and increased exposure to family planning messages were the major contributors to the observed reduction in the prevalence of unintended births in Zambia. Thus, signifying the importance of education in improving maternal health.

Another finding of interest in this study was the effect of contraceptive use transition on short birth interval. In Zambia, short birth intervals have been a prevalent issue, with many women experiencing pregnancies spaced closely together. This is particularly common among women in

rural areas and those with lower education and socioeconomic status. The relationship between contraceptive use and reduction in the prevalence of too close births has been documented by many studies around the global (Ajayi & Somefun, 2020; Belachew et al., 2023; Brown et al., 2015; Nausheen et al., 2021; Shimels Hailemeskel et al., 2020).

Drawing upon the empowerment and the social capital theories, the theoretical framework provided a comprehensive lens to understand the intricate relationships among key socio-demographic, economic, health and geographic variables and how they influenced contraceptive use transition in Zambia. Additionally, the adopted conceptual framework which was designed based on existing empirical studies served as a lens through which the analysis and interpretation of findings was determined. The adopted theoretical and conceptual foundation was paramount for framing the research questions, hypotheses, and guiding the selection of research methods. The choice of empowerment and social capital theories is justified by its proven efficacy in similar studies and its applicability to the current research context.

A woman's choice to use contraceptives is affected by a complex interplay of social factors that includes her own demographic characteristics, interpersonal relationships, as well as the broader sociocultural environment in which they live. To understand women's decision to use contraceptives methods, which is a key agent in influencing contraceptive use change, all possible contributing factors must be considered. This study sought to encompass all factors that have the potential to influence women's use of contraceptives. That is why a social context understanding of contraceptive use transition was adopted in terms of both theory and methodology. The theoretical framework used in this study, for example, reflects the fact that women are nested within complex interpersonal relationships and communities or neighborhoods and that the effects of these relationships vary in terms of characteristics.

It is in this regard that this study adopted the empowerment and social capital theories, reflecting social phenomena which operate at different level to influence contraceptive use. As such, contraceptive use can be viewed as a function of the level of empowerment among women, their access to social capital, and the degree to which gender inequality and problematic social norms are present in their social environment. The key woman empowerment elements include participation in the decision-making process, education attainment, access and ownership of resources, access to information, employment opportunity, and higher socioeconomic status.

This study has shown that improvement in women compositional factors, such as education, decision-making autonomy, access to family planning information and child mortality experience reduction, fertility experience and achieving reproductive health goals among other individual and community-level factors were key in driving contraceptive use change. Therefore, as emphasized in the empowerment and social capital theories, social change among women is key in influencing contraceptive use transition

The findings not only validate the relevance of core principles of the empowerment and social capital theories in explaining contraceptive use transition in Zambia, but also shed light on other theoretical aspects that should be considered when understanding contraceptive use change. This study has provided evidence that examining contraceptive use change should also be understood in the lens of other theoretical underpinning. This is because this current study has shown that other factors, such as experience of child mortality and desired family size, have a significant association with contraceptive use increase among sexually active women in Zambia.

8.6 Strengths and limitations of the study

This study had a number of strengths. First, this is the first study in Zambia to examine contraceptive use transition in Zambia at national and rural-urban level. The study utilised nationally representative data from the six cross-sectional datasets collected using the Zambia Demographic and Health Survey. Thus, findings of this current study can be generalised to the entire population of sexually active women aged 15-49 year in the country.

Second, the study applied a mixed method design, which allowed for an in-depth examination of the phenomenon of interest. Qualitative data collected through focus group discussions with women and in-depth interviews with the Ministry of Health official and staff from organisations implementing family planning programming was used to compliment quantitative data. The qualitative data helped to answer some of the "why" questions regarding the factors associated with contraceptive use transitions in Zambia.

Third, the DHS methodology's rigor validates the accuracy and quality of data and outcomes therefrom. Therefore, the results from this research can be comparable across countries where similar studies have been conducted using DHS. Because of this, this study significantly adds to our understanding of how social context has influenced contraceptive use transition in Zambia. Due to the dearth of longitudinal data in the majority of African countries, the DHS data provide a good chance to measure repeated outcomes.

Fourth, this study utilised multilevel regression analysis to identify determinants of current contraceptive use in Zambia among sexually active women. This method adequately accounts for hierarchical data structure in the DHS datasets. Therefore, the method applied was appropriate for examining both individual and contextual factors associated with current contraceptive use in

Zambia. Prior studies in Zambia had ignored the influence of social context in understanding contraceptive use.

Fifth, it is the first comprehensive study to have applied the multivariable decomposition analysis approach, based on Blinder-Oaxaca two component technique, to delineate the factors that have been contributing to transition in utilisation of contraceptive methods in Zambia. The study further used decomposition analysis to examine how the observed contraceptive use transition during the period 1992 to 2018 has influenced total fertility rate and maternal health indicators in Zambia.

Sixth, the study has reiterated that the tenets of the empowerment and social capital theory are important in explaining contraceptive use among women in Zambia. This confirms that the study's theoretical framework was relevant in studying the phenomenon of interest. Contraceptive use transition in Zambia. Previous studies that applied these theories have also shown their relevance in examining maternal health behaviour in other settings.

Despite the strengths, this study also had limitations, first, since women in DHSs are usually asked to self-report information about contraceptive use, therefore, there is a possibility of under or over reporting of the event which could be subject to social desirability bias or lead to measurement error. Further, women report events that happened in the past, there is therefore a possibility of recall bias. An effort was made in the analysis to report 95% confidence level.

Second, the main decomposition analysis, which covered the period 1992 to 2018, did not include some variables, such as household wealth status, visiting the health facility in the last 12 months, told about FP at the health facility and experienced pregnancy loss. Although these variables were reported in other studies to have influenced contraceptive use transition, they were not analysed

in this study because they were not collected in the 1992 DHS, which was the baseline for this analysis.

Third, the study did not explore the influence of sociocultural norms, values and beliefs, since there was no data collected in the DHS on these variables. Maternal health-seeking behaviours, which influence the use of contraceptives and other maternal health outcomes, are significantly influenced by cultural norms, beliefs, and practices unique to tribe groupings.

Fourth, our measures of contextual factors in the study's analysis represent a proxy that is based on data as captured by the DHS. Apart from region and place of residence, since primary sampling units were used as a proxy for the community, the construction of compositional community variables by aggregating individual level features may have influenced the results at the community level, leading to selection bias and the potential for multicollinearity. Therefore, the measure of contextual factors may not reflect the actual experience from the communities. This is because the DHS used the primary sampling unit as the measure of community. However, the community structures may be differently defined on the ground. However, this was examined, and multicollinearity between independent variables was not found.

Fifth, the ZDHS data were collected through a cross-sectional study design that does not permit measurement of causation between individual and contextual correlates with outcomes of interest. However, due to lack of longitudinal data, repeated cross-sectional data offer an opportunity to study transition in maternal health care utilisation over time.

Limitations in this study may have influenced the interpretation of results in different ways. Firstly, the reliance on self-reported data on contraceptive use data introduces the potential for recall bias and social desirability bias, as participants might be inclined to provide responses perceived as more socially acceptable. Additionally, the cross-sectional design of the study restricts the

establishment of causal relationships, limiting our ability to infer findings. The sample size, while representative of the target population, may have lacked the statistical power to detect subtle associations, particularly within some subgroup analyses. Moreover, the qualitative study was conducted in a specific geographic area, potentially limiting the variability of the socio-cultural influences of contraceptive use transition to broader Zambian population. Finally, unforeseen confounding variables not addressed in the research design may have influenced the observed outcomes.

Despite its limitations, the study's findings support the key tenets of the theories of empowerment and social capital in explaining changes in using of contraception. The study also provides evidence that understanding social context is key when designing family planning programmes aimed at improving contraceptive behaviour among women in Zambia. Furthermore, the study has delineated the factors responsible for contraceptive use transition in Zambia. This information is needed to guide informed decisions on how to redesign or reprogramming of family planning interventions in Zambia in order to sustain the increasing trend in contraceptive use.

CHAPTER 10 : CONCLUSION AND RECOMMENDATIONS

9.1 Introduction

This chapter highlights the main findings and conclusions of the research. It further presents the implications and recommendations for consideration to strengthen family planning and sexual reproductive health policy and interventions in Zambia. Furthermore, the chapter highlights the study's contribution to: (a) literature (b) theory and (c) discourse-issues about contraception and family planning field. Last, the chapter points out potential directions for future research works.

9.2 Summary of results and conclusions

This study found that the contraceptive prevalence rate in Zambia among sexually active women rose significantly by 30.8 percentage points between 1992 and 2018. This translates to an average of 1.2% change annually. The major share of contraceptive use increase in Zambia happened between 1992 and 1996 (10.3%) while the least increase was recorded during the period 2013-2018 (0.2%). Similarly, in urban areas, the biggest change happened during the phase 1992 to 1996 (12.9%). On the other hand, in rural areas, the major increase occurred during the period 2001 and 2007 (10.8%). Although women in rural areas showed a higher percentage increase in utilisation of contraceptive methods, rural areas still have lower utilisation rates compared to urban areas (45.6% versus 44.5%). However, the rural-urban gap has narrowed.

In Zambian, contraceptive use transition varied by region. Eastern province recorded the highest contraceptive use increase between 1992 and 2018 (42.5%) while Western province recorded the lowest increase during the same period (18.3%). In terms of age, contraceptive use increase has followed a similar trajectory over. Adolescents and young women aged 15-24 recorded the least amount of change (31.9%) during the analysis period, while women aged 25-34 recorded the highest increase (41.3%). Women aged 15-24 had the highest increase during the period 1992 -1996 (10.7%).

On the other hand, the biggest increase in contraceptive use among women aged 25-34 occurred during the period 1996 to 2001 (11.0%). The results show that although change in contraceptive use increased significantly during the analysis period, the change was not proportionally distributed by region.

In terms of level of education, those with primary level education recoded the most increase in utilisation of contraceptive methods during the period 1992 to 2018 (34.8.0%) while those with tertiary education recoded the least increase in use of contraceptive (4.0%). Women who were in employment recorded an increase of 28.4% in prevalence of contraceptive use while those who were unemployed recorded an increase of 33.6%. Sexually active women who were married recorded the most increase in contraceptive use prevalence (39.4%). On the other hand, never married women recorded an increase of 16.7%.

Transition in utilisation of injections or long-acting methods among sexually active women increased significantly by 63.7 percentage points between 1992 and 2018. The increase was more pronounced in rural (73.7%) compared to urban areas (54.9%). At the national level, the largest increase in utilisation of injections or long-acting methods was recorded during the period 2007 and 2013 (37.8%). On the other hand, the lowest increase occurred during the period 1996 to 2001 (8.8%).

The study has revealed that both the individual and community-level factors were important in influencing contraceptive use transition in Zambia. At individual level, increasing level of education was associated with increased probability of using contraceptive methods among sexually active women. Similarly, the study found that belonging to rich households increased the probability of utilising contraceptive methods among women. Furthermore, being in employment significantly increased the chance of using contraceptive methods among women in Zambia.

Regional disadvantage was observed in terms of contraceptive use in Zambia. Women living in Luapula, Northern, Southern and Western provinces had significantly lower odds of using contraceptive methods compared to women living in Lusaka province. These results reflect disparities in socio-economic, cultural values and access related factors associated with maternal health services across the regions in Zambia. Communities with a high proportion of women who had decision-making autonomy had high rates of contraceptive use compared to those from communities with a low proportion of women with decision-making autonomy. Similarly, the study found that women from communities with high access to community health worker visits had significantly higher rates of contraceptive utilisation. On the other hand, belonging to communities that had high fertility desire reduced the chances of utilising contraceptive methods among women in Zambia.

The study found that both changes in women's compositional structure and changes in women's contraceptive behaviour significantly contributed to the change in contraceptive use in Zambia. However, change in contraceptive behaviour of women was the main contributor to the observed increase in contraceptive use in Zambia. Improvements in access to education among women, reduction in experience of child mortality, changes in fertility desire and increase in improvement in woman decision-making autonomy were the major contributors to transition in contraceptive use among sexually active women in Zambia. This study further revealed that changes in women's compositional factors affected change in contraceptive use differently in rural and urban areas. For example, improvement in education had more impact in influencing contraceptive use transition in urban areas than in rural areas.

This study further reveal that change in contraceptive behaviour of women whose desired large family size, those living in urban areas, those living in communities with high access to CHW visits, of women aged 35-49 years and of who were married in adolescence age contributed

significantly to the increase in contraceptive use in Zambia. The results of this study affirm the study's hypothesis that women's compositional factors have significantly contributed to contraceptive use transition in Zambia.

An association between an increase in contraceptive use and reduction in fertility rate in Zambia was observed. The results show that an increase in contraceptive use had a negative association with fertility rate in Zambia. This signifies the importance of family planning programmes in efforts to reduce fertility rate in Zambia. Similarly, the increase in contraceptive use has had a significant effect on averting teenage pregnancy rates in Zambia. However, other factors such as reduction in the proportion of married women, an increase in the proportion of women marrying at age 20 or later and reduction in the proportion of women initiating early sexual debut were the major contributors of fertility decline in Zambia. The study results confirm the hypothesis that the increase in contraceptive use has impacted reduction in fertility rate and teenage pregnancy.

Overall, contraceptive utilisation among sexually active women in Zambia has shown a steady and significant progressive increase in the 26-year period from 1992 to 2018, despite regional and area disadvantage in contraceptive use transition. The observed increase in contraceptive use in Zambia is largely due to positive change in contraceptive behaviour among sexually active women of reproductive age. This could be because of the country's huge investment in family planning programming. The enhanced implementation of family planning programs by the government and its stakeholders, such as UNFPA, USAID, PPAZ and the Centre for Reproductive Health and Education (CRHE) has contributed to the improved procurement and delivery of contraceptives in the country. These organizations have supported the government in ensuring that contraceptives are well-stocked and available at health facilities, including rural areas and youth-friendly spaces.

However, improvement in women's empowerment through enhanced education and desire for fewer number of children plays a key role in influencing contraceptive use transition in Zambia. Therefore, there is a need for careful consideration of integrating social context when designing family planning interventions to further sustain the increasing trend of contraceptive use among sexually active women in Zambia. The study findings have shown that women's empowerment elements, such education decision-making autonomy and access to family planning information among other individual and community-level factors, as emphasised in the empowerment and social capital theories, have been crucial in driving contraceptive use transition in Zambia. Furthermore, sustained increase in contraceptive prevalence rate has the potential to further reduce fertility rate and teenage pregnancies in Zambia, hence improving maternal health. To further improve utilisation of contraceptive services, it is important for the government and healthcare providers to continue promoting awareness, providing comprehensive information, and addressing any barriers or concerns that women may have. Additionally, involving men in discussions and decision-making regarding family planning can also contribute to better support and acceptance of contraceptive methods especially among communities with less education.

9.3 Policy and programme implications

The following policy and programme implications stem from the current study's findings:

First, the transition in CPR shows that utilisation of contraceptive methods among sexually active women has increased significantly over time in Zambia. This is owed to the heavy investment in family planning programming by the government and stakeholders. Although transition has slowed in the past ten years (2007-2018), findings suggest that family planning programmes in Zambia have been yielding intended results, as observed by the increasing CPR. This is despite the country not meeting its planned target of 58% CPR by 2020. Thus, there is a need to scale-up sexual reproductive

health and family planning interventions to improve supply, demand and access of FP services and commodities, especially among the marginalised communities in Zambia.

Second, the variations in transition in contraceptive use by region shows that there are inequalities in socio-economic conditions across the provinces in Zambia. Western, Luapula and Northern provinces have the lowest change in contraceptive use among women. These regions are predominantly rural, with high poverty and fertility levels comparatively to other provinces. Access to education and health facilities is another challenge as women move long distances to access maternal health care services. This suggests that absence of empowerment opportunities, especially for women, can be a hindrance to speeding up access and utilisation of family planning services. There is a need for investment in education facilities and primary health care facilities for these regions to enable vulnerable women to have easy access family planning services. Furthermore, this finding implies that designing of family programmes in Zambia should take into consideration differing community context. For example, strengthening of community health worker visits should be considered a priority for rural areas, as it has shown the potential to increase utilisation of contraceptive methods in such settings.

Third, this study has established that change in contraceptive use in Zambia was largely driven by changes in contraceptive behaviour of sexually active women during the period 1992 to 2018. This implies that SRH public health interventions being implemented by government and non-governmental organisations working in the family planning sector have been effective in driving contraceptive behaviour change of women. This can be explained because women who receive accurate information about the available contraceptive options and the health benefits can make informed choices to accept to use and take control of their reproductive health. Furthermore, changing societal norms because of availability of information about benefits of a smaller family size has led

to a shift in attitudes towards promoting greater acceptance and use of contraception among women. Therefore, SRH interventions aimed at changing contraceptive behavior among women should be strengthened in order to further speed up contraceptive use transition in Zambia. Additionally, findings of this study suggest that social context influenced contraceptive use differently in urban and rural areas. For example, improvement in education had more impact on urban areas than in rural areas.

Fourth, this study has established that education was one of the key compositional factor that has positively contributed to the increasing trend in utilisation of contraceptive methods among women in Zambia. Evidence from the findings of this current study suggests that increasing the proportion of women with secondary education in Zambia has a significant impact on trend increase in contraceptive use. This means that education is an important driver to improving maternal health in the country. Scholars have also viewed education as a key ingredient for enhancing woman empowerment. This is because women who are educated can make informed and independent decision about their own health. The government of Zambia, with support from the World Bank, has in the past five years invested financial resources in building secondary schools country wide to enhance access to secondary education, especially in rural areas where access has been a challenge for a long time. There is, therefore, a need for the Zambia government to continue increasing and sustaining the investments in the education sector, especially for the rural population. This investment will create a long-term positive impact on improving maternal health will eventually reduce maternal mortality in the country.

Firth, the study found that reducing the child mortality rate in Zambia has the potential to increase contraceptive use trend. Reducing child mortality is also key to improving maternal health. This implies that investments in child health strategies such as vaccinations, detecting disease early,

child nutrition support and growth monitoring through under five clinics is key for improving maternal health as it can enhance contraception uptake. Thus, women do not experience child mortality can decide to continue utilising contraception if they have reached their desired family size. On the other hand, women who experience child mortality may stop using contraceptive methods if they have pressure to replace a lost child. Additionally, women may decide to reduce their fertility desire if they do not experience child mortality. This is because pregnancy and childbirth carry potential health risks for women. Using contraception enables them decide about their reproductive health. Therefore, there is a need for the government to continue investing in child health programmes to improve child survival.

Sixth, Zambia is one country in SSA experiencing high fertility rate and high prevalence of teenage pregnancy. The study established that the increase in contraceptive use during the period 1992 to 2018 significantly contributed to the reduction in fertility rate in the country. Furthermore, the observed reduction in teenage pregnancy rates was significantly impacted by the increase in contraceptive use among adolescent girls. Thus, these results have significant implications for strengthening family planning commodity supply and access in order to further reduce fertility rate and teenage pregnancies in the country. There is also need for government through the Ministry of Health to consider revising the adolescent reproductive health policy to allow adolescents to access family planning services at health facilities without parental consent. This will help to increase the uptake of contraception among adolescent girls.

9.4 Recommendations

Based on the findings from the study, the following recommendations are being proposed:

i) To reduce inequalities in utilisation of contraceptive methods among regions in Zambia. The Government should address the existing disparities in the socioeconomic conditions at regional level.

The variations in contraceptive utilisation across regions indicate the need to design tailor made sexual reproductive health and family planning interventions that are appeal to the social and cultural environment of each region. Deliberate community based family planning programmes aimed at improving access and enhance contraceptive behaviour change should be implemented in the regions that have shown low utilisation and low change in trend use, such as, Western, Luapula, Northern provinces.

ii) The government should increase and sustain the funding in the education sector, especially increasing access to secondary school education facilities. Education sector priorities should ensure to improve provision and access to education facilities at local community level country wide. Increased access to affordable education will encourage families from marginalised communities to keep girls in school. These initiatives will enable women and the country to continue to benefit from education gains in the form of increased utilisation of contraceptive methods, which will contribute to improving maternal health.

iii) In Zambia, an increase in transition of contraceptive use over time has been positively impacted by a decrease in the experience of child mortality among women. Therefore, to further increase child survival rates in the country, the government, with support from its cooperating partners, should enhance implementation of child health programmes. Such interventions should include prioritising investments in accessible and quality maternal and child healthcare services, particularly in marginalised areas, to ensure that pregnant women have access to skilled birth attendants, essential antenatal and postnatal care services within the local primary health care facility. Furthermore, health sector funding should prioritize strengthening maternal and child health programmes that focus on prevention and early detection of disease in children.

iv) To sustain positive contraceptive behaviour among sexually active women in Zambia, it is important that sexual reproductive health education be introduced to adolescents at an early stage in their life cycle. Therefore, the government, through the Ministries of Education and Health, should roll out the implement of the comprehensive sexuality education programmes in schools and communities country wide. This initiative has the potential to improve knowledge and awareness of sexual reproductive health, including knowledge of contraceptive methods and their benefits. These programs should address gender norms, promote healthy relationships, and emphasize informed decision-making regarding sexual and reproductive health, especially among out-of-school adolescents.

v) To maximize the benefits of mass-media's potential to reach out to a wider population, there is need to redesign media based family planning messages in order to make them more effective. Organizations complementing government effort in implementation of sexual reproductive health programs should design community context tailored family planning messaging and health promotion communication campaigns. The targeted communication campaigns should be broadcast using both national television, radio stations, social media platform and local community radio stations to ensure that messages reach the marginalized communities. The messages should be intended to raise awareness about contraception, its benefits, and dispel myths and misconceptions. Tailor messages should also appeal to specific cultural and linguistic contexts to ensure that information is easily understandable, culturally appropriate, and addresses the specific needs and concerns of different populations.

vi) In Zambia, evidence has shown that reduction in the desire for a large family size among women has positively impacted trend increase in contraceptive use. Therefore, the government should strengthen the implementation of reproductive health programmes at community level challenging

fertility norms that perpetuate desire for large family size, especially among women in rural areas. Furthermore, implementing programmes that promote gender equality and women's empowerment through initiatives that improve educational opportunities, economic empowerment, and decision-making power for women will help to address socio-cultural norms and dispelling myths surrounding fertility norms. Such interventions will enable to women make informed choices about family size and promote smaller family sizes, this contributing to improved maternal and child health outcomes.

vii) There is need for government to invest resources in improving data collection and monitoring of family planning indicators in the country. The government, through the Ministry of Health and the Zambia Statistics Agency, should provide resources to design and implement the annual family planning survey. This survey will allow frequent tracking of progress of family planning indicators such as contraceptive use, method mix, and trends over time. Regular collection of data on contraceptive prevalence, discontinuation rates, and reasons for non-use is very important to inform programmatic decisions and identify areas that require improvement in implementation of SRH and FP interventions.

9.5 Contribution to knowledge of the study

The current study contributes to the field of family planning research in Zambia and sub-Saharan Africa at large by providing evidence on the drivers of change in contraceptive use. By utilising a decomposition analysis approach, this study is unique in the Zambia context because it is the first research to utilise nationally representative repeated cross-sectional surveys to delineate determinants of change in contraceptive use among sexually active women during the period 1992-2018. Furthermore, there is no evidence of such a study in Zambia that applied decomposition analysis to examine the contribution effect of contraceptive use transition on fertility rate, teenage pregnancy, prevalence of unintended births and short birth interval. The research gaps to understand how the

social context of has influenced contraceptive use transition in Zambia were identified through extensive literature review at the global level and sub-Saharan African context.

This research expands upon prior studies and strengthens the understanding of the relationship between social context and changes in contraceptive use. Thus, contributing to literature on contraception and family planning in Zambia and sub-Saharan Africa. Prior studies have not examined these findings before in the country. This study has also shed light on the importance of women's compositional factors such as education, woman decision making autonomy, fertility desire and access to media in driving contraceptive use transition in Zambia. Furthermore, the study has provided evidence of that increasing contraception use in women has a significant impact on reducing fertility rate and teenage pregnancy rates in Zambia. This information is relevant for understanding the country's fertility dynamics and strategies aimed at controlling population growth. This is because Zambian population policy acknowledges family planning as an important element in reducing high fertility and population growth rate. Additionally, the information about social factors that have been contributing to contraceptive use transition in Zambia is useful for evaluating the effectiveness of the various family planning interventions being implemented by government and its stakeholders.

Previous studies on contraceptive use in Zambia focused on examining factors associated with utilisation of contraceptive methods among women. Thus, these studies were lacking in informing what factors are driving the change in contraceptive use. This information is useful to guide health policy makers in identifying programmatic areas that require more priority in implementation of family planning strategies as well as identify programme areas that need redesign to make them more effective. In doing so, the country will make evidence-based decisions about allocation of resources to family planning interventions in order to sustain the increase in trend of contraceptive use.

This study makes a contribution to the applicability of the adopted conceptual framework. The conceptual framework employed in this study serves as a crucial lens through which the complex dynamics influencing contraceptive use transition in Zambia have been analyzed. The integration of individual level demographic factors, socioeconomic variables, household and community-level factors as well as fertility experiences, reproductive health goals and access to family planning information provided a comprehensive framework for understanding the intricacies of contraceptive use transition among sexually active women. By adopting a theoretical foundation that acknowledges the interplay of these elements, this research has illuminated nuanced patterns and trends in contraceptive method utilisation. The findings of this study has provided evidence that individual and community level factors such as education, and women's decision making autonomy are key in influencing contraceptive use transition.

Furthermore, fertility experience factors such as number of living children and child mortality experience are influential in driving contraceptive use transition among women. Additionally, women's reproductive health goals that is ideal number of children and access to family planning information through community health worker visits and exposure to watching television are important factors in understanding contraceptive use dynamics among women. As we navigate the implications of this study, the significance of this conceptual framework in informing future research endeavors, policy formulations, and targeted interventions becomes evident, underscoring its enduring relevance in the realm of reproductive health scholarship.

The present study makes a significant contribution to the relevance and applicability of the empowerment and social capital theories in understanding the social context of contraceptive use transition in Zambia. By utilizing the Empowerment and Social capital theories and the literature in coming the study's conceptual framework, this study extends the understanding of how social context

has influenced contraceptive use transition in Zambia and provides empirical evidence to support the theoretical propositions that women's empowerment is key to improving maternal health. Women who are empowered with information and resources can make an informed decision about their own health.

Specifically, the study examined the association between changing women's social context and improved utilisation of contraceptive methods among sexually active women within the framework of the Empowerment and Social capital theories and identifies nuanced patterns and dynamics that contribute to a deeper understanding of the transition in contraceptive use in Zambia. These findings have implications for both theory development and practical applications, as they strengthen the theoretical foundation and inform interventions or strategies that align with the principles of the Empowerment and Social capital theories in explaining contraceptive use improvement. Overall, this study advances the relevance and significance of the Empowerment and Social capital theories by providing empirical evidence, expanding its scope, and contributing to its continued evolution in the field of family planning.

The findings of this study not only validate the importance of core principles of the Empowerment and Social capital theories in explaining improvement in utilisation of family planning services in Zambia but also shed light on the need to consider additional theoretical underpinning to enhance understanding other aspects that are also important in explaining contraceptive use transition. This study has provided evidence that examining contraceptive use transition should also be understood in the lens of other theoretical underpinning such as the Demographic Transition Theory (DTT). The DTT helps explain the link between the reduction in child mortality and the increase in contraceptive use. As child survival rates improve, individuals and families perceive a decreased need for larger family sizes, leading to a shift in reproductive decision-making. Economic considerations,

changing gender roles, and improved access to healthcare and family planning services also play important roles in driving the increase in contraceptive use.

The scientific knowledge that has been generated by this research is of valuable contribution to the current debate about the relevance of family planning in improving maternal health in sub-Saharan Africa. Furthermore, the research outputs produced as a result of conducting this current study have contributed to the growing body of evidence suggesting strategies to inform family policy shifts and strengthening of SRH programming aimed at enhancing maternal and child health. The publications are listed below:

Peer reviewed publications:

1. Million Phiri, Clifford Odimegwu, Chester Kalinda (2023). Unmet need for family planning among married women in sub-Saharan Africa: a meta-analysis of DHS data (1995 - 2020). **Published** in Contraception and Reproductive Medicine. 2023 Jan 11;8(1):3.

2. Harriet Namukoko, Nkekwa Likwa, Twaambo Hamoonga, Million Phiri. Unmet need for family planning among married women in Zambia: lessons from the 2018 Demographic and Health Survey. **Publidhed** in BMC Women's Health. 2022 Apr 27;22(1):137.

3. Million Phiri, Clifford Odimegwu, Harriet Namukoko, Adewoyin Yemi, Simona Simona (2023) COVID-19 and sexual reproductive health service utilisation among women of reproductive age in Zambia. **Published** in Development Southern Africa. 2023 Jul 14;0(0):1–17.

4. Odimegwu, C., Phiri, M., Tapera, T., & Simona, S. (2023). Patterns and correlates of intention to use contraceptives among fecund sexually active women in developing countries. **Publication** *in Global Health Action*, *16*(1), 2255043. https://doi.org/10.1080/16549716.2023.2255043

5. Million Phiri, Clifford Odimegwu, Oluwatoyin Aladejebi, Chester Kalinda. Correlates of modern contraceptive use among sexually active women in Zambia: do contextual factors matter? – **Submitted to Sexual and Rrproductive Health Matters, Taylor and FrancisPress**

6. Clifford Odimegwu, Million Phiri, Simona Simina, Chester Kalinda. Contraceptive use transitions in sub-Saharan Africa: a systematic review and meta-analysis - **Submitted to Genus**

7. Million Phiri, Clifford Odimegwu, Tafadzwa Mindu. A systematic review and meta-analysis of individual and contextual-level factors associated with contraceptive use in Africa (2010-2022) – **Submitted to BMC Systematic Reviews**

8. Million Phiri, Clifford Odimegwu, Chester Kalinda. Decomposition analyisis of determinants of modern contraceptive use transition among sexually active women in Zambia (2007-2018): Is there rural-urban differential - **Submitted to Sage Open**

9. Sara Riese, Oluwatoyin Aladejebi, Million Phiri. Correlates of modern contraceptive use among sexually active women Collective norms and modern contraceptive use in men and women: A multilevel analysis of DHS Program data in Nigeria and Zambia - **Submitted to Gates Open Research**

10. Million Phiri, Clifford Odimegwu, Adewoyin Yemi. Social context and contraceptive use transition in Zambia, 1992-2018: a decomposition analysis approach - **Submitted to PLOS ONE**

11. Million Phiri and Clifford Odimegwu. Individual and neighbourhood factors associated with unmet need for contraception among sexually active adolescent girls and young women in Zambia - **Submitted to BMJ Sexual & Reproductive Health**

9.6 Awards

1: 2022: DHS Fellowship – USAID/ICF

2: 2022: Publication Grant, Faculty of Humanities – University of the Witwatersrand, Johannesburg

3. 2023: 2nd Prize at Cross-Faculty Postgraduate Symposium - University of the Witwatersrand, Johannesburg

9.7 Future research

Research on contraceptive use transition in sub-Saharan Africa and Zambia in particular is of utmost importance, as it informs strengthening of existing maternal health strategies aimed at reducing maternal mortality in the region. While this study has generated valuable insights for understanding the influence of social context of contraceptive use transition in Zambia, which is necessary to inform strengthening existing family planning policies and interventions, there are still areas which still warrant further research. Thus, enhancing policies relating to family planning in order to further

promote contraceptive use in Zambia will not be conclusive until consideration is given to the possibility of additional research to be conducted in the proposed areas.

There is a need to carry out a comprehensive profiling of the features of the women in Zambia who do not use of any form of family planning methods. In addition, subsequent research must take into consideration the possibility of investigating the elements that are associated with woman's future intention to utilise contraceptive methods, especially among sexually active adolescent females who are not currently using. By carrying out these studies, data will be generated to inform the designing of targeted and future FP programmes that will appeal to certain target groups based on their needs. Further, in order to understand how to overcome barriers of contraceptive usage behaviour related to gender norms, cultural beliefs, and religious values, an in-depth qualitative study will be required.

This current study has shown that contraceptive use increase has slowed down, as evidenced by the recent DHS phases. Therefore, it will be paramount for future studies to consider examine the factors explaining why trend of contraceptive utilisation is slowing down in the past ten years. The anticipate research will produce data that will identify present barriers and challenges that are still hindering access and utilisation of contraceptive methods among women. The proposed research will also be essential to devising efficient interventions that can enhance equitable access to maternal health services in the country.

This study has provided a benchmark regarding the understanding of how changing social context is impacting transition of contraceptive use in Zambia. Therefore, further analysis should be conducted on the next DHS wave to identify new insights. Future research should endeavor to consider integration of other variables that were not considered in this current analysis to enhance the understanding of contraceptive use transition in Zambia.

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CHAPTER 3: APPENDICES

A3.1 In-depth Interview Guide Ministry of Health Policy Staff

Interview Guide for Ministry of Health
Directorate of Public Health

Study title: Understanding the social context of contraceptive use transition in Zambia, 1992- 2018

Introduction: My name is Million Phiri, and I am a PhD student in the department of Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project, and I am investigating the social context of contraceptive use transition in Zambia from 1992-2018. The purpose of this study is to investigate the factors that explain contraceptive use transition in Zambia from 1992 to 2018. As part of this project, I would like to invite you to take part in a one off interview. This one-off in-depth interview will involve a discussion that will take around 30 minutes.

Interview instructions: This interview will be conducted in a conversational (question and answer session) and the probes may be introduced in such a way that they ensure a continued flow of the information between you and the interviewer. The information you will provide will be strictly confidential and will be confidential and will be used strictly used for research purposes only.

Identifiers

Province_____

District_____

Department/Directorate_____

Interview conducted by: _____
Date_____

Role of the participant in Family Planning and SRH programme implementation

1. What is your work designation in the Ministry)?

   _____

2. For how long have you worked with the institution? _____

3. Please briefly the core functions of your directorate/department in relation to Family Planning programming in the organization?

_____

A: Family Planning Policy and Programmes

a) Are there specific health policies that govern implementation of Family Planning in Zambia? If YES, state the specific policies that are in place?

b) What specific family planning programmes are being implemented by MoH to ensure universal provision of contraceptive services and commodities /products in the country?

B: PLANNING OF FAMILY PLANNING PROGRAMMES

a) Please also share what informs the planning of FP programmes in the Ministry

b) What role does Family Planning technical working group play in the planning and designing of family planning programmes?

C: FAMILY PLANNING PROGRAMME IMPLEMENTATION

a) What specific FP services and commodities does Ministry of Health provide or support?

b) Who is your target population and what age group for FP service provision?

c) Does the Ministry face any challenges with implementation of FP programmes? Outline the challenges being faced by the Ministry?

D: CONTRACEPTIVE USE

a. Generally, contraceptive use is still low in Zambia despite heavy investment in family planning programmes. What do you think are the explanations for the observed low use?

b. In Zambia, there are variations in contraceptive use by age, adolescents have been observed to have low use while young women and older women have slightly higher use. What do you think explains the variations?

E: SOCIAL CONTEXT AND CONTRACEPTIVE USE TRANSITION

a. In Zambia, contraceptive use has increased over time among women, what do you think are the social factors contributing to the increase in use of contraceptives among women? of these identified factors which ones do you think have contributed the most to increase in contraceptive use? Give detail

b. What factors do you think are contributing to women's acceptance of contraceptive methods in Zambia?

c. There has been a shift from preference of using short-acting methods (pills, condoms) to long-acting methods over time (injections, implants) why do think people are now preferring long-acting contraceptive method?

d. What social factors do you think are responsible for the shift from short-term to long-term methods among women/men?

F: FAMILY PLANNING IMPLEMENTATION BARRIERS

a. What are some of the policy or programme barriers being faced by the MoH and stakeholders in achieving universal provision of FP services?
b. What are the health system barriers to achieving universal provision of FP services and products especially to the marginalised communities?
c. What are the socio-cultural barriers that affect implementation of FP programmes in the country?

G: RECOMMENDATIONS/SUGGESTIONS FOR IMPROVED FP PROGRAMMES

a) Based on your experiences, what strategies would you suggest to improve FP policies or programming in the country?
b) What strategies are needed to improve FP service provision and accessibility at health facility or community level in the country? do you any suggestions on how to improve uptake of contraceptive methods among AGYW and women in general in Zambia?

_____

Thank you for your participation and time

In-depth Interview Guide for Health Facility Family Planning Provider

In-depth Interview Guide

(Health Facility Family Planning Provider)

Study title: Understanding the social context of contraceptive use transition in Zambia, 1992- 2018 under the supervision of Professor Clifford Odimegwu

My name is Million Phiri, and I am a PhD student in the department of Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project, and I am investigating the social context of contraceptive use transition in Zambia from 1992-2018. The purpose of this study is to investigate the factors that explain contraceptive use transition in Zambia from 1992 to 2018. As part of this project, I would like to invite you to take part in a one off interview. This one-off individual interview will involve a discussion that will take around 45 minutes.

Instruction: This interview will be conducted in a conversational (question and answer session) and the probes may be introduced in such a way that they ensure a continued flow of the information between you and the interviewer. The information you will provide will be strictly confidential and will be used strictly used for research purposes only.

Questions

Introductions

1. Tell us about your job description?

Section A: Sources of family planning information in the community

1. Doe the health facility has a unit/office responsible for disseminating family planning information? Probe, how often the office is accessible to the public?
2. In the facility coverage community, other than the healthy facility, are there places where one can go to get family planning information? Probes.
3. How about community health workers that do door to door dissemination of family planning information, do we have them in facility coverage area?

Section B: Availability of contraceptive commodities

1. Tell us about the types of FP methods that are provided by the facility? What do you think are the benefits of using contraceptive methods? Are these contraceptive methods usually available throughout the month?
2. Are all the types of contraceptive methods which people always want available in your facility? If not, why? Are there times when you run out of stocks? How often does this happen? When

contraceptives methods are not available at facility, where women in this community access them from?

3. Are women required to pay to access contraceptives at your facility?
4. Do you think women are comfortable accessing contraceptive methods from this health facility? If not, why?

Section C: Access and Utilization of contraceptive methods

1. Who accesses contraceptive methods most in your facility? Adolescents, young women or adult women? Probe why
2. Which types of contraceptive methods are mostly accessed by women in your community? And why?
3. Do you know of women who ever stopped using these contraceptive methods? Probes for reasons for stopping use
4. Are women given a chance at the health facility to choose which family methods they should get? If not, do medical personnel decide on behalf of women?
5. At what stage do you think women in marriage start using contraception? (e.g when they have one child, two children etc).

Section D: Contraceptive use transition

c. In Zambia, contraceptive use has increased over time among women, (different social factors such as increase in women who have education, in employment, increased wealth status, increased literacy and desire for fewer children are important to stir contraceptive use increase)
-what do you think is contributing to the increased use of contraceptives among women?
-of these identified factors which ones do you think have contributed the most to increase in contraceptive use? probe for detail
d. What factors do you think are contributing to women's acceptance of contraceptive methods in Zambia?
e. There has been a shift from preference for short-acting methods (pills, condoms) to long-acting methods (injections, implants) why do think people are now preferring long-acting contraceptive method?
f. What women and men factors do you think are responsible for this change?

Section E: Barriers to utilization of contraceptives commodities in the community

1. Do you know of women who prefer not to use contraceptive methods in your coverage community? If so why?
2. Why do some women prefer not to use contraceptive services in your coverage community? Probe for reasons for not using
3. Are there cultural or religious norms that prevent women from using contraception in your coverage community? (Probe for these factors)
4. Do you know if parents make it difficult for adolescent girls to easily access contraceptive methods from the community?
5. What challenges prevent the health facility to constantly provide contraceptive methods to women in your coverage community?
6. Are there other challenges that prevent women from accessing contraceptive methods from health facility? (probe for costs of buying, transport, husband oppose etc?

Section F: Recommendations for improving utilization of family planning services

1. What do you think should be done by government (Ministry of Health) to ensure that all women have access to contraceptive methods of their choice?

2. What about the community, is there anything than can be done to encourage those who fear to use family planning services?
3. What about men, what should they do to support women to use contraceptive methods?

THANK YOU FOR PARTICIPATING
END

In-depth Interview Guide for Organizations Implementing Family Planning Programmes

Interview Guide for Family Planning Implementing Organization

Study title: Understanding the social context of contraceptive use transition in Zambia, 1992- 2018

Introduction: My name is Million Phiri, and I am a PhD student in the department of Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project, and I am investigating the social context of contraceptive use transition in Zambia from 1992-2018. The purpose of this study is to investigate the factors that explain contraceptive use transition in Zambia from 1992 to 2018. As part of this project, I would like to invite you to take part in a one off interview. This one-off in-depth interview will involve a discussion that will take around 30 minutes.

Interview instructions: This interview will be conducted in a conversational (question and answer session) and the probes may be introduced in such a way that they ensure a continued flow of the information between you and the interviewer. The information you will provide will be strictly confidential and will be confidential and will be used strictly used for research purposes only.

IDENTIFIERS
Name of organization: _____
Province_____
District_____
Department/Unit_____

Interview conducted by: _____ Date_____

Role of the participant in SRH programme design and implementation

1. What is your role in your organisation)? _____
2. For how long have you worked with this organization/institution? Please tell me more about the work that you do as an officer in your organisations in relation to FP programming?
   _____

A: OVERVIEW OF FAMILY PLANNING PROGRAMMES:

c) Does your organization implement or support implementation of family planning (FP) programmes?
d) What FP services or programmes are currently being implemented/ supported by your organisation/ institution?

e) What is the geographic coverage for the FP services or programmes you implement/support (if not national, state which province or districts or community)?

f) Who is your target population for your FP services or programmes and what age groups?

B: DESIGN OF FAMILY PLANNING PROGRAMMES

c) Does your organization design family planning programmes?

d) If YES, what processes informs the designing of family planning interventions or prgrammes in your organization?

e) Does your organization belong to the national level family planning steering committee?

f) If yes, what is your role in the committee?

C: IMPLEMENTATION OF FP PROGRAMMES?

a) What specific contraceptive methods or commodities does your organization provide or support?

b) Who is your target population and what age groups for contraceptive commodities provision?

c) Is your organization implementation of FP programmes guided by the Ministry of Health national FP implementation framework? If no, why?

D: CONTRACEPTIVE USE IN ZAMBIA

a. Generally, contraceptive use based on 2018 DHS is still low in Zambia despite heavy investment in family planning programmes. What do you think are the explanations for the observed low use?

b. In Zambia, there are variations in contraceptive use by age, adolescents have been observed to have low use while young women and older women have slightly higher use. What do you think explains the variations?

E: SOCIAL CONTEXT AND CONTRACEPTIVE USE TRANSITION IN ZAMBIA

a. In Zambia, contraceptive use has increased over time among women, (different social factors such as increase in women who have education, in employment, increased wealth status, increased literacy, education of partner and desire for few children are important to stir contraceptive use increase)
-what do you think is contributing to the increased use of contraceptives among women?
-of these identified factors which ones do you think have contributed the most to increase in contraceptive use? probe for detail

b. What factors do you think are contributing to women's acceptance of contraceptive methods in Zambia?

c. There has been a shift from preference for short-acting methods (pills, condoms) to long-acting methods over time (injections, implants) why do think people are now preferring long-acting contraceptive method?

d. What social factors do you think are responsible for this shift from short-term to long-term methods?

F: FP PROGRAMME IMPLEMENTATION BARRIERS

a. Are there policy level barriers being faced by the country in achieving universal provision of FP services?

b. What are the barriers or challenges faced by your organization to implementation of FP programes?

c. Are there barriers at community level regarding acceptability of FP services? Explain the barriers

d. What are the personal level barriers regarding acceptability and utilisation of FP services in areas where your organization operates? Explain the barriers

G: RECOMMENDATIONS/SUGGESTIONS FOR IMPROVED FP PROGRAMMES

a) Based on your experiences, what improvement is needed to existing Family Planning policies in the countries?

b) What specific programme strategies are needed to improve Family Planning service provision in the country to achieve universal access?

c) Do you have any suggestions, or recommendation on how to improve uptake of contraceptive methods among;

   i. Adolescents (15-19 years)

   ii. Young women (20-24 years)

   iii. Older women (25-49 years)

Thank you for your participation and time

Focus Group Discussion Guide for Women of Reproductive Age 15-49 years

Focus Group Discussion Schedule

(Women of reproductive age (15-49 years) in the selected community)

Study title: Understanding the social context of contraceptive use transition in Zambia, 1992- 2018 under the supervision of Professor Clifford Odimegwu

My name is Million Phiri, and I am a PhD student in the department of Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project, and I am investigating the social context of contraceptive use transition in Zambia from 1992-2018. The purpose of this study is to investigate the factors that explain contraceptive use transition in Zambia from 1992 to 2018. As part of this project, I would like to invite you to take part in a one off interview. This one-off group interview will involve a discussion that will take around 45 minutes.

Instruction: This interview will be conducted in a conversational (question and answer session) and the probes may be introduced in such a way that they ensure a continued flow of the information between you and the interviewer. The information you will provide will be strictly confidential and will be used strictly used for research purposes only.

Questions

Introductions

1. Tell us about yourselves?

Section A: Awareness and knowledge of family planning

1. Kindly share with us what you know about what family planning is? Tell us about the types of FP methods that you know? What do you think are the benefits of using family planning?

Section B: Sources of family planning information

1. In your community are there places where one can go to get information about contraceptives? Probes (Clinic, health center, NGO etc).
2. How about community health workers that do door to door dissemination of family planning information, has any one of you been visited by these people?

Section C: Access and availability of contraceptive commodities in the community

1. In your community are there places where one can get contraceptive methods (e.g. Condoms, FP Pills, Injections)? Probe if these places are public or private or NGO run? are these contraceptives offered for free?
2. Does accessing these products come with transport costs? Any other costs?
3. Which of the sources of contraceptives are useful for you?

4. Where do women prefer getting contraceptive methods from in your community?
5. Are all the types of contraceptive methods which people always want available in your community? If not? How often does this happen? If these contraceptives methods are not always available, where do women in this community access them from?
6. Are these contraceptives easily accessible in this community? What do you like about these places where these contraceptives are distributed from?

Section D: Utilization of contraceptive commodities

1. Who uses contraceptive methods most in your community? Adolescents, young women or adult women? Probe why
2. Which types of contraceptive methods are mostly used by women in your community? And why?
3. Do you know women who ever stopped using these contraceptive methods? Probes for reasons for stopping use
4. Are women given a chance at the health facility or pharmacy to choose which contraceptive methods they should get? Probe if medical personnel decide on behalf of women? And why?
5. At what stage do you think women in marriage start using contraception? (e.g when they have one child, two children etc).

Section E: Social context and Contraceptive use transition

1. In Zambia, contraceptive use has increased over time among women, (different social factors such as increase in women who have education, in employment, increased wealth status, increased literacy and desire for fewer children are important to stir contraceptive use increase)
   -what do you think is contributing to the increased use of contraceptives among women?
   -of these identified factors which ones do you think have contributed the most to increase in contraceptive use? probe for detail
2. What factors do you think are contributing to women's acceptance of contraceptive methods in Zambia?
3. There has been a shift from preference for short-acting contraceptive methods (pills, condoms) to preferring injections and long-acting methods (IUD, Implants etc) why do you think people are now preferring long-acting contraceptive method?
4. What women and men factors o you think are responsible for this improvement in use of contraceptives?

Section F: Barriers to utilization of contraceptives services in the community

1. Are there women who prefer not to use contraceptive methods in your community? If so why?
2. Why do some women prefer not to use contraceptive methods in your community? Probe for reasons for not using
3. Are there women who stop using contraceptives because their husbands no longer approve of their use?
4. Are there cultural or religious norms that prevent women from using contraception? (Probe for these factors)
5. Do you think parents make it difficult for young girls to easily contraceptive methods?
6. What other challenges prevent women from using contraceptive methods? (probe for costs of buying, transport, partner disapproval etc?

Section G: Recommendations for improving utilization of contraceptive methods

1. What do you think should be done by government (Ministry of Health) to ensure that all women have easy access to contraceptive methods in your community?
2. What about the community, is there anything than can be done to encourage those who fear to use contraceptive methods?
3. What about men, what should they do to support women to use contraceptive methods?

THANK YOU FOR PARTICIPATING
END

STUDY INFORMATION DOCUMENT FOR FOCUS GROUP DISCUSSION (Women of reproductive age in the selected community)

Study title: Understanding the social context of contraceptive transition in Zambia, 1992- 2018

under the supervision of Professor Clifford Odimegwu

My name is Million Phiri, and I am a PhD student in the department of Demography and Population Studies at the University of the Witwatersrand, Johannesburg. As part of my studies, I must undertake a research project, and I am investigating the social context of contraceptive transition in Zambia from 1992-2018. The purpose of this study is to investigate the factors that explain contraceptive transition in Zambia from 1992 to 2018. As part of this project, I would like to invite you to take part in a one off interview. This one-off group interview will involve a discussion that will take around 30 minutes. This interview will not be audio recorded. This data collection of this study is happening in November and December of 2022. The focus group discussion is being conducted as face to face interview with all invited members. You have been chosen to be part of the study as you are a woman in the reproductive age group.

There will be no personal costs to you if you participate in this project, you will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential, and I will not be asking for your name or any identifying information, and the information you give to me will be held securely and not disclosed to anyone else. I will be using a pseudonym (false name) to represent your participation in my final research report. If you experience any distress or discomfort at any point in this process, we will stop the interview or resume another time.

If you have any questions during or afterwards about this research, feel free to contact me on the details listed below. This study will be written up as a research report which will be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you. The data collected from this research project will be stored in a one drive file and will be kept for five years.

This study has been approved by the Human Research Ethics Committee (Non-Medical) of the University of the Witwatersrand, Johannesburg ("Committee") and the ERES Converge IRB of Zambia. A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.

Yours sincerely,
Million Phiri

For more clarity feel free to contact:

Contacts:

Researcher:

Talent Tapera, **Email:** 2490107@students.wits.ac.za , **Phone number:** +260973990482

Supervisor:

Professor Clifford Odimegwu, **Email:** Clifford.Odimegwu@wits.ac.za, **Phone number:** +27 117174056

Date: Month and Year only

University of the Witwatersrand, Ethics Approval to conduct the study

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Phiri

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H22/11/73**
PROJECT TITLE	Understanding the social context of contraceptive transition in Zambia, 1992-2018
INVESTIGATOR(S)	Mr M Phiri
SCHOOL/DEPARTMENT	Social Sciences/
DATE CONSIDERED	25 November 2022
DECISION OF THE COMMITTEE	Approved Risk Level: Low
EXPIRY DATE	13 February 2026

DATE 14 February 2023 **CHAIRPERSON** _____
(Professor J Watermeyer)

cc: Supervisor : Prof C Odimegwu

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **A SIGNED COPY** returned to the Secretary electronically. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I/we agree to completion of a regular progress report. For Minimal and Low Risk studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

_____ 15 / 02 / 2023
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

National Health Research Authority, Approval to conduct the study

NATIONAL HEALTH RESEARCH AUTHORITY

Paediatric Centre of Excellence, University Teaching Hospital, P.O. Box 30075, LUSAKA
Chalala Office Lot No. 18961/M, Off Kasama Road, P.O. Box 30075, LUSAKA
Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Ref No: NHRA000002/05/01/2023 **Date:5th January 2023**

The Principal Investigator,
Mr Million Phiri,
University of Zambia,
School of Humanities and Social Sciences,
Department of Population Studies
P.O Box 32379,
Lusaka, Zambia.

Dear Mr Phiri,

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for ethical clearance and authority to conduct research titled **"Understanding the social context of contraceptive transition in Zambia, 1992-2018."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,
Director/Chief Executive Officer

Prof. Godfrey Biemba,
National Health Research Authority

ERES Converge Ethical Approval for the study

ERES CONVERGE

Plot No. 272, Cnr Olive Tree Meanwood Road,
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Tel: +260 955 155 633
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Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
F.W.A. No. 00011697

03rd October, 2022.

Ref. No.2022-Sep-024

The Principal Investigator
Mr. Million Phiri
The University of Zambia
School of Humanities and social sciences
Department of population studies
P.O. Box 32379
Lusaka, Zambia

Dear Mr. Phiri

RE: UNDERSTANDING THE SOCIAL CONTEXT OF CONTRACEPTIVE TRANSITION IN ZAMBIA,1992-2018

Reference is made to your protocol submission. The IRB resolved to approve this study and your participation as Principal Investigator for a period of one year.

Review Type	**Fast-Track**	Approval No. **2022-Sep-024**
Approval and Expiry Date	Approval Date: 03rd October,2022	Expiry Date: 2nd October, 2023
Protocol Version and Date	Version - Nil.	2nd October, 2023
Information Sheet, Consent Forms and Dates	• English.	2nd October, 2023
Consent form ID and Date	Version - Nil	2nd October, 2023
Recruitment Materials	Nil	2nd October, 2023
Other Study Documents	Data Collection Sheet, Focus Group Discussion.	2nd October, 2023
Number of participants approved for study	-	2nd October, 2023

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- A reprint of this letter shall be done at a fee.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

Dr. Jason Mwanza
Dip. Clin. Med. Sc., BA., M.Sc., PhD
CHAIRPERSON

Table 1: Extract from the woman questionnaire -variables, Research questions and survey Items

Variables, Research questions and Survey Items		
Variable name	**Research question**	**Item on questionnaire**
Age	RQ 1, RQ 2,	How old were you at your last birthday?
Marital Status	RQ 2	What is your marital status now? 1. Never been in union 2. Married/Living with a man 4. Widowed 5. Divorced 6. Separated
Education level	RQ 2	What is the highest level of school you attended? 0. None 1. Primary 2. Secondary 3. Higher
Household wealth index	R1, R2	Household wealth index 1. Poorer 2. Poor 3. Middle 4. Richer 5. Richest
Residence	R1, R2	Classification of respondent's residence 1. Urban 2. Rural
Province	R1, R2	Province of respondent residence _____
Religious denomination	R1, R2	What is your religious denomination? 1. Catholic 2. Protestant 3. Muslim 6. Other specify_____
Occupation	R1, R2	What is your occupation, that is, the kind of work do you usually/mainly do?_____
Literacy	R1, R2	I would like you to read this sentence to me. 1. Cannot read at all 2. Able to read only parts of the sentence 3. Able to read whole sentence 4. No card with required language 5. Blind/Visionally impaired
Native language	R2	Native language of a respondent_____
Age at first marriage	R2	How old were you when you first started living with your husband/partner?_____
Age at first sexual intercourse	R2	How old were you when you had sexual intercourse for the very first time?_____
Parity	R2, R3	You have had how many births in total during your life?_____
Living children	R2, R3	How many living children do you have_____
Birth interval	R3	Number of months between last and recent birth _____
Woman's income status	R2	Would you say that the money that you earn is more than the earnings of your (husband/partner), less than what he earns, or about the same? 1. More than him 2. Less than him 3. About the same 4. Husband/Partner' has no earning 5. Don't know

Woman decision making	R2	Who usually decides how the money you earn will be used in the household? 1. Respondent only 2. Husband/partner only 3. Respondent/Husband/Partner Jointly
Knowledge of contraception	R2	Have you heard of any ways or methods that women or men can use to avoid pregnancy? 1. Yes 2. No
Current contraception use	RQ 1, RQ 2, RQ 3	Are you or your partner/husband currently doing anything or using any method to delay or avoid or prevent pregnancy? 1. Yes 2. No
Type of contraception method for current use	R1, R2	Which method are you using? 1. Short-acting method 2. Long -acting method
Ever used contraception	R1, R2	Have you ever used anything or tried in any way to delay or avoid getting pregnant? 1. Yes 2. No
Intention to use contraception in future	R1, R2	Do you think you will use a contraceptive method to delay or avoid pregnancy at any time in the future? 1. Yes 2. No
First source of current contraception method	R2	When you first started using (CURRENT METHOD) in Where did you obtain it at that time? 1. Government health facility 2. Private health facility 3. Pharmacy 4. Community based agent/fieldworker 5. Other sources
Fertility preference	R2, R3	Would you like to have another child or you would prefer not to have any more children? 1. Have another child 2. No more 3. Can't get pregnant 4. Undecided
Husband fertility preference	R2, R3	Does your (husband/partner) want same number of children as you want, or does he want fewer or more than you want? 1.Same number 2.More children 3.Fewer children 4.Don't know
Husbands' education level	R2	What was the highest level of school he attended by partner/husband: primary, secondary, or higher? 0. None 1. Primary 2. Secondary 3. Higher 4. Don't know
Husband's approval for contraception use	R2	Husband/Partner opposed to using a method to prevent pregnancy? 1. Yes 2. No
Internet Utilization	R2	In the last 12 months, have you used the internet? 1. Yes 2. No
Access to FP messages on Radio	R2	In the last few months have you: Heard about family planning information through radio? 1. Yes 2. No

Access to FP messages on TV	R2	In the last few months have you: Heard about information about family planning on the television? 1. Yes 2. No
Access to FP messages in newspapers/magazine	R2	In the last few months have you: Read about family planning from newspapers/magazine? 1. Yes 2. No
Access to FP messages via mobile phone	R2	In the last few months have you: Received family planning messages through a mobile phone? 1. Yes 2. No
Decision maker for contraception use	R2	Would you say that using contraception is mainly your own decision, mainly your (husband's/partner's) decision, or did you both decide together? 1. Mainly respondent' 2. Mainly Husband/partner 3. Joint decision 4. Other
Decision maker for not using contraception	R2	Would you say that not using contraception is mainly your own decision, mainly your (husband's/partner's) decision, or did you both decide together? 1. Mainly respondent 2. Mainly Husband/partner 3. Joint decision 4. Other
Reasons for not using contraception	R2	Can you tell me why you are not using a method to avoid pregnancy/conception?_____
Experienced spousal violence	R2	Have your (husband/partner) ever hit, slapped, kicked, or anything else to physically hurt by you or physically force you to have sexual intercourse with him when you did not want to? 1. Yes 2. No
Experienced pregnancy loss	R3	Have you ever had a pregnancy that miscarried, was aborted, or ended in a stillbirth? 1. Yes 2. No
Knowledge of ovulation cycle	R2	From one menstrual period to the next one, are there certain days when a woman is more likely to become pregnant if she has sexual intercourse? 1. Yes 2. No
Husband's occupation	R2	What is your husband's occupation, that is, what kind of work he does mainly?_____
Knowledge of side effects of contraception	R2	Were you told about side effects or problems you might have with the method? 1. Yes 2. No
Knowledge of place where to access family planning	R2	Do you know a place where you can get a method of family planning? 1. Yes 2. No
Visited by a community health worker	R2	In the last twelve months, were you visited by a community health worker? 1. Yes 2. No
Received family planning information from a community health worker	R2	Did the community health worker talk to you about family planning? 1. Yes 2. No

Experienced unplanned pregnancy	R3	When you got pregnant last did you want to get pregnant at that time'? 1. Yes 2. No
Ever visited facility in the last 12 months	R2	In the last 12 months, have you visited a health facility for care for yourself? 1. Yes 2. No
Received family planning information at facility	R2	Did any health worker at the health facility speak to you about family planning methods? 1. Yes 2. No
Duration of using current method	R2	For how long have you been using current method without stopping_____
Reasons for contraception discontinuation	R2	Why did you stop using contraceptive method? _____
Woman who experienced infant mortality	R3	Number of children who died before reaching 12 months? _____

CHAPTER 4: APPENDICES

Table 4.1: Myers' blended index for women in Zambia, DHS 1992

Terminal digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-49 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	581	1	581	285	9	2565	3146	8.18	1.82	1.82
1	542	2	1084	254	8	2032	3116	8.11	1.89	1.89
2	608	3	1824	314	7	2198	4022	10.46	-0.46	0.46
3	652	4	2608	317	6	1902	4510	11.73	-1.73	1.73
4	485	5	2425	263	5	1315	3740	9.73	0.27	0.27
5	482	6	2892	254	4	1016	3908	10.17	-0.17	0.17
6	428	7	2996	206	3	618	3614	9.40	0.60	0.60
7	490	8	3920	199	2	398	4318	11.23	-1.23	1.23
8	406	9	3654	196	1	196	3850	10.01	-0.01	0.01
9	422	10	4220	195	0	0	4220	10.98	-0.98	0.98
Sum							**38444**	**100**		**9.16**
Index										**4.58**

Table 4.2: Myers' blended index for women in Zambia, DHS 1996

Terminal Digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-4 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	705	1	705	360	9	3240	3945	8.86	1.14	1.14
1	667	2	1334	336	8	2688	4022	9.03	0.97	0.97
2	652	3	1956	381	7	2667	4623	10.38	-0.38	0.38
3	632	4	2528	296	6	1776	4304	9.66	0.34	0.34
4	570	5	2850	279	5	1395	4245	9.53	0.47	0.47
5	540	6	3240	237	4	948	4188	9.40	0.60	0.60
6	522	7	3654	273	3	819	4473	10.04	-0.04	0.04
7	583	8	4664	232	2	464	5128	11.51	-1.51	1.51
8	490	9	4410	288	1	288	4698	10.55	-0.55	0.55
9	491	10	4910	254	0	0	4910	11.02	-1.02	1.02
Sum							**44536**	100.00		**7.02**
Index										**3.51**

Table 4.3 Myers' blended index for women in Zambia, DHS 2001

Terminal digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-49 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	705	1	705	340	9	3060	3765	8.55	1.45	1.45
1	667	2	1334	311	8	2488	3822	8.68	1.32	1.32
2	652	3	1956	325	7	2275	4231	9.60	0.40	0.40
3	632	4	2528	345	6	2070	4598	10.44	-0.44	0.44
4	570	5	2850	257	5	1285	4135	9.39	0.61	0.61
5	540	6	3240	263	4	1052	4292	9.74	0.26	0.26
6	522	7	3654	252	3	756	4410	10.01	-0.01	0.01
7	583	8	4664	284	2	568	5232	11.88	-1.88	1.88
8	490	9	4410	246	1	246	4656	10.57	-0.57	0.57
9	491	10	4910	220	0	0	4910	11.15	-1.15	1.15
Sum							**44051**	100.00		**8.08**
Index										**4.04**

Table 4.4: Myers' blended index for women in Zambia, DHS 2007

Terminal digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-49 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	616	1	616	337	9	3033	3649	8.53	1.47	1.47
1	593	2	1186	327	8	2616	3802	8.88	1.12	1.12
2	596	3	1788	305	7	2135	3923	9.17	0.83	0.83
3	597	4	2388	325	6	1950	4338	10.14	-0.14	0.14
4	578	5	2890	281	5	1405	4295	10.04	-0.04	0.04
5	556	6	3336	248	4	992	4328	10.11	-0.11	0.11
6	504	7	3528	221	3	663	4191	9.79	0.21	0.21
7	539	8	4312	266	2	532	4844	11.32	-1.32	1.32
8	500	9	4500	237	1	237	4737	11.07	-1.07	1.07
9	469	10	4690	222	0	0	4690	10.96	-0.96	0.96
Sum							**42797**	100.00		**7.26**
Index										**3.63**

Table 4.5: Myers' blended index for women in Zambia, DHS 2013

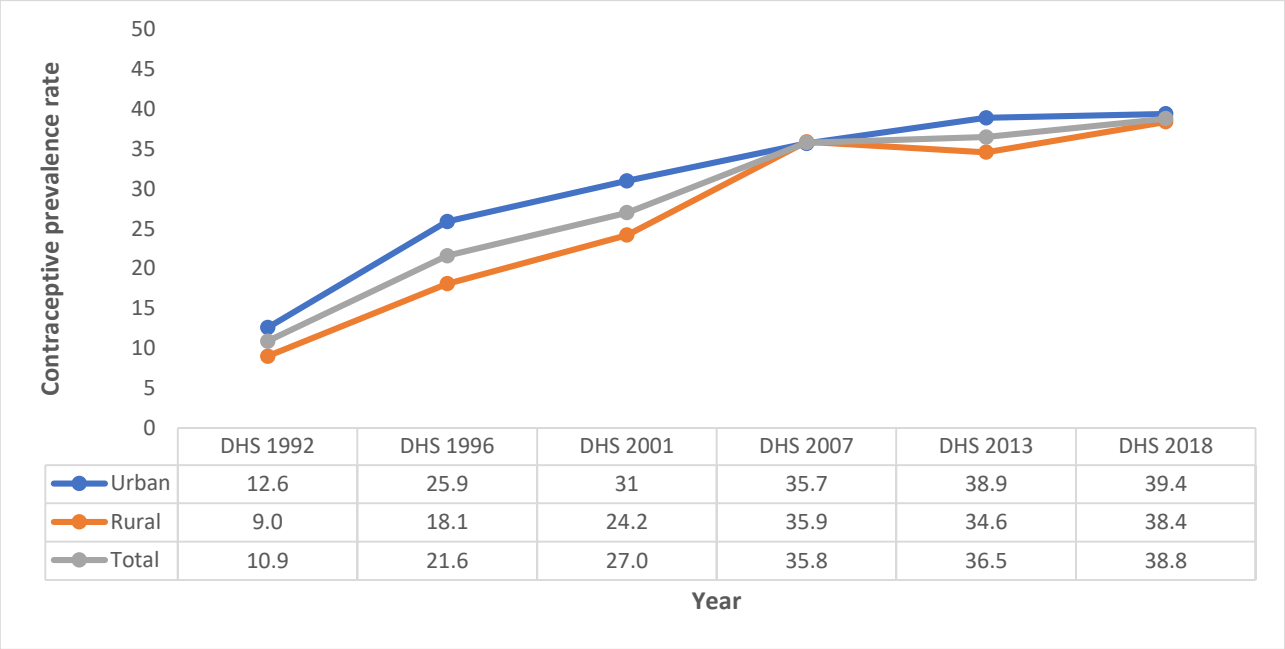
Terminal digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-49 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	1620	1	1620	879	9	7911	9531	9.56	0.44	0.44
1	1559	2	3118	897	8	7176	10294	10.33	-0.33	0.33
2	1360	3	4080	710	7	4970	9050	9.08	0.92	0.92
3	1183	4	4732	711	6	4266	8998	9.03	0.97	0.97
4	1219	5	6095	704	5	3520	9615	9.65	0.35	0.35

5	1265	6	7590	673	4	2692	10282	10.31	-0.31	0.31
6	1083	7	7581	556	3	1668	9249	9.28	0.72	0.72
7	1134	8	9072	576	2	1152	10224	10.26	-0.26	0.26
8	1173	9	10557	592	1	592	11149	11.18	-1.18	1.18
9	1129	10	11290	598	0	0	11290	11.33	-1.33	1.33
Sum							**99682**	100.00		**6.82**
Index										**3.41**

Table 4.6: Myers' blended index for women in Zambia, DHS 2018

Terminal digits	Sum of ages 20-49 (step 1)	Weight 1 (step 2)	Product of sum of ages 20-49 with Weight 1 (step 3)	Sum of age 30-49 (step 4)	Weight 2 (step 5)	Product of sum of ages 30-49 with Weight 2 (6)	Blended population	% distribution	Deviation from 10	Absolute deviation
0	1309	1	1309	677	9	6093	7402	9.04	0.96	0.96
1	1109	2	2218	599	8	4792	7010	8.56	1.44	1.44
2	1261	3	3783	694	7	4858	8641	10.56	-0.56	0.56
3	1034	4	4136	549	6	3294	7430	9.08	0.92	0.92
4	1118	5	5590	625	5	3125	8715	10.65	-0.65	0.65
5	1117	6	6702	600	4	2400	9102	11.12	-1.12	1.12
6	1075	7	7525	591	3	1773	9298	11.36	-1.36	1.36
7	833	8	6664	421	2	842	7506	9.17	0.83	0.83
8	925	9	8325	526	1	526	8851	10.81	-0.81	0.81
9	790	10	7900	436	0	0	7900	9.65	0.35	0.35
Sum							**81855**	100.00		**8.99**
Index										**4.50**

CHAPTER 5: APPENDICES



	DHS 1992	DHS 1996	DHS 2001	DHS 2007	DHS 2013	DHS 2018
Urban	12.6	25.9	31	35.7	38.9	39.4
Rural	9.0	18.1	24.2	35.9	34.6	38.4
Total	10.9	21.6	27.0	35.8	36.5	38.8

Figure 5.1: Contraceptive use levels and trends among adolescents' young women (15-24) in Zambia by residence

Rural- Urban trends in Contraceptive Methods Use

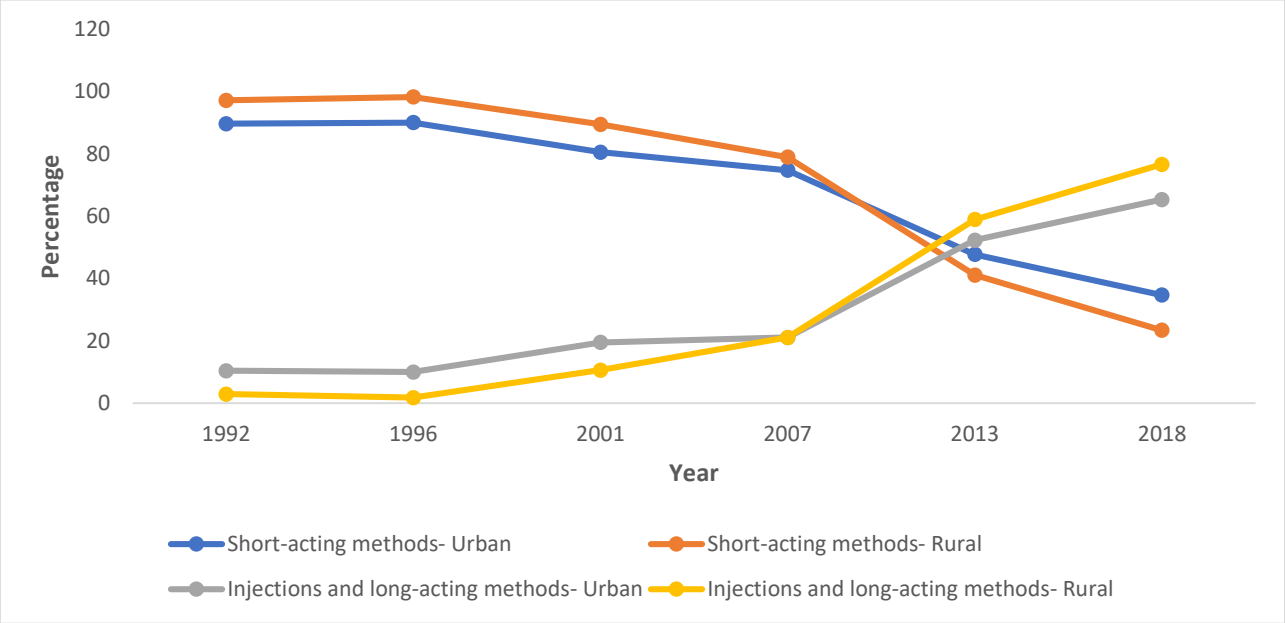


Figure 5.2: Trends in type of contraceptive method use among sexually active women in Urban and Rural areas, DHS 1992-2018

Table 5.1: Percent distribution of contraceptive use among sexually active young women (15-24 years) by background characteristics, DHS 1992 - 2018, Zambia

Background Characteristics	DHS 1992 (N=2,108)	DHS 1996 (N=2,421)	DHS 2001 (N=2,205)	DHS 2007 (N=1,765)	DHS 2013-14 (N=4,018)	DHS 2018 (N=3,513)	Percentage point difference in use of contraceptives 1992 to 2018
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Age							
15 – 19	69 (6.9)	147 (15.1)	183 (20.7)	153 (24.4)	383 (25.0)	362 (28.3)	21.4
20 – 24	160 (14.4)	371 (26.0)	415 (31.2)	455 (42.5)	1039 (44.0)	976 (45.0)	30.6
Residence	*		**		*		
Urban	139 (12.6)	274 (25.9)	281 (31.0)	249 (35.7)	673 (38.9)	579 (39.4)	26.8
Rural	91 (9.0)	244 (18.1)	317 (24.2)	358 (35.9)	749 (34.6)	758 (38.4)	29.4
Province	*		*		***	***	
Central	15 (8.8)	32 (16.1)	33 (20.7)	45 (27.8)	125 (33.3)	108 (36.1)	27.3
Copperbelt	62 (11.9)	104 (22.1)	127 (30.6)	93 (35.4)	126 (37.8)	190 (38.1)	26.2
Eastern	21 (9.0)	68 (21.4)	72 (24.1)	106 (47.3)	196 (39.5)	209 (45.6)	36.6
Luapula	7 (5.3)	11 (5.6)	46 (30.3)	14 (12.4)	52.7 (22.9)	73 (27.6)	22.3
Lusaka	55 (14.8)	108 (27.8)	121 (34.4)	97 (35.7)	302 (40.3)	263 (44.0)	29.2
Muchinga	_	_	_	_	67 (36.8)	83 (46.2)	46.2
Northern	28 (16.1)	72 (27.7)	64 (24.7)	83 (35.0)	78 (30.4)	82 (30.7)	14.6
North-western	5 (8.5)	37 (41.8)	25 (25.3)	37 (35.4)	65 (30.0)	97 (43.4)	34.9
Southern	19 (5.5)	50 (19.0)	63 (24.2)	79 (42.5)	231 (43.1)	154 (36.7)	31.2
Western	19 (15.5)	35 (16.5)	48 (21.5)	54 (39.7)	90 (31.9)	79 (32.7)	17.2
Education level	***	**		*	**	***	
None	9 (3.7)	38 (16.0)	49 (19.8)	48 (33.7)	42 (28.5)	31 (22.9)	19.2
Primary	136 (10.2)	288 (19.8)	328 (26.1)	322 (36.9)	587 (38.1)	584 (43.2)	33.0
Secondary/higher	85 (15.6)	192 (27.1)	222 (31.1)	237 (33.8)	792 (35.9)	723 (37.3)	21.7
Marital Status							
Never married	44 (5.6)	113 (13.0)	115 (37.4)	125 (19.10)	321 (18.2)	389 (22.3)	16.7
Married	175 (15.4)	381 (29.5)	454 (37.4)	448 (49.4)	1017 (54.4)	865 (58.1)	42.7
Formerly married	11 (5.8)	24 (9.9)	30 (14.3)	34.0 (25.2)	84 (32.3)	84 (38.6)	32.8
Partners Education Level							
None	9 (9.2)	21 (20.2)	22 (19.8)	21 (33.8)	49 (38.7)	34 (64.1)	54.9
Primary	66 (10.8)	159 (24.2)	186 (29.2)	212 (44.2)	321 (48.2)	240 (49.0)	38.2
Secondary	99 (17.8)	186 (27.5)	239 (40.5)	210 (48.8)	652 (54.9)	540 (64.0)	46.2
Higher	10 (31.1	32 (46.4)	30 (53.5)	29 (66.6)	61 (62.7)	29 (46.7)	15.6
Religion			*				
Catholic	209 (15.0)	352 (25.1)	410 (31.4)	418 (39.2)	971 (44.4)	774 (43.4)	28.4
Protestant	489 (13.9)	1044 (24)	1336 (31.1)	1576 (38.6)	4510 (45.1)	3838 (45.3)	31.4
Other	22 (13.4)	23 (22.7)	23 (19.0)	35 (38.2)	57 (32.9)	85 (47.1)	33.7
Wealth status		***	***				
Poor	-	167 (18.5)	171 (21.0)	227 (37.2)	518 (36.2)	523 (39.4)	20.9
Moderate	-	73 (17.3)	126 (28.8)	105 (33.1)	299 (38.0)	277 (41.0)	23.7
Rich	-	277 (25.9)	302 (31.2)	276 (35.8)	605 (36.1)	538 (37.2)	11.3
Employment status		***		**	*	*	
Unemployed	104 (8.3)	286 (19.3)	316 (26.3)	337 (32.5)	861 (35.0)	861 (37.3)	29.0
Employed	126 (14.7)	231 (25.2)	282 (27.8)	270 (41.3)	547 (39.0)	477 (41.9)	27.2
Age at first sex	*	**	*		***		
Less than 15 years	38 (8.1)	110 (17.6)	106 (22.9)	81 (31.5)	180 (31.9)	263 (39.3)	31.2
15 - 19 years	117 (10.5)	278 (21.5)	340 (27.3)	355 (36.1)	874 (35.5)	1009 (39.4)	28.9
20+ years	75 (14.0)	130 (27.0)	153 (29.9)	171 (37.6)	368 (42.5)	65 (30.1)	16.1
Living Children	***	***	***	***	***	***	
0	29 (3.5)	92 (10.3)	91 (12.1)	90 (17.2)	115 (9.5)	133 (12.3)	8.8
1	103 (13.3)	184 (22.4)	256 (31.3)	228 (37.0)	668 (43.6)	678 (46.2)	32.9
2	61 (16.9)	151 (32.8)	168 (36.6)	200 (52.1)	468 (55.9)	410 (60.2)	43.3
3+	37 (22.7)	90 (40.9)	84 (43.7)	90 (51.4)	172 (52.5)	117 (52.9)	30.2
Children ever born	***	***	***	***	***	***	
0	26 (3.6)	88 (11.2)	82 (12.2)	81 (17.0)	104 (9.1)	120 (11.6)	8.0
1	84 (11.6)	146 (19.1)	226 (29.4)	205 (35.1)	629 (42.7)	647 (45.4)	33.8
2	71 (17.1)	164 (33.7)	168 (35.5)	192 (50.5)	481 (55.1)	432 (60.5)	43.4
3+	49 (18.5)	120 (32.)	122 (40.4)	129 (51.0)	208 (51.2)	138 (49.6)	31.1

Table 5.1 continued

Family Size	***				***	***	
Concordance							
Both want same	75 (21.4)	154 (34.1)	223 (43.3)	201 (53.5)	507 (58.5)	412 (60.1)	38.7

Husband want more	31 (16.8)	103 (34.6)	71 (38.3)	65 (44.8)	218 (56.0)	173 (59.1)	42.3
Husband want less	26 (16.6)	41 (32.6)	44 (44.9)	32 (59.8)	55 (60.1)	81 (73.9)	57.3
Don't know	42 (9.5	81 (20.0)	116 (28.0)	150 (45.3)	288 (44.6)	198 (49.5)	40.0
Ideal Number of children					*		
0-1	16 (13.6)	47 (22.5)	103 (29.4)	79 (35.3)	161 (34.1)	142 (34.6)	21.0
2-3	81 (11.8)	228 (24.0)	314 (29.7)	300 (35.0)	819 (37.3)	780 (39.4)	27.6
4-5	133 (10.1)	243 (20.0)	181 (22.3)	228 (37.1)	442 (35.9)	415 (39.3)	29.2
Exposure to radio	**	**	*				
No	70 (8.0)	190 (18.3)	224 (24.4)	179 (33.3)	559 (35.6)	744 (38.3)	30.3
Yes	160 (12.9)	326 (24.0)	374 (28.9)	426 (36.9)	862 (37.1)	593 (39.5)	26.6
Exposure to television		***	**			*	
No	166 (10.1)	338 (19.5)	379 (24.6)	415 (36.8)	807 (36.7)	861 (40.9)	30.8
Yes	64 (13.5)	180 (27.0)	219 (32.5)	192 (33.8)	615 (36.3)	476 (35.5)	22
Exposure to newspaper	*	***					
No	114 (9.4)	357 (19.4)	448 (26.2)	393 (35.0)	918 (37.7)	1091 (39.7)	30.3
Yes	113 (12.7)	160 (28.8)	150 (29.9)	214 (37.6)	503 (34.7)	246 (35.4)	22.7
Exposure to Media FP messages			**				
No	201 (10.1)	336 (18.5)	412 (25.5)	466 (34.9)	1106 (35.9)	1188 (39.6)	29.5
Yes	29 (21.8)	181 (31.0)	186 (31.0)	141 (39.0)	316 (38.8)	150 (33.4)	11.6
Told about FP at health facility		***	***	***	***	***	***
No	-	170 (16.9)	271 (26.5)	150 (37.8)	383 (32.6)	466 (38.2)	21.3
Yes	-	211 (36.7)	203 (44.1)	205 (53.8)	566 (55.0)	520 (50.7)	14
Visited health facility in last 12 months		***	***	***	***	***	
No	-	137 (16.8)	125 (17.0)	252 (27.4)	471 (28.0)	352 (29.3)	12.5
Yes	-	381 (24.0)	473 (31.9)	354 (45.7)	950 (43.1)	985 (43.9)	19.9
Visited by a community health worker			***	***			
No	-	491 (21.3)	520 (25.9)	547 (34.5)	1236 (35.6)	1157 (38.2)	16.3
Yes	-	27 (27.2)	79 (37.6)	60 (54.0)	183 (44.4z0	180 (42.9)	15.7
Fertility preference	*				*		
Want another child	162 (15.0)	475 (22.1)	538 (27.1)	517 (36.3)	1263 (36.2)	1170 (39.2)	24.2
Want no more children	9 (32.5)	32 (20.0)	49 (28.7)	57 (38.2)	107 (45.5)	102 (40.0)	7.5
Undecided	2 (10.1)	11 (11.2)	11 (19.6)	32 (27.1)	51 (31.8)	65 (31.9)	21.8
Experienced pregnancy loss							
No	-	-	539 (26.9)	558 (35.4)	1339 (36.3)	1263 (38.7)	11.8
Yes	-	-	60 (27.7)	49 (41.4)	83 (39.8)	74 (40.2)	12.5
Experienced unplanned birth			*	*	*		
No	128 (14.7)	248 (27.2)	295 (36.8)	280 (47.7)	682 (50.7)	579 (52.2)	37.5
Yes	74 (15.3)	174 (27.0)	216 (31.5)	233 (39.5)	610 (46.1)	594 (49.7)	34.4
Experienced child mortality							
No	201 (15.5)	425 (28.3)	507 (34.6)	518 (44.1)	1308 (48.5)	1204 (50.8)	**35.3**
Yes	29 (3.5)	93 (10.3)	91 (12.1)	90 (17.2)	115 (9.5)	133 (12.3)	**9.8**
Total	**10.9**	**21.6**	**27.0**	**35.8**	**36.5**	**38.8**	**27.9**

*** $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$

CHAPTER 6: APPENDICES

Table 6.1. Multilevel parameter estimates and adjusted odds ratios of individual and contextual factors associated with contraceptive use among sexually active women in Urban Zambia, 2018 DHS.

Variables	Model 0	Model I aOR (95%CI)	Model II aOR (95%CI)	Model III aOR(95%CI)
Individual level factors				
Age				
15 – 24		1		1
25 – 34		0.58*** (0.45,0.74)		0.57*** (0.45,0.73)
35 – 49		0.25*** (0.17,0.35)		0.25*** (0.17,0.35)
Education level				
None		1		1
Primary		2.00** (1.31,3.05)		2.02** (1.32,3.08)
Secondary		2.06** (1.27,3.35)		2.07** (1.27,3.38)
Higher		2.42** (1.31,4.48)		2.44** (1.32,4.52)
Wealth status				
Poor		1		1
Moderate		0.99 (0.65,1.50)		0.97 (0.64,1.48)
Rich		1.07 (0.73,1.56)		1.06 (0.72,1.55)
Employment status				
Not working		1		1
Working		1.08 (0.87,1.35)		1.09 (0.87,1.36)
Age at first sex				
Less than 15		1		1
15-19		1.15 (0.87,1.50)		1.16 (0.88,1.52)
20+		1.19 (0.88,1.61)		1.19 (0.89,1.61)
Marital status				
Never married		1		1
Married		3.37*** (2.50,4.55)		3.34*** (2.48,4.51)
Formerly married		1.03 (0.74,1.42)		1.02 (0.73,1.42)
CEB				
0 -1		1		1
2 -3		2.00*** (1.53,2.61)		2.01*** (1.54,2.62)
4 -5		3.05*** (2.17,4.28)		3.06*** (2.18,4.28)
6+		3.36*** (2.22,5.10)		3.38***(2.23,5.12)
Ideal number of children				
0 -1		1		1
2 -3		0.70 (0.38,1.30)		0.71 (0.38,1.32)
4 -5		0.70 (0.35,1.37)		0.71 (0.36,1.39)
6+		0.60 (0.31,1.16)		0.61 (0.31,1.18)
Distance to health facility				
Not a big problem		1		1
A big problem		1.07 (0.85,1.36)		1.06 (0.84,1.35)
Visited by community health worker				
No		1		1
Yes		1 (0.78,1.28)		0.97 (0.75,1.25)
Woman decision making autonomy				
Low		1		1
High		1.12 (0.83,1.50)		1.12 (0.83,1.51)
Experienced pregnancy loss				
No		1		1
Yes		0.70* (0.52,0.94)		0.71* (0.53,0.95)
Exposure to listening radio				
No		1		1
Yes		1.09 (0.89,1.33)		1.09 (0.89,1.33)
Exposure of watching television				
No		1		1
Yes		0,84 (0.69,1.04)		0.83 (0.68,1.02)
Exposure to reading newspaper				
No		1		1
Yes		1.13 (0.90,1.43)		1.14 (0.91,1.44)

Table 6.1 continued

Ownership of mobile phone				
No		1		1
Yes		1.17 (0.89,1.53)		1.17 (0.89,1.53)
Exposure to media FP messages				
No		1		1
Yes		1.00 (0.82,1.23)		1.00 (0.82,1.23)
Experienced child mortality				
No		1		1
Yes		0.32*** (0.21,0.46)		0.31*** (0.21,0.46)
Contextual-level factors				
Lusaka			1	1
Central			0.89 (0.69,1.14)	0.91 (0.70,1.20)
Copperbelt			0.95 (0.73,1.21)	0.98 (0.78,1.22)
Eastern			1.10 (0.76,1.61)	1.06 (0.77,1.46)
Luapula			0.95 (0.76,1.20)	1.04 (0.79,135)
Muchinga			1.16 (0.80,1.69)	1.15 (0.80,1.66)
Northern			0.84 (0.62,1.12)	0.71 (0.52,0.97)*
North-western			0.92 (0.71,1.22)	0.92 (0.64,1.30)
Southern			1.00 (0.78,1.28)	0.84 (0.62,1.15)
Western			0.72 (0.51,1.03)	0.84 (0.57,124)
Community education				
Low			1	1
Medium			0.87 (0.70,1.08)	0.8 (0.67,1.02)
High			0.92 (0.72,1.17)	0.89 (0.70,1.14)
Community wealth				
Low			1	1
Medium			1.06 (0.81,1.39)	1.02 (0.74,1.39)
High			1.05 (0.79,1.41)	0.95 (0.69,1.31)
Community employment				
Low			1	1
Medium			0.97 (0.80,1.17)	0.92 (0.75,1.12)
High			0.91 (0.75,1.09)	0.98 (0.82,1.18)
Community woman decision making autonomy				
Low			1	1
Medium			0.96 (0.78,1.17)	1.05 (0.85,1.31)
High			1.18 (0.93,1.49)	1.27* (1.09,1.62)
Community access to CHW home visits				
Low			1	1
Medium			1.32** (1.08,1.62)	1.32** (1.09,1.59)
High			1.23* (1.04,1.46)	1.16* (0.97,1.40)
Community family size desire				
Low			1	1
Medium			1.08 (0.87,1.35)	0.92 (0.75,1.13)
High			0.73 (0.50,1.07)	0.69 (0.46,1.05)
Community early childbearing				
Low			1	1
Medium			0.96 (0.78,1.17)	0.96 (0.78,1.18)
High			0.95 (0.79,1.13)	0.97 (0.81,1.16)
Community access to FP messages				
Low			1	1
Medium			0.92 (0.76,1.12)	0.97 (0.79,1.18)
High			1.00 (0.82,1.22)	1.02 (0.81,1.27)
Random effects				
Variance (CI)	0.10 (0.06-0.17)	0.08 (0.04-0.14)	0.07 (0.05-0.13)	0.06 (0.03-0.12)
ICC (%)	3.0	2.3	2.4	1.8
PCV (%)	Ref	20.0	30.0	40.0
MOR	1.36	1.31	1.31	1.42
Wald Chi-square	Ref	584.75***	23.64	673.97***
Model fit statistics				
Log-likelihood	-3297.3	-2838.8	-3287.6	-2831.6
AIC	6598.6	5737.7	6607.3	5751.2
BIC	6611.3	5927.8	6708.7	6029.9
N	4,175	4,175	4,175	4,175

* = $p < 0.05$; 1=Reference Category; Model 0 contains no explanatory variables; Model I includes individual-level factors only; Model II includes both individual-level and community-level factors; Model III includes community-level factors only aOR adjusted odds ratio, CI confidence internal, ICC intraclass correlation coefficient, PVC Proportional variance change, AIC Akaike information criterion, BIC Bayesian Information Criteri

Table 6.2. Multilevel parameter estimates and adjusted odds ratios of individual and contextual factors associated with contraceptive use among sexually active women in Rural Zambia, 2018 DHS.

Variables	Model 0	Model I aOR(95%CI)	Model II aOR(95%CI)	Model III aOR(95%CI)
Individual level factors				
Age				
15 – 24		1		1
25 – 34		1.04 (0.85,1.28)		1.02 (0.84,1.27)
35 – 49		0.51*** (0.40,0.65)		0.50*** (0.39,0.64)
Education level				
None		1		1
Primary		1.46** (1.17,1.81)		1.43** (1.16,1.77)
Secondary		1.50** (1.17,1.94)		1.47** (1.14,1.89)
Higher		1.22 (0.73,2.04)		1.16 (0.69,1.93)
Wealth status				
Poor		1		1
Moderate		1.23* (1.03,1.47)		1.24* (1.04,1.48)
Rich		1.09 (1.03,1.47)		1.11 (0.83,1.48)
Employment status				
Not working		1		1
Working		1.14 (0.99,1.31)		1.17* (1.02,1.35)
Age at first sex				
Less than 15		1		1
15-19		0.97 (0.85,1.11)		0.98 (0.85,1.12)
20+		0.74* (0.56,0.98)		0.74* (0.56,0.97)
Marital status				
Never married		1		1
Married		2.39*** (1.88,3.05)		2.41*** (1.90,3.07)
Formerly married		0.75* (0.56,0.99)		0.75* (0.56,0.99)
Parity				
0 -1		1		1
2 -3		1.35* (1.05,1.74)		1.35* (1.05,1.73)
4 -5		1.73*** (1.28,2.34)		1.74*** (1.28,2.35)
6+		1.92*** (1.39,2.65)		1.93*** (1.39,2.66)
Ideal number of children				
0 -1		1		1
2 -3		0.91 (0.52,1.60)		0.92 (0.53,1.62)
4 -5		0.96 (0.58,1.61)		0.98 (0.59,1.64)
6+		0.70 (0.41,1.17)		0.71 (0.43,1.19)
Distance to health facility				
Not a big problem		1		1
A big problem		1.01 (0.88,1.17)		1.02 (0.89,1.18)
Visited by community health worker				
No		1		1
Yes		1.17 (0.97,1.42)		1.14 (0.94,1.38)
Woman autonomy				
Low		1		1
High		1.21* (1.04,1.41)		1.22* (1.05,1.43)
Experienced pregnancy loss				
No		1		1
Yes		0.93 (0.77,1.12)		0.92 (0.76,1.12)
Exposure to listening radio				
No		1		1
Yes		1.29** (1.10,1.51)		1.30** (1.12,1.52)
Exposure of watching television				
No		1		1
Yes		1.11 (0.90,1.37)		1.12 (0.91,1.38)
Exposure to reading newspaper				
No		1		1

Yes	1.13 (0.92,1.39)		1.13 (0.92,1.39)

Table 6.2 continued

Ownership of mobile phone			
No	1		1
Yes	1.19* (1.01,1.39)		1.19* (1.02,1.40)
Exposure to Media FP messages			
No	1		1
Yes	0.88 (0.67,1.16)		0.89 (0.67,1.17)
Experienced child mortality			
No	1		1
Yes	0.16*** (0.67,1.16)		0.17*** (1.12,0.23)
Contextual-level factors			
Region			
Lusaka		1	1
Central		0.80 (0.55,1.16)	0.72 (0.50,1.04)
Copperbelt		0.66 (0.44,1.01)	0.66 (0.42,1.02)
Eastern		0.95 (0.66,1.36)	0.95 (0.66,1.37)
Luapula		0.41 (0.28,0.61)***	0.34 (0.26,0.59)***
Muchinga		0.90 (0.62,1.29)	0.96 (0.66,1.38)
Northern		0.57 (0.38,0.85)**	0.56 (0.37,0.85)**
North-western		0.56 (0.38,0.82)**	0.66 (0.45,0.97)*
Southern		0.59 (0.40,0.87)**	0.56 (0.41,0.86)**
Western		0.34 (0.25,0.60)***	0.47 (0.30,0.73)**
Community education			
Low		1	1
Medium		1.05 (0.84,1.30)	1.10 (0.84,1.28)
High		1.21 (0.94,1.56)	1.33* (1.03,1.72)
Community wealth			
Low		1	1
Medium		0.87 (0.68,1.09)	0.88 (0.61,1.00)
High		1.17 (0.89,1.53)	1.05 (0.99,1.60)
Community employment			
Low		1	1
Medium		0.96 (0.77,1.08)	0.90 (0.75,1.08)
High		0.92 (0.69,1.03)	0.73 (0.59,0.89)
Community woman decision making autonomy			
Low		1	1
Medium		0.95 (0.76,1.18)	0.92 (0.74,1.14)
High		1.08 (0.89,1.12)	1.05 (0.85,1.30)
Community access to CHW home visits			
Low		1	1
Medium		1.10 (0.88,1.36)	1.03 (0.82,1.29)
High		1.36*** (1.15,1.61)	1.27** (1.07,1.51)
Community family size desire			
Low		1	1
Medium		0.90 (0.73,1.11)	0.93 (0.75,1.15)
High		0.85 (0.68,1.07)	0.86 (0.68,1.09)
Community early childbearing			
Low		1	1
Medium		1.13 (0.94,1.36)	1.18 (0.98,1.42)
High		0.83 (0.68,0.99)*	0.81* (0.66,0.98)
Community access to FP messages			

Low			1	1
Medium			0.86 (0.66,1.02)	0.86 (0.68,1.08)
High			0.87 (0.62,1.10)	0.86 (0.65,1.15)
Random effects				
Variance (CI)	0.28 (0.20-0.39)	0.26 (0.19-0.38)	0.14 (0.09-0.22)	0.13 (0.08-0.23)
ICC (%)	7.7	7.5	4.1	4.0
PCV (%)	Ref	7.1	50.0	53.4
MOR	1.65	1.64	1.56	1.53
Wald Chi-square	Ref	532.84***	33.17**	591.96***
Model fit statistics				
Log-likelihood	-3803.6	-3410.5	-3786.8	-3391.3
AIC	7611.2	6881.0	7605.7	6870.6
BIC	7624.7	7083.2	7713.6	7167.3
N	**6,262**	**6,262**	**6,262**	**6,262**

* = $p < 0.05$; 1=Reference Category; Model 0 contains no explanatory variables; Model I includes individual-level factors only; Model II includes both individual-level and community-level factors; Model III includes community-level factors only aOR adjusted odds ratio, CI confidence internal, ICC intraclass correlation coefficient, PVC Proportional variance change, AIC Akaike information criterion, BIC Bayesian Information Criterion

CHAPTER 7: APPENDICES

Table 7.1: D**istribution of trend change in total fertility rate of women (15-49 years) by background characteristics, DHS 1992 - 2018, Zambia**

Background characteristic	DHS 1992 (N=5,090)	DHS 1996 (N=5,827)	DHS 2001 (N=5,736)	DHS 2007 (N=5,253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage point difference in use of contraceptives 1992 to 2018
Residence							
Urban	5.8	5.1	4.3	4.3	3.7	3.4	-2.4
Rural	7.1	6.9	6.9	7.5	6.6	5.8	-1.3
Province							
Central	6.8	6.3	6.2	6.4	5.9	4.8	-2.0
Copperbelt	6.2	5.6	4.5	4.8	4.0	3.4	-2.8
Eastern	6.8	7.1	6.8	7.1	5.8	5.5	-1.3
Luapula	7.2	6.8	7.3	7.2	6.4	6.0	-1.2
Lusaka	5.5	4.9	4.3	4.1	3.7	3.5	-2.0
Muchinga	_	_	_	_	6.3	5.7	5.7
Northern	7.5	7.2	6.9	7.9	6.6	5.6	-1.9
North-western	6.9	6.2	6.8	7.3	6.2	4.9	-2.0
Southern	7.1	6.2	6.1	6.7	6.2	5.5	-1.6
Western	5.7	5.5	6.4	6.2	5.6	5.4	-0.3
Education level							
None	7.1	6.8	7.4	8.2	7.2	6.4	-0.7
Primary	6.8	6.7	6.5	7.1	6.3	5.6	-1.2
Secondary	4.9	4.8	4.1	4.2	3.8	3.7	-1.2
Higher	4.1	2.9	2.1	2.4	3.0	2.4	-1.7
Marital Status							
Never married	2.7	2.2	1.8	1.5	1.8	1.9	-0.8
Married	7.7	7.5	7.4	7.8	6.9	6.2	-1.5
Formerly married	4.8	5.0	4.4	4.8	4.6	4.3	-0.5
Partners Education Level							
None	7.2	7.5	6.9	8.2	7.3	7.4	0.2
Primary	7.6	7.6	7.6	8.4	7.4	6.8	-0.8
Secondary	6.7	6.4	6.3	6.3	5.8	5.6	-1.1
Higher	6.0	5.8	5.0	4.7	4.9	4.8	-1.2
Wealth status							
Poor	_	7.1	7.2	8.0	7.1	6.4	-0.7
Moderate	_	6.4	6.8	7.2	6.0	4.9	-1.5
Rich	_	5.0	4.3	4.3	3.6	3.4	-1.6
Employment status							0.0
Unemployed	6.6	6.2	5.9	6.7	5.2	5.0	-1.6
Employed	6.5	6.2	6.0	6.0	5.6	4.7	-1.8
Age at first sex							0.0
Less than 15 years	5.6	5.3	5.0	5.0	4.0	4.2	-1.4
15 - 19 years	6.2	6.0	6.1	6.3	5.3	5.1	-1.1
20+ years	7.5	7.2	6.6	7.1	6.4	3.5	-4.0
Age at first marriage							
Less than 15 years	7.3	7.3	7.1	7.3	6.5	5.8	-1.5
15 - 19 years	6.9	7.3	6.9	7.5	6.6	5.9	-1.0
20+ years	6.3	5.4	5.7	5.7	5.3	5.4	-0.9
Desired family size							
0-3	5.1	4.0	4.1	4.0	3.7	3.5	-1.6
4-5	6.0	5.8	5.9	5.9	4.9	4.3	-1.7
6+	7.1	7.0	6.9	7.9	6.7	6.1	-1.0
Total	**6.5**	**6.1**	**5.9**	**6.2**	**5.3**	**4.7**	**-1.8**

Table 7.2: D**istribution of trend change in the prevalence of short-birth interval among women (15-49 years) by background characteristics, DHS 1992 - 2018, Zambia**

Background characteristic	Short-birth interval						
	DHS 1992 (N=5,090)	**DHS 1996 (N=5,827)**	**DHS 2001/2 (N=5,736)**	**DHS 2007 (N=5,253)**	**DHS 2013-14 (N=12,419)**	**DHS 2018 (N=10,437)**	**Percentage point difference in use of contraceptives 1992 to 2018**
Age							
15 – 24	435 (64.5)	566 (67.1)	462 (60.2)	363 (57.7)	761 (59.8)	468 (47.8)	-15.7
25 – 34	708 (48.9)	813 (50.2)	717 (43.4)	736 (43.0)	1467 (37.4)	921 (31.7)	-17.2
35 – 49	487 (40.4)	517 (37.9)	554 (37.5)	508 (35.9)	1165 (31.7)	927 (28.7)	-11.7
Residence							
Urban	773 (48.2)	778 (49.4)	560 (39.6)	490 (36.5)	1115 (31.0)	823 (27.6)	-20.6
Rural	856 (49.8)	1118 (49.3)	1173 (47.2)	1117 (46.3)	2278 (43.2)	1493 (36.1)	-13.7
Province							
Central	162 (52.2)	157 (50.4)	140 (49.4)	152 (41.8)	341 (42.1)	196 (31.9)	-23.3
Copperbelt	381 (49.9)	362 (52.5)	289 (40.7)	225 (36.7)	443 (33.0)	312 (30.9)	-19
Eastern	172 (46.4)	301 (51.6)	234 (46.4)	266 (46.6)	467 (41.4)	279 (31.3)	-15.1
Luapula	115 (54.6)	175 (50.4)	174 (54.3)	144 (48.9)	327 (47.9)	251 (43.5)	-11.1
Lusaka	273 (48.9)	318 (49.4)	224 (41.5)	202 (38.2)	475 (30.5)	358 (26.8)	-22.1
Muchinga					202 (40.8)	167 (38.8)	38.8
Northern	156 (50.2)	209 (49.4)	249 (45.8)	256 (47.9)	337 (46.4)	256 (43.2)	-7
North-western	40 (44.7)	65 (43.4)	90 (45.9)	101 (52.3)	170 (43.9)	117 (33.7)	-11
Southern	248 (50.1)	207 (51.3)	197 (45.4)	160 (40.5)	457 (39.0)	257 (29.5)	-20.6
Western	84 (38.4)	101 (34.9)	139 (37.0)	100 (38.1)	174 (30.3)	124 (27.7)	-10.7
Education level							
None	312 (45.7)	280 (45.9)	265 (45.9)	223 (42.7)	427 (42.6)	274 (36.4)	-9.3
Primary	1021 (50.5)	1230 (51.8)	1108 (45.5)	1065 (45.9)	2011 (39.9)	1295 (34.6)	-15.9
Secondary	263 (47.1)	357 (47.2)	333 (41.3)	289 (37.1)	847 (34.3)	680 (29.5)	-17.6
Higher	33 (52.9)	29 (27.6)	27 (32.8)	30 (22.2)	104 (29.4)	67 (21.0)	-31.9
Marital status							
Never married	19 (28.9)	38 (38.3)	19 (26.0)	23 (27.9)	79 (33.2)	96 (34.6)	5.7
Married	1393 (51.6)	1545 (51.2)	1423 (46.6)	1349 (44.7)	2810 (39.6)	1817 (33.3)	-18.3
Formerly married	217 (38.7)	313 (43.1)	292 (37.7)	235 (35.9)	504 (32.9)	403 (29.0)	-9.7
Partners Education Level							
None	158 (47.3)	128 (42.9)	132 (45.4)	118 (43.5)	238 (44.3)	126 (37.7)	-9.6
Primary	756 (48.4)	849 (50.3)	820 (47.2)	777 (47.4)	1432 (42.1)	739 (36.4)	-12
Secondary	591 (51.9)	731 (51.9)	613 (42.6)	565 (42.3)	1350 (36.1)	775 (32.1)	-19.8
Higher	81 (51.6)	123 (43.9)	114 (40.7)	91 (27.3)	171 (25.2)	104 (22.7)	-28.9
Children ever born							
0-3	648 (53.1)	782 (52.8)	709 (45.8)	631 (43.4)	1349 (38.2)	966 (31.8)	-21.3
4-5	391 (47.7)	515 (50.9)	460 (44.5)	472 (41.8)	915 (35.7)	597 (28.6)	-19.1
6+	590 (46.0)	598 (44.3)	564 (42.8)	504 (42.9)	1129 (40.7)	734 (37.8)	-8.2
Wealth status							
Poor	_	787 (49.1)	730 (46.4)	731 (47.5)	1639 (45.6)	1115 (39.0)	39
Moderate	_	344 (49.0)	402 (49.3)	336 (46.5)	705 (38.9)	419 (31.1)	31.1
Rich	_	765 (49.6)	601 (39.8)	540 (36.1)	1049 (30.3)	782 (26.8)	26.8
Employment status							
Unemployed	704 (51.9)	852 (49.3)	644 (44.1)	694 (42.8)	1297 (37.7)	1096 (35.6)	-16.3
Employed	924 (47.0)	1043 (49.4)	1088 (44.6)	910 (42.7)	2085 (38.7)	1220 (30.2)	-16.8
Age at first sex							
Less than 15 years	269 (47.0)	348 (51.0)	274 (46.0)	175 (43.7)	324 (42.8)	497 (34.6)	-12.4
15 - 19 years	558 (49.4)	816 (51.4)	794 (43.9)	689 (40.0)	1471 (35.8)	1627 (32.1)	-17.3
20+ years	802 (49.5)	731 (46.5)	665 (44.5)	743 (45.5)	1598 (39.9)	191 (31.7)	-17.8
Age at first marriage							
Less than 15 years	304 (46.3)	290 (45.8)	250 (44.0)	217 (42.6)	365 (39.0)	265 (34.5)	-11.8
15 - 19 years	1047 (50.7)	1247 (52.8)	1164 (46.1)	1052 (45.1)	2198 (40.1)	1327 (33.1)	-17.6
20+ years	279 (46.2)	358 (42.3)	320 (39.5)	338 (37.0)	830 (33.8)	723 (30.9)	-15.3
Contraceptive use							
No	1329 (48.5)	1308 (47.9)	1115 (44.4)	908 (42.9)	1627 (42.9)	1108 (32.4)	-16.1

Yes	301 (51.7)	589 (52.8)	618 (44.6)	699 (42.6)	1845 (40.8)	1208 (32.6)	-19.1
Family Size Concordance							
Both want same	457 (51.3)	567 (51.7)	584 (46.2)	469 (43.1)	1090 (39.0)	745 (34.2)	-17.1
Husband want more	325 (50.1)	456 (51.4)	320 (45.4)	306 (44.6)	712 (39.8)	480 (35.4)	-14.7
Husband want less	165 (58.3)	125 (50.8)	123 (46.7)	85 (44.1)	160 (35.2)	147 (30.0)	-28.3
Don't know	442 (50.9)	394 (50.1)	396 (48.1)	486 (46.4)	842 (41.2)	445 (31.2)	-19.7
Ideal number of children							
0-3	110 (50.7)	156 (48.1)	236 (44.5)	198 (39.5)	433 (37.1)	283 (28.1)	-22.6
4-5	492 (49.4)	719 (50.8)	716 (43.3)	662 (41.0)	1396 (35.9)	992 (30.5)	-18.9
6+	1026 (48.8)	1020 (48.5)	781 (45.6)	747 (45.5)	1564 (41.0)	1041 (36.4)	-12.4
Exposure to Media FP messages							
No	1501 (48.2)	1449 (49.9)	1359 (45.8)	1362 (45.4)	2877 (40.5)	2877 (40.5)	-7.7
Yes	129 (61.1)	447 (47.6)	375 (40.1)	245 (32.4)	516 (29.3)	516 (29.3)	-31.8
Total	49.0	49.3	44.4	42.8	38.2	32.5	-16.5

Table 7.3: D**istribution of trend change in the prevalence of unplanned birth among women (15-49 years) by background characteristics, DHS 1992 - 2018, Zambia**

Background characteristic	DHS 2001 (N=5,736)	DHS 2007 (N=5,253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage point difference in use of contraceptives 1992 to 2018
Age					
15 – 24	686 (46.1)	590 (50.1)	1322 (49.6)	1195 (51.9)	6.8
25 – 34	660 (43.2)	723 (44.4)	1282 (34.6)	904 (33.5)	-9.7
35 – 49	403 (53.6)	390 (53.0)	867 (44.6)	610 (39.8)	-13.8
Residence					
Urban	717 (54.3)	644 (54.2)	1421 (44.1)	1137 (44.4)	-9.9
Rural	1032 (42.2)	1059 (45.0)	2051 (40.2)	1572 (39.60)	-2.6
Province					
Central	132 (50.1)	185 (51.7)	417 (52.7)	211 (36.6)	-13.5
Copperbelt	360 (55.4)	320 (60.0)	554 (46.9)	428 (47.6)	-7.8
Eastern	218 (43.4)	199 (37.2)	353 (33.5)	408 (48.2)	4.8
Luapula	111 (35.8)	113 (40.8)	248 (38.0)	252 (44.8)	9.0
Lusaka	288 (55.1)	211 (46.5)	569 (41.2)	491 (44.3)	-10.8
Muchinga			168 (35.7)	137 (35.2)	-0.5
Northern	206 (38.0)	280 (52.8)	305 (43.8)	158 (29.0)	-9.0
North-western	57 (29.8)	85 (43.1)	165 (42.5)	172 (48.2)	18.4
Southern	249 (59.5)	206 (52.5)	497 (43.7)	294 (36.0)	-23.5
Western	129 (34.9)	105 (39.6)	196 (34.9)	156 (36.4)	1.5
Education level					
None	193 (36.6)	192 (41.5)	272 (33.4)	219 (36.9)	0.3
Primary	1061 (45.8)	1010 (47.3)	1784 (40.2)	1271 (40.0)	-5.8
Secondary	467 (55.1)	464 (55.3)	1308 (48.0)	1144 (46.0)	-9.1
Higher	28 (36.2)	37 (35.6)	107 (31.9)	75 (27.3)	-8.9
Marital Status					
Never married	244 (74.1)	260 (79.6)	632 (72.8)	735 (77.4)	3.3
Married	1265 (43.1)	1236 (43.8)	2402 (36.9)	1649 (34.3)	-8.8
Formerly married	240 (47.8)	206 (52.5)	437 (46.4)	326 (41.5)	-6.3
Partners Education Level					
None	77 (31..3)	83 (38.3)	161 (34.8)	86 (31.2)	-0.1
Primary	667 (41.4)	670 (44.2)	1071 (37.1)	613 (35.2)	-6.2
Secondary	657 (49.6)	570 (48.9)	1322 (39.9)	804 (36.6)	-13.0
Higher	85 (41.2)	88 (37.2)	176 (31.7)	87 (21.9)	-19.3
Wealth status					
Poor	619 (40.0)	685 (45.4)	1319 (37..5)	1088 (39.0)	-1.0
Moderate	366 (46.0)	313 (44.8)	820 (47.5)	526 (41.9)	-4.1
Rich	764 (53.6)	704 (52.9)	1332 (43.3)	1095 (44.0)	-9.6
Employment status					
Unemployed	773 (49.2)	830 (47.3)	1603 (42.6)	1554 (46.0)	-3.2
Employed	976 (44.5)	868 (48.8)	1853 (41.0)	1155 (36.6)	-7.9
Age at first sex					
Less than 15 years	261 (44.7)	194 (49.4)	297 (39.4)	518 (42.4)	-2.3

15 - 19 years	920 (49.7)	862 (51.1)	1901 (46.3)	1950 (41.5)	-8.2
20+ years	569 (42.7)	647 (44.3)	1274 (36.8)	241 (39.5)	-3.2
Age at first marriage					
Less than 15 years	183 (43.8)	197 (52.0)	267 (38.5)	203 (37.6)	-6.2
15 - 19 years	1048 (44.9)	962 (45.8)	1919 (39.7)	1190 (35.6)	-9.3
20+ years	518 (50.9)	545 (51.3)	1286 (46.0)	1315 (49.6)	-1.3
Contraceptive use					
No	1077 (46.6)	905 (48.6)	1627 (42.9)	1242 (42.4)	-4.2
Yes	672 (46.1)	798 (47.5)	1845 (40.8)	1467 (40.7)	-5.4
Family Size Concordance					
Both want same	539 (43.3)	457 (42.9)	975 (36.4)	654 (32.9)	-10.4
Husband want more	301 (48.4)	286 (46.3)	574 (36.7)	417 (35.7)	-12.7
Husband want less	124 (49.4)	94 (53.6)	186 (45.1)	145 (35.1)	-14.3
Don't know	301 (36.7)	396 (41.4)	663 (36.2)	432 (35.2)	-1.5
Told about FP at health facility					
No	786 (45.9)	484 (53.9)	1179 (44.9)	961 (43.6)	-2.3
Yes	610 (50.1)	509 (44.2)	1227 (40.9)	1036 (41.2)	-8.1
Exposure to listening to radio					
No	717 (41.3)	539 (45.2)	1410 (41.1)	1498 (41.6)	0.3
Yes	1033 (50.9)	1162 (49.5)	2061 (42.2)	1211 (41.3)	-9.6
Exposure to watching television					
No	1224 (43.4)	1188 (47.1)	2174 (41.7)	1705 (40.8)	-2.6
Yes	524 (55.4)	515 (50.6)	1297 (41.8)	1003 (42.7)	-12,7
Exposure to Media FP messages					
No	1293 (44.4)	1382 (47.6)	2815 (41.5)	2815 (41.5)	-2.9
Yes	457 (53.4)	321 (50.2)	656 (42.7)	656 (42.7)	-10.7
Experienced child mortality					
No	1706 (46.4)	1676 (48.1)	3438 (41.7)	2672 (41.3)	-5.1
Yes	43 (47.1)	27 (48.0)	34 (50.0)	36 (58.1)	11.0
Total	**46.4**	**48.1**	**41.7**	**41.5**	**4.9**

Table 7.4: D**istribution of trend change in the prevalence of teenage pregnancy among women (15-19 years) by background characteristics, DHS 1992 - 2018, Zambia**

Background characteristic	DHS 1992 (N=5,090)	DHS 1996 (N=5,827)	DHS 2001 (N=5,736)	DHS 2007 (N=5253)	DHS 2013 (N=12,419)	DHS 2018 (N=10,437)	Percentage point difference in use of contraceptives 1992 to 2018
Age	***	***	***	***	***	***	
15 – 17	1182 (84.2)	1364 (84.5)	1278 (82.3)	998 (82.0)	2336 (84.7)	1994 (82.5)	-1.7
18 – 19	1162 (72.4)	1231 (66.9)	1253 (67.5)	1223 (63.5)	2821 (64.6)	2107 (62.7)	-9.7
35 – 49	902 (73.2)	1011 (70.6)	1104 (71.8)	965 (65.3)	2481 (64.9)	2059 (61.3)	-11.9
Residence		***	**	***	***	***	
Urban	1585 (75.8)	1471 (70.4)	1352 (70.9)	1113 (62.5)	2949 (62.7)	2413 (59.8)	-16.0
Rural	1660 (77.2)	2134 (76.3)	2283 (75.4)	2073 (73.0)	4688 (75.1)	3748 (73.4)	-3.8
Province	**	*	**	***	***	***	
Central	309 (78.7)	282 (72.0)	277 (78.1)	320 (71.7)	757 (75.7)	564 (72.3)	-6.4
Copperbelt	758 (77.9)	670 (74.6)	692 (74.9)	513 (65.7)	1118 (65.9)	825 (60.3)	-17.6
Eastern	349 (72.4)	529 (74.6)	446 (72.5)	487 (72.5)	1037 (77.0)	827 (73.9)	-1.5
Luapula	198 (77.5)	321 (75.1)	306 (78.0)	253 (73.8)	551 (69.0)	475 (66.9)	-10.6
Lusaka	537 (72.4)	581 (68.4)	496 (67.4)	409 (59.7)	1270 (61.7)	1030 (58.3)	-14.1
Muchinga	–	–	–	–	402 (68.5)	352 (68.3)	-0.2
Northern	289 (75.2)	393 (74.0)	477 (71.7)	425 (67.2)	599 (71.7)	518 (72.2)	-3.0
North-western	92 (82.6)	145 (78.8)	181 (76.6)	182 (79.1)	364 (75.0)	328 (69.9)	-12.7
Southern	502 (80.2)	400 (77.8)	420 (76.5)	359 (73.8)	1039 (74.1)	829 (74.8)	-5.4
Western	212 (76.5)	283 (74.7)	340 (73.3)	233 (68.6)	501 (68.4)	412 (70.7)	-5.8
Education level	***	***	***	***	***	***	
None	590 (74.2)	538 (74.7)	524 (76.2)	402 (70.6)	809 (74.5)	593 (72.4)	-1.8

Primary	2102 (81.8)	2353 (80.1)	2333 (78.5)	2038 (75.3)	4370 (76.5)	3340 (75.8)	-6.0
Secondary	530 (66.6)	679 (63.1)	747 (65.5)	697 (61.1)	2350 (64.7)	2114 (61.1)	-5.5
Higher	23 (27.4)	34 (22.8)	32 (23.0)	49 (23.9)	103 (20.3)	112 (24.8)	-2.6
Marital Status			*	***	*	*	
Never married	263 (80.4)	272 (72.7)	264 (70.7)	273 (70.4)	706 (68.2)	820 (70.0)	-10.4
Married	2452 (76.2)	2685 (74.7)	2698 (74.3)	2387 (69.0)	5771 (71.0)	4321 (67.9)	-8.3
Formerly married	531 (76.2)	648 (70.7)	673 (72.2)	525 (67.8)	1161 (65.1)	1019 (63.7)	-12.5
Religion		*				***	
Catholic	855 (74.5)	858 (73.4)	816 (71.7)	661 (71.2)	1330 (69.8)	991 (63.6)	-10.9
Protestant	2283 (77.5)	2680 (74.0)	2727 (74.0)	2469 (68.4)	6210 (69.9)	5080 (68.5)	-9.0
Other	107 (72.7)	67 (70.9)	92 (83.2)	56 (66.5)	97 (62.8)	89 (55.1)	-17.6
Wealth status		***	***	***	***	***	
Poor	_	1494 (76.3)	1431 (75.5)	1293 (73.0)	3174 (75.5)	2603 (74.7)	-1.6
Moderate	_	694 (79.0)	790 (78.6)	645 (74.2)	1680 (77.1)	1276 (74.3)	-4.7
Rich	_	1417 (69.2)	1412 (69.5)	1248 (63.0)	2784 (61.0)	2281 (58.0)	-11.2
Employment status		*		*	***	***	
Unemployed	1428 (77.4)	1739 (75.4)	1441 (74.2)	1474 (70.7)	3364 (73.0)	3005 (70.4)	-7.0
Employed	1817 (75.9)	1865 (72.4)	2191 (73.3)	1707 (67.5)	4234 (67.3)	3155 (64.8)	-11.1
Age at first sex	***	***	***	***	***	***	
Less than 15 years	676 (91.4)	797 (88.4)	675 (86.4)	427 (83.5)	848 (86.8)	1500 (87.3)	-4.1
15 - 19 years	1201 (74.2)	1604 (74.5)	1824 (77.0)	1626 (73.7)	4002 (75.3)	4613 (70.7)	-3.5
Age at first marriage	***	***	***	***	***	***	
Less than 15 years	686 (97.4)	667 (96.0)	584 (93.5)	517 (94.5)	966 (96.2)	783 (96.3)	-1.1
15 - 19 years	2100 (83.1)	2396 (83.3)	2500 (83.6)	2116 (79.7)	5180 (83.0)	3763 (81.5)	-1.6
20+ years	460 (45.5)	543 (41.3)	550 (41.7)	553 (39.0)	1492 (40.3)	1614 (43.5)	-2.0
Desired family size	***	***	***	***	***	***	
0-1	23 (81.0)	29 (68.6)	45 (64.8)	35 (56.6)	118 (72.9)	132 (73.6)	-7.4
2-3	229 (68.5)	353 (65.3)	620 (69.1)	473 (57.3)	1137 (61,9)	956 (58.8)	-9.7
4-5	1059 (73.5)	1388 (72.5)	1507 (72.7)	1373 (69.5)	3389 (69.2)	2798 (65.9)	-7.6
6+	1934 (79.3)	1835 (76.8)	1464 (77.2)	1305 (74.3)	2994 (74.0)	2274 (73.7)	-5.6
Contraceptive use	**	**				***	
No	2751 (77.3)	2685 (75.1)	2397 (73.4)	1856 (69.0)	3807 (70.6)	3173 (70.0)	7.3
Yes	495 (72.2)	920 (70.4)	1238 (74.2)	1330 (68.8)	3831 (68.9)	2987 (64.9)	7.3
Exposure to media FP messages	**	***	***	***	***	***	
No	3054 (76.9)	2810 (76.9)	2791 (75.9)	2604 (72.1)	6321 (73.3)	5554 (70.3)	-6.6
Yes	192 (70.2)	795 (64.5)	844 (67.1)	582 (57.7)	1316 (56.6)	606 (49.0)	-21.2
Total	**76.5**	**73.8**	**73.6**	**68.9**	**69.8**	**67.4**	**9.1**

Table 7.5: Contribution of explanatory variables to the difference in prevalence of pregnancy loss among sexually active women between 2001-2018, ZDHS

Background Characteristics	Due to differences in characteristics (E)		Due to differences in coefficients (C)	
	Coefficients	%	Coefficients	%
Contraceptive use				
No	**Ref**		**Ref**	
Yes	-0.00125	1.41	-0.00686	7.77
Residence				
Rural	**Ref**		**Ref**	
Urban	-0.0004	0.46	-0.00137	1.55
Woman's education level				
None	**Ref**		**Ref**	
Primary	0.00165	-1.87	-0.01128	12.8
Secondary	-0.00445*	5.04	0.00608	-6.9
Higher	0.00037	-0.42	0.00202	-2.29
Wealth status				
Poor	**Ref**		**Ref**	
Moderate	0.00042**	-0.48	-0.00913*	10.35
Rich	-0.00094**	1.07	-0.01787*	20.26
Working status				
Not working	Ref		Ref	

Working	-0.00193***	2.19	0.00229	-2.6
Age at first sex				
Less than 15 years	Ref		Ref	
15 - 19 years	-0.00163	1.85	0.00394	-4.47
20+ years	-0.00003	0.03	0.00975	-11.06
Woman decision making autonomy				
No	**Ref**		**Ref**	
Yes	-0.00345	3.92	-0.02270***	25.74
Exposure to listening to radio				
No	**Ref**		**Ref**	
Yes	-0.00234***	2.65	0.0111	-12.58
Exposure to watching television				
No	**Ref**		**Ref**	
Yes	0.00143	-1.62	0.00523	-5.93
Exposure to media FP messages				
No	**Ref**		**Ref**	
Yes	0.00051	-0.57	-0.00024	0.27
Constant			**-0.04711**	**53.42**
Total	**-0.01205***	**13.66**	**-0.07614*** **	**86.34**

*** $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$; Ref=Reference Category

LITERATURE REVIEW MATRIX APPENDICES

Table 1: Matrix of Literatures Reviewed in Zambian Context

Serial No.	Citation/Journal	Country	Data, Sample and Method	Finding	Gaps
1	Nkole T et al. (2021), Community and health provider perspectives on the quality of family planning and contraceptive services in Kabwe District, Zambia. Sexual and Reproductive Health Matters.	Zambia	Case-study design, community members, key community stakeholders, health committee members and frontline and managerial health care providers, thematic content analysis.	Health personnel attitude and availability of preferred methods were associated with contraceptive use.	Study did not examine individual or household level determinants of contraceptive use.
1	Munakampe M. M. et al. (2021), A critical discourse analysis of adolescent fertility in Zambia: a postcolonial perspective. Reproductive Health.	Zambia	Case-study design, adolescents, thematic and critical discourse analysis.	Age and marital status were key factors influencing access to SRH services.	Study focus was mainly on adolescent fertility and SRH.
2	Chola M, et al., (2020) Patterns, trends, and factors associated with contraceptive use among adolescent girls in Zambia (1996 to 2014): a multilevel analysis. BMC Women's Health.	Zambia	Repeated cross-sectional surveys, Adolescent girls aged 15-19, multilevel multivariate binary logistic regression analysis.	Age, level of education and marital status were the main determinants of contraceptive use.	Study only focused on examining trends and factors associated with contraceptive use in adolescents, thus predictors of contraceptive use transition were not measured.
3	Li JL, Kilembe W, Inambao M, et al, (2020) Fertility intentions and long-acting reversible contraceptive use among HIV-negative single mothers in Zambia. American Journal of Obstetrics & Gynecology	Zambia	Longitudinal survey, HIV-negative single mothers, multivariable bivariate logistic regression.	The main contributor of contraceptive discontinuity was desire for more children.	Study analysis population was limited to HIV negative single mothers.
4	Bakibinga et al., (2019), Factors associated with use of injectables, long-acting and permanent contraceptive methods (iLAPMs) among married women in Zambia: analysis of demographic and health	Zambia	Repeated cross-sectional surveys, married women aged 15-49, binary logistic regression analysis.	The main predictor for iLAPMs use was desire for children.	Study analysis was limited to injectables, long-acting and permanent contraceptive methods use.

	surveys, 1992 to 2014. Journal of Reproductive Health				
5	Silumbwe et al. (2018) Community and health systems barriers and enablers to family planning and contraceptive services provision and use in Kabwe District, Zambia. BMC Health Services Research.	Zambia	Qualitative case-study, community members and health care providers, thematic analysis.	The main determinants of contraceptive uptake were distance to health facility and stock-outs of preferred methods.	Study findings cannot be generalized to the whole Zambian context due to limitation of sampling approach.
6	Ntoimo L. F C & Chirwa B. P (2017) Examining the Role of Couples' Characteristics in Contraceptive use in Nigeria and Zambia. African Journal of Reproductive Health	Nigeria and Zambia	Cross-sectional surveys, couples in monogamous unions, multivariate logistic regression analysis.	The main predictors of contraceptive use were educational attainment, religious affiliation, frequency of listening to the radio, reported number of children, fertility preference, region of residence and household wealth index.	Study unit of analysis was limited to couples in monogamous unions.
7	Chanda Michael M., Ortblad Katrina F., Mwale Magdalene, Chongo Steven, Kanchele Catherine, Kamungoma Nyambe, Barresi Leah G., Harling Guy, B¨arnighausen Till, Oldenburg Catherine E., (2017) Contraceptive use and unplanned pregnancy among female sex workers in Zambia. Contraception.	Zambia	Cross-sectional survey, female sex workers 18+, multivariable logistic regression analysis.	Access to condoms was associated with increase in use and reduction in unplanned pregnancy.	Study findings cannot be generalized to entire population due to non-scientific sampling approach.
8	Hancock et al. (2016) Contraceptive use among HIV-infected women and men receiving antiretroviral therapy in Lusaka, Zambia: a cross-sectional survey. BMC Public Health.	Zambia	Cross-sectional survey, HIV- positive adults, backward-selection multivariable logistic regression.	HIV status disclosure and sexual activity were associated with contraceptive use.	Study population was limited one geographical text.

9	Hancock N. L et at., (2015), Temporal Trends and Predictors of Modern Contraceptive Use in Lusaka, Zambia, 2004 to 2011, Hindawi Publishing Corporation. BioMed Research International	Zambia	Repeated cross-sectional population based surveys, females aged 16-50 years, backwards stepwise logistic regression analysis.	Age and education level were the key determinants of LARC use.	Study findings cannot be generalized to the whole Zambia.
10	Mutombo N. and Bakibinga P. (2014) The effect of joint contraceptive decisions on the use of Injectable, Long-Acting and Permanent Methods (ILAPMs) among married females (15–49) contraceptive users in Zambia: a cross-sectional study. Reproductive Health.	Zambia	Cross-sectional survey, married females aged 15-49, binary logistic regression analysis.	Wealth index was the main predictor of ILAPMs use.	Study unit of analysis only focused on married women.
11	Mbizvo MT, Bellows N, Rosen JG et al., (2020) Family Planning in Zambia: An Investment Pillar for Economic Development. Gates open research	Zambia	Review of literature	Improving contraceptive needs of women can have significant impact on developmental agenda	This was a review article on family planning benefits
12	Lasong J, Zhang Y, Gebremedhin SA et al., (2020) Determinants of modern contraceptive use among married women of reproductive age: a cross-sectional study in rural Zambia. BMJ Open.	Zambia	Cross-sectional survey, married or cohabiting women aged 15-49, multiple logistic regression analysis.	Women's education, wealth index, high parity, men older than women < 10 and sensitized about family planning at the health facility were the main predictors of contraceptive use.	Study unit of analysis only focused on married or cohabiting women.
13	Eunice N. S. Imasiku, Clifford O. Odimegwu, Sunday A. Adedini and Dorothy N. Ononokpono (2014). Variations in Unmet Need for Contraception in Zambia: Does Ethnicity Play a Role? Journal of Biosocial Science.	Zambia	Cross-sectional survey, ever married women aged 15-49, Multivariate logistic regression analysis.	Children ever born and region of residence were the most important predictors of unmet need for spacing. Ethnicity was not a significant predictor of unmet need for conception.	Study unit of analysis was limited to ever-married women.

14	Harriet et al. (2022) Unmet need for family planning among married women in Zambia: lessons from the 2018 Demographic and Health Survey, BMC women's health	Zambia	Cross-sectional survey, currently married women aged 15-49, Multivariate logistic regression analysis.	A woman's age, parity, household wealth, and exposure to family planning messages presented on the media were significantly associated with an unmet need for family planning among married women.	Study did not examine influence of community factors
15	Promise M. Nduku and Beatrice D. Simo-Kengne (2022) Drivers of contraceptive use choice in Zambia. African Journal of Reproductive Health	Zambia	Cross-sectional survey, women of reproductive age, the Conditional logit	Educated women, older and poorer women are likely to adopt the traditional contraceptive methods whereas those employed women are indifferent between traditional and modern birth control options.	Study did not examine s

Table 2: Matrix of Literatures Reviewed in Sub-Saharan Africa

Serial No.	Citation/Journal	Country/Region	Data, Sample and Method	Finding	Gap
1	Yussuf MH, Elewonibi BR, Rwabilimbo MM, Mboya IB, Mahande MJ (2020) Trends and predictors of changes in modern contraceptive use among women aged 15–49 years in Tanzania from 2004–2016: Evidence from Tanzania Demographic and Health Surveys. PLoS ONE.	Tanzania	Repeated cross-sectional surveys, Women of reproductive age 15-49, multivariate decomposition analysis.	Partner's education levels, women's recent sexual activity and being visited by a family planning worker were are the main factors contributing to the increase in mCPR.	Findings may not suffice in the Zambian context considering that study was done in Tanzania. Potentially there could be a methodological gap due to non-consideration of hierarchy in the data structure.
2	Fekadu GA, Omigbodun AO, Roberts OA, Yalew AW (2020) Determinants of change in longacting or permanent contraceptives use in Ethiopia; A multivariate decomposition analysis of data from	Ethiopia	Repeated cross-sectional surveys, married women (15-49), multivariate decomposition analysis.	Changes in LAPMs use was significantly associated with visit by health workers, age, working status, concordance on the desired number of children between women and partner, and woman's occupation	Only married women were considered in the study population

	the Ethiopian demographic and health survey. PLoS ONE.				
3	Ariho and Kabagenyi. (2020) Age at first marriage, age at first sex, family size preferences, contraception and change in fertility among women in Uganda: analysis of the 2006–2016 period. BMC Women's Health	Uganda	Repeated cross-sectional surveys, women (15–49), nonlinear multivariate decomposition analysis	Changes in fertility were associated with changes in age at first marriage, family size preference, age at first sex and contraceptive use.	Multilevel analysis was not used.
4	Behrman et al. (2018) Trends in Modern Contraceptive Use among Young Adult Women. Studies in Family Planning.	sub-Saharan Africa	Repeated cross-sectional surveys, young adult women (15–24) who have had sex, Decomposition analysis	Increase in modern contraceptive use was driven by an increase in short term methods.	Study population was limited to young adult women aged.
5	Donatien et al. (2017) Changes in Use of Family Planning among the Urban Poor: Evidence from Nairobi Slums. Studies in Family Planning.	Kenya	Repeated cross-sectional surveys, women (15-49) years, decomposition analysis	Increase in observed modern contraceptive use among women was due to the changes in reproductive behaviour.	Multilevel analysis was not used.
6	Muhoza D. N. et al. (2016) Measuring the success of family planning initiatives in Rwanda: a multivariate decomposition analysis. Springer Science Business Media Dordrecht.	Rwanda	Repeated cross-sectional Surveys, married women (15-49), multivariate decomposition analysis.	Changes in contraceptive use was influences by place of residence, women's education, and experience of child mortality.	The study population was limited to married women
7	Worku AG, Tessema GA, Zeleke AA (2015) Trends of Modern Contraceptive Use among Young Married Women Based on the 2000, 2005, and 2011 Ethiopian Demographic and Health Surveys: A	Ethiopia	Repeated cross-sectional surveys, young married women (15-24), Logit-based decomposition analysis.	Age, educational status, religion, couple concordance on family size, and fertility preference contributed to changes in modern contraceptive use.	Study population was restricted to young married women

	Multivariate Decomposition Analysis. PLoS ONE.				
8	Pillai and Teboh (2010) A decade of contraceptive use in Cameroon: influences of structural changes: Dove press	Cameroon	Repeated cross-sectional Surveys, married women (15-49), multivariate decomposition analysis.	Education level, decision making and age at marriage contributed to changes in contraceptive use	Study did not apply multilevel analysis
9	Appiah F et al. (2020) Trends and determinants of contraceptive use among female adolescents in Ghana: Analysis of 2003–2014 Demographic and Health Surveys. PLoS ONE.	Ghana	Repeated cross-sectional surveys ,sexually active female adolescents aged 15–19, Multinomial Logistic Regression analysis	Contraceptive use declined among adolescents.	Study did not apply multilevel analysis
10	Kamuyango A et al., (2020) Trends and Contributing Factors to Contraceptive Usein Kenya: A Large Population-Based Survey 1989 to 2014. Int. J. Environ. Res. Public Health.	Kenya	Repeated cross-sectional surveys, Women of reproductive age 15-49, binary logistics regression analysis.	Changes in women's characteristics contributed little to improvement in contraceptive use.	Study did not apply multilevel analysis
11	Adedini SA, Omisakin OA, Somefun OD (2019) Trends, patterns and determinants of long- acting reversible methods of contraception among women in sub-Saharan Africa. PLoS ONE.	Sub-Saharan Africa	Repeated cross-sectional surveys, Women of reproductive age 15-49, multinomial logistic regression analysis Data was pooled in single file	Key predictors for LARC use were age, work status, exposure to mass media, level of education and wealth index.	Individual country level analysis was not conducted.
12	Ahmed S et al., (2019) Trends in contraceptive prevalence rates in sub-Saharan Africa since the 2012 London Summit on Family Planning: results from repeated cross-sectional surveys. Lancet Global Health	Sub- Saharan Africa	Repeated cross-sectional surveys, women (15-49), linear and quadratic logistic regression analysis	Rate of change in mCPR varied across countries	Study did not examine contributors of change in contraceptive use

13	Sarnak D et al., (2020) The predictive utility of unmet need on time to contraceptive adoption: a panel study of non-contracepting Ugandan women, Contraception	Uganda	Longitudinal surveys, Fecund and sexually women, multivariate Cox regression analysis	Women with unmet needs were slower to adopt contraceptives than women who did not have unmet needs.	Study did not conduct multilevel analysis
14	Adedini SA, Mobolaji JW, Alabi M, Fatusi AO (2021) Changes in contraceptive and sexual behaviours among unmarried young people in Nigeria: Evidence from nationally representative surveys. PLoS ONE.	Nigeria	Cross-sectional surveys, unmarried young people (15-24 years), binary logistic regression analysis (2008, 2013, 2018)	No major progress was made in terms of contraceptive use transitions over a period of ten years.	Study did not measure contraceptive use transition over time because it applied separate analysis for each survey phase.
15	Olika et al. (2021) Contraceptive use among sexually active female adolescents in Ethiopia: trends and determinants from national demographic and health surveys. Reproductive Health.	Ethiopia	Cross-sectional Surveys ,sexually active female adolescents aged 15–19, binary and multiple logistic regression analysis	Contraceptive use increased among sexually active adolescent over a 16year period.	Study did not apply multilevel analysis
16	Sidibe et al. (2020) Trends in Contraceptive Use, Unmet Need and Associated Factors of Modern Contraceptive Use among Urban Adolescents and Young Women in Guinea.	Guinea	Cross-sectional surveys, among urban adolescents and young women (15–24 years), binary logistic regression analysis	Key predictors of contraceptive use transitions were age, wealth index, marital status, ethnic group and region.	Study population was limited to urban population
17	Ontiri S, Were V, Kabue M, Biesma-Blanco R, Stekelenburg J (2020) Patterns and determinants of modern contraceptive discontinuation among women of reproductive age: Analysis of Kenya Demographic Health Surveys, 2003–2014. PLoS ONE.	Kenya	Cross-sectional surveys, women of reproductive age from 15 to 49 years, multivariable logistic regression analysis, and Cox proportional hazards analysis.	Experience of side effect, husband disapproval and desire for more effect contraceptive method were associated with contraceptive discontinuity.	Study did not examine contraceptive use transitions.
18	Sidibé et al. (2020) Trends in contraceptive use, unmet need and associated factors of modern contraceptive use among urban adolescents and young women in Guinea. BMC Public Health.	Guinea	Cross-sectional surveys, Among urban adolescents and young women (15–24 years), binary logistic regression.	Changes in modern contraceptive use was influenced by age, marital status, wealth index, ethnic group and region.	Study population was limited to urban population

19	Izugbara, C. O., Wekesah, F. M., Tilahun T., Amo-Adjei, J., and Tsala Dimbuene, Z. T. (2018). Family Planning in East Africa: Trends and Dynamics. African Population and Health Research Center (APHRC), Nairobi, Kenya.	East Africa	Cross-section surveys ,Married or in-union women aged 15-49, descriptive analysis	Low uptake of long-acting FP methods was observed across all countries.	Study population was limited to women in marriage or in-union
20	Aviisah et al. (2018) Modern contraceptive use among women of reproductive age in Ghana: analysis of the 2003–2014 Ghana Demographic and Health Surveys. BMC Women's Health.	Ghana	Cross-sectional surveys, women of reproductive age 15 - 49, multiple cox proportional hazards analysis.	Residence and women's educational level were identified to be strong predictors of contraceptive use.	Study did not examine contraceptive use transitions
21	Dennis et al, (2017) Pathways to Increased coverage: an analysis of time trends in contraceptive need and use among adolescents and young women in Kenya, Rwanda, Tanzania and Uganda. Reproductive Health.	Kenya Rwanda Tanzania Uganda	Cross-sectional surveys, young women of (15-24) and older women (25-49), Poisson regression analysis.	Contraceptive use increased among adolescent and young women in East Africa but unmet need remained high.	Study only attempted to measure differences in contraceptive prevalence over time.
22	Gichangi P, Waithaka M, Thiongo M, Agwanda A, Radloff S, Tsui A, et al. (2021) Demand satisfied by modern contraceptive among married women of reproductive age in Kenya. PLoS ONE.	Kenya	Longitudinal surveys, married women (15-49), Poisson regression analysis	Demand for family planning declined	Parity, experienced of abortion, knowledge of FP and knowledge of FP were not included in the analysis
23	Seidu et al. (2020) Modern contraceptive utilization and associated factors among married and cohabiting women in Papua New Guinea: a population-based cross-sectional study. Contraception and Reproductive Medicine.	New Guinea	Cross-section survey ,women in sexual unions (15-49), binary logistic regression analyses.	Age, employment, partner's education, region of residence, frequency of listening to radio and partner's desire for children were identified as main predictors of contraceptive use.	Study did not apply multilevel analysis
24	Odimegwu et al., (2018) Fertility, Family Size Preference and Contraceptive Use in Sub-Saharan Africa: 1990-2014, African Journal of Reproductive Health	sub-Saharan Africa	Cross-sectional surveys, married women 15-49, ecological time series regression	Contraceptive use increase was low in Western and Central African regions.	Analysis was limited to married/in-union women

25	Bongaarts J and Hardee K (2019) Trends in Contraceptive Prevalence in Sub-Saharan Africa: The Roles of Family Planning Programs and Education, African Journal of Reproductive Health	sub-Saharan Africa	Cross-sectional surveys, married women 15-49,	Women's education attainment contributed significantly to contraceptive use increase in SSA.	Analysis was limited to married/in-union women
26	Goldenberg T, Stephenson R (2019) Applying a deviance framework to understand modern contraceptive use in sub-Saharan Africa. PLoS ONE.	sub-Saharan Africa	cross-sectional survey, ever married women of reproductive age from 15 to 49 years, Random-effects logistic regression analysis.	Education and marital status were associated with an increase in modern contraceptive use across countries.	Study population was limited to ever-married women
27	Fekadu et al. (2019) Factors associated with long acting and permanent contraceptive methods use in Ethiopia. Contraception and Reproductive Medicine.	Ethiopia	Cross-sectional Survey , women of the reproductive age (15-49), multinomial logistic regression analysis.	Women's occupation, history of abortion, ideal number of children, sex of head of the household and wealth index were key predictors increase in LAPC use	Study did not apply multilevel analysis.
28	Yaya et al. (2018) Women empowerment as an enabling factor of contraceptive use in sub-Saharan Africa: a multilevel analysis of cross sectional surveys of 32 countries. Reproductive Health.	sub-Saharan Africa	Cross-sectional surveys, Women of reproductive age 15-49, multilevel binary logistic regression analysis.	Decision making autonomy, participation in labour force, reduction in abuse and violence, and knowledge level were associated with contraceptive use.	Study did not examine determinants of contraceptive use transitions
30	Tesfa Sewunet Alamneh, Achamyeleh Birhanu Teshale and Yigizie Yeshaw (2022) Socioeconomic inequality in barriers for accessing health care among married reproductive aged women in sub-Saharan African countries: a decomposition analysis. BMC Women's Health.	sub-Saharan Africa	Cross sectional surveys, married women (15-49 years), decomposition analysis.	wealth index, place of residency, husband educational level, women educational level, and mass media exposure were the major contributors for the pro-poor socioeconomic inequalities in barriers for accessing health care	Study did not examine determinants of contraceptive use transitions.

32	Sennen Hounton, William Winfrey et al., (2015) Patterns and trends of postpartum family planning in Ethiopia, Malawi, and Nigeria: evidence of missed opportunities for integration. Global Health Action.	Ethiopia Nigeria Malawi	Cross sectional survey, all women with completed calendar and those who gave birth between 57 and 60 months prior to data collection, logistic regression.	Education level, place of residence, and wealth quintile were major contributors to postpartum use of modern contraception.	Study did not examine community level factors
33	Sennen Hounton, Aluisio J. D. Barros (2015) Patterns and trends of contraceptive use among sexually active adolescents in Burkina Faso, Ethiopia, and Nigeria: evidence from cross-sectional studies. Global Health Action	Burkina Faso Ethiopia Nigeria	Cross sectional survey, sexually active adolescents (15-19 years), multivariate analysis.	The strongest factors affecting modern contraception use among childbearing adolescents were marriage and child immunization.	Study population was limited to adolescents.
34	Markos Mezmur, Kannan Navaneetham et al., (2017) Socioeconomic inequalities in the uptake of maternal healthcare services in Ethiopia. . BMC Health Services Research.	Ethiopia	Repeated cross sectional survey, women who had a live birth in the 5 years preceding the surveys, Decomposition analysis.	Inequalities in education and media access significantly contribute to inequalities in maternal health service utilization favoring the non-poor.	Study did not examine determinants of contraceptive use transitions.
35	Abdoulaye Maıga, Sennen Hounton et al., (2015) Trends and patterns of modern contraceptive use and relationships with high-risk births and child mortality in Burkina Faso. Global Health Action.	Burkina Faso	Repeated cross sectional surveys, married or living with a partner women (15-49), multivariate models.	Women's fertility history and cultural and socio-economic background were also significant factors in predicting use of modern contraception.	Study population was limited to women in marriage or in-union
36	Chinelo C. Okigbo et al., (2018) Gender norms and modern contraceptive use in urban Nigeria: a multilevel longitudinal study. BMC Women's Health.	Nigeria	Longitudinal surveys, women (15-49 years) Multilevel multinomial logistic regression models	A positive change in the gender-equitable attitudes towards household decision-making, couples' family planning decisions, and family planning self-efficacy at the individual and neighborhood levels were associated with increased relative probability of modern contraceptive use.	Multilevel analysis was not done in this study

37	Semaria Solomon et al., (2022) Contraceptive Utilization and Unmet Need for Contraception Among Women Undergoing Treatment for Tuberculosis in Addis Ababa, Ethiopia: a Cross-Sectional Study. Open Access Journal of Contraception.	Ethiopia	Cross-sectional study, women (18-49 years), Logistic regression models.	Parity had a significant association with contraceptive utilization.	Study population excluded adolescents aged 15-17 years
38	Obasanjo Afolabi Bolarinwa et al., (2021) Prevalence and predictors of long-acting reversible contraceptive use among sexually active women in 26 sub-Saharan African countries. International Health.	26 Sub-Saharan Africa countries	Cross-sectional survey, sexually active women (15–49 years), multivariate regression analysis.	Education, marital status and parity were significantly associated with high use of LARC.	Did not examine contraceptive use transitions
39	Noudéhouénou Crédo Adelphe Ahissou et al., (2022) Modern contraceptive use among adolescent girls and young women in Benin: a mixed-methods study. BMJ Open	Benin	Cross-sectional survey, women ages 15–49 years, multivariable logistic regression.	factors associated with demand satisfied by a modern method were literacy, being unmarried, knowing a greater number of modern contraceptive methods and experiencing barriers in access to health services.	Did not examine community influences
40	Edward Nketiah-Amponsah et al., (2022) Socioeconomic determinants of use and choice of modern contraceptive methods in Ghana. Tropical Medicine and Health.	Ghana	Cross-sectional survey, men (15-59 years) and women (15-49 years), multinomial logistic regression.	Marital status, education, religion and residence were associated with modern contraceptive use and choice among men and women.	Study did not apply multilevel analysis.

41	Innocent Ngerageze et al., (2022) Knowledge and Utilization of Contraceptive Methods among Secondary School Female Adolescents in Rwamagana District, Rwanda. Rwanda Journal of Medicine and Health Sciences.	Rwanda	Cross-sectional design, secondary school female adolescents (12-19), Multivariate logistic regression analysis.	Contraceptive use was associated with level of education, having heard of contraception, knowledge of source of contraception and knowledge of specific contraception	Study population was limited to school going adolescents girls
42	Kelvin Amaniampong Kwame Use and awareness of emergency contraceptives among women of reproductive age in sub-Saharan Africa: a scoping review	Sub-Saharan Africa	Systematic review reproductive aged women (15-49 years), scoping review.	The level of use of emergency contraceptives was relatively low in Sub-Saharan Africa but awareness was low.	Did not measure contraceptive use transitions
43	Lisa M. Calhoun et al., (2022) Perceptions of peer contraceptive use and its influence on contraceptive method use and choice among young women and men in Kenya: a quantitative cross-sectional study. Reproductive Health.	Kenya	Cross-sectional survey, young men and women (15-24), multinomial logistic regression.	Sexually experienced young men and women who perceive that their peers are using contraceptives are more likely to report current use of condoms compared to being a nonuser.	Study population was limited to young men and women.
44	Kim Jonas et al., (2022) Rumours, myths, and misperceptions as barriers to contraceptive use among adolescent girls and young women in South Africa. Research Square.	South Africa	Cross-sectional Survey, adolescent girls (15-24 years), thematic analysis.	Peer/friends' disapproval, parents' and boyfriend's lack of support for AGYW's use of contraceptives, based on rumours and perceived side effects were associated with access and use of contraceptives.	Study population was limited to adolescents.

45	Dereje Haile et al., (2022) Magnitude of dual contraceptive method utilization and the associated factors among women on antiretroviral treatment in Wolaita zone, Southern Ethiopia.	Ethiopia	Cross-sectional Survey, women on ART (15-49 years), multivariate logistic regression.	HIV sero-status disclosure to community, disclosure to sexual partners, sexual activity, fertility desire, and history of STI, partners' sero-HIV status, and discussion with sexual partners about dual contraceptive methods were significantly associated with dual contraceptive utilization.	Study population was restricted to only women on ART.
46	Isaac Boadu (2022) Coverage and determinants of modern contraceptive use in sub-Saharan Africa: further analysis of demographic and health surveys. Reproductive Health	Sub-Saharan Africa	Cross-sectional Survey, women (15-49 years), multilevel logistic regression.	Women were more likely to use modern contraceptive if they were between the ages of 35–39 years, married, had seven or more children, had knowledge of any method of contraceptives and when field worker visited and talked about family planning.	Study did not apply multilevel analysis.
47	Kusse Urmale Mare et al., (2022) Married women's decision-making autonomy on contraceptive use and its associated factors in Ethiopia: A multilevel analysis of 2016 demographic and health survey. SAGE Open Medicine.	Ethiopia	Cross-sectional Survey, married women (15-49 years), multilevel logistic regression.	Media exposure, women's age, household wealth, religion, age at marriage, visiting health facilities, community exposure to family planning messages, and residence were the factors associated with women's decision-making autonomy on contraceptive use.	Study population was restricted to only married women.

Table 3: Literature Review Matrix Table for Multilevel Analysis Studies in Sub-Saharan Africa

Serial No.	Citation/Journal	Country/Region	Data, Sample and Method	Finding	Gap
1.	**Samuel H. Nyarko** (2020), Spatial variations and socioeconomic determinants of modern contraceptive use in Ghana: A Bayesian multilevel analysis, PLOS ONE	Ghana	Cross-sectional survey, women (15-49), Bayesian multilevel regression analysis.	Individual level factors (education, employment status, marital status) and Contextual factors (distance to health facility, community exposure to family planning messaging) were major determinants of modern contraceptive use	Study did not examine factors explaining contraceptive use transition.

2	Bright Opoku Ahinkorah et al (2020), Individual and community-level factors associated with modern contraceptive use among adolescent girls and young women in Mali: a mixed effects multilevel analysis of the 2018 Mali demographic and health survey, Contraception and Reproductive Medicine.	Mali	Cross-sectional survey, young women (15-24), Binary multilevel logistic regression analysis.	Individual level factors (marital status, educational level, wealth quintile, parity, ethnicity and ideal number of children) and Contextual factors (Community knowledge of modern contraceptives) were major determinants of modern contraceptive use.	Study population was limited to young women 15-24
3	Dorothy N. Ononokpono et al (2020), Contraceptive Use in Nigeria: Does Social Context Matter? Africa Journal of Reproductive Health	Nigeria	Cross-sectional survey, married women (15-49), Multilevel logistic regression analysis.	Individual level factors (age, education of women, partner's education, parity, religion, access to mass media and household wealth index) and Contextual factors (region of residence, community education and ethnic diversity) were major determinants of modern contraceptive use.	Study population was limited to married women.
4	Esther O. Lamidi (2015),State Variations in Women's Socioeconomic Status and Use of Modern Contraceptives in Nigeria, PLOS ONE.	Nigeria	Cross-sectional survey, sexually active married and cohabiting women (15-49), Multilevel logistic regression models.	Individual level factors (education, household wealth, makes health decisions, husband's education, residence age, ethnicity, religion, desired number of children and number of surviving children) and Contextual factors (percent making health decisions) were major determinants of contraceptive use.	Study population was limited to sexually active married women and cohabiting women.
5	Obasanjo Afolabi Bolarinwa et al (2021), Spatial distribution and factors associated with modern contraceptive use among women of reproductive age in Nigeria: A multilevel analysis, PLOS ONE.	Nigeria	Cross-sectional survey, women (15-49), Multilevel and spatial analysis.	Individual level factors (education level, ethnicity, parity and exposure to media) and Contextual factors (wealth index, community modern contraceptive knowledge and community literacy level) were major determinants of modern contraceptive use.	

6	Mackfallen G. Anasel and Hinke Haisma (2020), Variation in contraceptive prevalence rates in Tanzania: A multilevel analysis of individual and regional determinants, Sexual & Reproductive Healthcare.	Tanzania	Cross-sectional survey, married women (15-49) and their husbands, Multilevel logistic regression.	Individual level factors (Total children ever born, type of place of residence, Woman' occupation, Household wealth index, Person to talk to most about family planning) and contextual variables (Women education) were major determinants of contraceptive use.	The study population was limited to married women.
7	Teketo Kassaw Tegegne (2020), Spatial variations and associated factors of modern contraceptive use in Ethiopia: a spatial and multilevel analysis, BMJ Open.	Ethiopia	Cross-sectional survey, married women, Multilevel and spatial analysis.	Individual level factors (age, husband/partner's education, household wealth, number of living children and exposure to family planning messages) and Contextual factors (health facility's readiness to provide short-term modern contraceptives) were major determinants of modern contraceptive use.	Study population was limited to married women.
8	Samuel Hailegebreal (2021), individual and community-level factors associated with modern contraceptive use among adolescent girls and young women in Ethiopia: a multilevel analysis of 2016 Ethiopia demographic and health survey, Archive of Public Health.	Ethiopia	Cross-sectional survey, Adolescent girls and young women (15–24), Multilevel logistic regression modeling.	Individual level factors (religion, marital status, wealth status, working status, abortion/ever terminate a pregnancy, husband desire for children, parity, and TV exposure) and Contextual factors (residence, region) were major determinants of modern contraceptive use.	Study population was limited to adolescent girls and young women (15-24).
9	Masrie Getnet Abate and Amare Abera Tareke (2019), Individual and community level associates of contraceptive use in Ethiopia: a multilevel mixed effects analysis, Archives of Public Health.	Ethiopia	Cross-sectional survey, fecund and sexually active women aged (15–49), Two-level mixed-effects logistic regression.	Individual level factors (Household wealth index, women's age, number of living children, husband's occupation, ever experience of a terminated pregnancy, current working status of the women, number of births in the last 3 years and hearing of FP messages through different media) and Contextual factors (region, place of residence, religion, and community-level wealth) were	Study did not examine contraceptive use transition

				major determinants of contraceptive use.	
10	Monica A. Magadi and Winnie A. Magadi (2016), HIV/AIDS and contraceptive use: factors associated with contraceptive use among sexually active HIV-positive women in Kenya, Contraception.	Kenya	Cross-sectional survey, sexually active women (15-49), Multilevel logistic regression.	Individual level factors (Education, fertility intention) and Contextual factors (Region, place of residence) were major determinants of contraction use	
11	Caroline Whidden et al (2021), Women's empowerment, intrahousehold infuences, and health system design on modern contraceptive use in rural Mali: a multilevel analysis of cross-sectional survey data, Reproductive Health.	Mali	Cross-sectional survey, women (15-49), Three-level, mixed-effects logistic regression.	Individual level factors (decision making, education level, participants in paid labour) and Contextual factors (Someone else in the household using modern contraception, Distance to health center, Health catchment area) were major determinants of modern contraceptive use.	Study did not examine contraceptive use transition
12	Teklehaymanot Huluf Abraha et al (2018), Predictors of postpartum contraceptive use in rural Tigray region, northern Ethiopia: a multilevel analysis, BMC Public Health.	Ethiopia	Cross-sectional survey, postpartum women, Mixed-effects multilevel logistic regression analysis.	Individual level factors (husband/partner education level, wealth index, postnatal care follow up) and Contextual factors (community-level antenatal care utilization and distance from household to the health facility) were major determinants of modern contraceptive use.	Study population was limited to postpartum women.
13	Oluwafemi David Alo et al (2020), Factors influencing the use of modern contraceptive in Nigeria: a multilevel logistic analysis using linked data from performance monitoring and accountability 2020, BCM Women's health.	Nigeria	Longitudinal survey, sexually active women (15-49), . 2-level binary logistic regression analysis.	Individual level factors (Education level, marital status, children ever born, household wealth status, fertility intention, knowledge of FP) and community level (Perception about FP	Study did not examine contraceptive use transition

				support) were main determinants of contraceptive use.	
14	José G. Dias and Isabel Tiago de Oliveira (2015), Multilevel Effects of Wealth on Women's Contraceptive Use in Mozambique, PLOS ONE.	Mozambique	Longitudinal survey, women who are married or living together (15-49), Single level and multilevel probit regression models.	Individual level factors (religion, age, number of living children, ideal number of children,desire to have more children, ethnicity, media exposure, wealth index and woman's decision making) and Contextual factors (region, residence, community literacy level and community knowledge of modern contraceptive) were major determinants of contraceptive use.	Study population was limited to married or cohabiting women
15	Oumer Abdulkadir Ebrahim et al (2021), Geographic variation and associated factors of long-acting contraceptive use among reproductive-age women in Ethiopia: a multi-level and spatial analysis of Ethiopian Demographic and Health Survey 2016 data, Reproductive Health.	Ethiopia	Cross-sectional survey, women (15-49), Multilevel Mixed-effect Logistic regression model.	Individual factors (Marital status, number of children, fertility preference, working status, experience of abortion) and contextual factors (Place of residence and region) were determinants of contraceptive use	Study did not examine contraceptive use transition
16	Chinelo C. Okigbo (2018), Gender norms and modern contraceptive use in urban Nigeria: a multilevel longitudinal study, BMC Women's Health.	Nigeria	Longitudinal survey, women (15-49), Multilevel multi-nominal logistic regression models.	Individual level factors (household decision-making, couples' family planning decisions, and family planning self-efficacy) and contextual factors (household decision-making, couples' family planning decisions, and family planning self-efficacy) were major determinants of contraceptive use.	Study did not examine contraceptive use transition
17	Sewunet Sako Shagaro et al (2022), Four out of ten married women utilized modern contraceptive method in Ethiopia: A Multilevel analysis of the 2019 Ethiopia mini demographic and health survey, PLOS ONE.	Ethiopia	Cross-sectional survey, married women (15-49), Descriptive and multilevel mixed-effect logistic regression analysis.	Individual level factors (Age, education level, wealth status, number of living children, number of births in last 3 years, number of under 5 children in household) and Contextual (Geographic	Study population was limited to married women.

				region) were associated with contraceptive use.	
18	Sunday A. Adedini et al (2022), Community-level influences on women's experience of intimate partner violence and modern contraceptive use in Nigeria: a multilevel analysis of nationally representative Survey, AAS Open Research.	Nigeria	Cross-sectional survey, sexually active married women (15-49), Multilevel binary logistic regression analysis.	Individual level factors (Religion, ethnicity, education, age at marriage, household wealth status) and Contextual (Region, place of residence, education, wealth status, media exposure)	Study population was limited to the study population.
19	Victor Agadjanian et al (2015), Bridging user and provider perspectives: Family planning access and utilization in rural Mozambique, International Journal of Gynecology and Obstetrics.	Mozambique	Cross-sectional survey, women (15-49), Binomial and multi-nominal logistic models.	Individual level factors (education, household wealth, perceived HIV infectin status) and contextual (distance to health facility) were determinant of contraceptive use.	Study did not examine contraceptive use transition
20	Anthony Idowu Ajayi et al (2018), Use of traditional and modern contraceptives among childbearing women: findings from a mixed methods study in two southwestern Nigerian states, BMC Public Health.	Nigeria	Cross-sectional survey, women (15-49), Binary logistic regression models.	Individual level factors (age, education, wealth status, children ever born) and Contextual factors (residence, peri-urban residence and socioeconomic status) were major determinants of contraception use.	
21	Betregiorgis Zegeye et al (2022), Individual, household, and community-level predictors of modern contraceptive use among married women in Cameroon: a multilevel analysis, International Health.	Cameroon	Cross-sectional survey, married women (15-49), Pearson $\chi 2$ test and multilevel logistic regression analysis.	Individual level factors (age, education level, occupation, religion, wealth quintile and parity) and Contextual factors (region) were major predictors of contraceptive use.	Study population was limited to married women.
22	Chalie Tadie Tsehay (2022), Factors associated with modern contraceptive demands satisfied among currently married/in-union women of reproductive age in Ethiopia: a multilevel analysis of the 2016 Demographic and Health Survey, BMJ Open.	Ethiopia	Cross-sectional survey, married/in-union women (15-49), Multilevel analysis.	Individual level factors (age, education, occupation, religion, household wealth, husband's current living place, decision maker for women's health care and household purchase) and Contextual factors (region and residence) were major	Study population was limited to married women.

				determinants of modern contraceptive use.	
23	Clifford Odimegwu and Garikayi B. Chemhaka (2021), Contraceptive use in Eswatini: do contextual influences matter? Journal of Bio-social Science.	Eswatini	Cross-sectional survey, sexually experienced women (15-49), Multilevel logistic regression.	Individual level factors (occupation, wealth, education, media exposure, women's empowerment, ideal number of children, union status, age and number of living children and none of the contextual factors were major determinants of modern contraceptive use.	Study did not examine contraceptive use transition
24	Joshua O. Akinyemi et al (2015), Effect of internal migration, individual and contextual factors on contraceptive use among Nigerian women, Paper Presented at the 7th African Population Conference, Pretoria, South Africa: Nov 30- Dec 4, 2015.	Nigeria	Cross-sectional survey, sexually active women (15-49), Multilevel logistic regression models.	Individual level factors (region, residence, age, education, wealth quintile, family planning messages, number of living children, marital status) and Context factors (community fertility norm, community education, community poverty) were major determinants of modern contraceptive use.	Study did not examine contraceptive use transition
25	Kegnie Shitu et al (2022), Individual and community-level determinants of intention to use contraceptive among married women in Ethiopia: A multi-level analysis of National Survey.	Ethiopia	Cross-sectional survey, married/in union women (15-49), Multilevel logistic regression model.	Individual level factors (age, husband's/ partner's education, heard of FP from the community, ever use of FP, number of children) and Context factors (community FP utilization) were major determinants of modern contraceptive use.	Study population was restricted to married/ in union women
26	Kusse Urmale Mare et al (2022), Married women's decision-making autonomy on contraceptive use and its associated factors in Ethiopia: A multilevel analysis of 2016 demographic and health survey, SAGE Open Medicine.	Ethiopia	Cross-sectional survey, married women (15-49), Multilevel logistic regression models.	Individual level factors religion, wealth index, exposure to mass media, current age, age at marriage, and visiting health facility) and Contextual factors (residence, community exposure	Study population was limited to married women.

				to FP messages) were major determinants of contraceptive use.	
27	Betregiorgis Zegeye et al (2021), Modern contraceptive utilization and its associated factors among married women in Senegal: a multilevel analysis, BMC Public Health.	Senegal	Cross-sectional survey, married women (15-49), Multilevel logistic regression models.	Individual level factors (age, education level, husband/partner's education, household wealth, number of living children and exposure to family planning messages) and Contextual factors (health facility's readiness to provide short-term modern contraceptives) were major determinants of contraceptive use.	Study population was limited to married women
28	Steven P. Masiano et al (2019), The effects of community-based distribution of family planning services on contraceptive use: The case of a national scale-up in Malawi, Social Science & Medicine.	Malawi	Cross-sectional survey, women (15-49), Multilevel logistic regression.	Individual factors (education, income) and Community factor (Place of residence, community education, community wealth) were associated with increase in contraception use	Study did not examine contraceptive use transition
29	Solomon Sisay Mulugeta et al (2022), Factors associated with non-use of modern contraceptives among sexually active women in Ethiopia: a multi-level mixed effect analysis of 2016 Ethiopian Demographic and Health Survey, Archives of Public Health.	Ethiopia	Cross-sectional survey, women (15-49), Multilevel multi-variable binary logistic regression Models.	Individual level factors (age, religion, education level, husband's/partner's education, wealth index, health facility delivery, watched family planning on TV last few months, births in last five years, and ANC visit) and Contextual factors (residence and region) were major predictors of contraceptive use.	Did not examine factors associated with use of contraceptives
30	Philomina Akadity Aviisah et al (2018), Modern contraceptive use among women of reproductive age in Ghana: analysis of the 2003–2014 Ghana Demographic and Health Surveys, BMC Women's Health.	Ghana	Cross-sectional survey, women (15-49), The Cox proportional hazards model analysis was employed via a multilevel modelling approach.	Individual level factors (age, number of children, education level, wealth index, religion and decision making on respondent's health) were major determinants of contraceptive use.	Study did not examine contraceptive use transition

31	Setegn Muche Fenta and Shewayiref Geremew Gebremichael (2021), Predictors of modern contraceptive usage among sexually active rural women in Ethiopia: A multi-level analysis, Archives of Public health.	Ethiopia	Cross-sectional survey, sexual active rural women (15-49), Multilevel logistic regression model.	Individual level factors (wealth index, educational level, education level of husband, age, occupation of women, religion, age at first birth, contraceptive use, number of living children, birth in the last three years, marital status, occupation of husbands) and Contextual factors (access to mass media and region) were major determinants of contraceptive use.	Study did not examine contraceptive use transition
32	Sylvain Y. M. Some et al (2021), Empowerment and use of modern contraceptive methods among married women in Burkina Faso: a multilevel Analysis, BMC Public Health.	Burkina Faso	Cross-sectional survey, married women (15-49), Principal component analysis (PCA) and Cronbach's alpha test.	Individual level factors (age, wealth status, education level, problems accessing healthcare) and contextual factors (female genital mutilation, fertility expectations, asset ownership, exposure to family planning messages) were major determinants of contraceptive use.	Study population was limited to married women.
33	Yohannes Dibaba Wado et al (2019), Contextual influences on the choice of long acting reversible and permanent contraception in Ethiopia: A multilevel analysis, PLOS ONE.	Ethiopia	Cross-sectional survey, women (15-49), Two-level multilevel logistic regression.	Individual level factors (age, wealth status, employment status, fertility preference, exposure to family planning information and knowledge of LARP methods) and contextual factors (development region and women's empowerment) were major determinants of contraceptive use.	Analysis was limited to long acting contraceptive methods
34	Gurmesa Tura Debelew and Mahilet Berhanu Habte (2021), Contraceptive Method Utilization and Determinant Factors among Young Women (15-24) in Ethiopia: A Mixed-Effects Multilevel Logistic Regression Analysis of the Performance Monitoring for Action 2018 Household Survey, Hindawi.	Ethiopia	Cross-sectional survey, Women (15-24), Multilevel analysis.	Individual level factors (Age, marital status, parity, future birth intention, and knowledge of contraceptive methods) and contextual factors (Wealth status and religion) were major determinants of contraceptive use.	Study population was limited to women 15-24

35	Enock Ngome and Clifford Odimegwu (2014), The social context of adolescent women's use of modern contraceptives in Zimbabwe: a multilevel Analysis, Reproductive Health.	Zimbabwe	Cross-sectional survey, adolescent women (15-19), . Univariate, bivariate and multilevel binary logistic regression analysis.	Individual level factors (marital status, parity and media access) and contextual factors (access to health care, mean number of children ever born per woman, mean number of years of school for women and women with at least secondary education) were major determinants of contraceptive use.	Study population was limited to adolescent women 15-19
36	Mohamed Amara (2014), Multilevel Modelling of Individual Fertility Decisions in Tunisia: Household and Regional Contextual Effects, Social Indicators Research.	Tunisia	Cross-sectional survey, women (15-49), Multilevel Poisson models.	Individual level factors (current age of woman, age at first marriage, household's economic situation, woman's education, current contraceptive use, land ownership, husband's education, husband's age and area of residence) and contextual factors (poverty rate, unemployment rate, infant mortality rate) were major determinants of contraceptive use.	Study main focus was fertility
37	Noura Anwar Abdel-Fatah (2019), Quantifying the Community Effect on Contraceptive Use in Egypt, Athens Journal of Social Sciences.	Egypt	Cross-sectional survey, married women (15-49), Multilevel models.	Individual level factors (number of children ever born and age difference between spouses) and contextual factors (mean number of children ever born and mean level of wealth) were major determinants of contraceptive use.	Study population was limited to married women
38	Sonia Hakizimana and Emmanuel Nene Odjidja (2021), Beyond knowledge acquisition: factors influencing family planning utilization among women in conservative communities in Rural Burundi, Reproductive Health.	Burundi	Cross-sectional survey, Married women (15-49), Logistic modelling analysis.	Individual level factors (age, education level, parity, birth interval between last 2 children, desired number of children) and contextual factorsn (fear of side effects, religious beliefs, cultural barriers, spousal communication gap, Refusal of family planning services by health practitioners) were major determinants of contraceptive use.	Study population was limited to married women.

39	Bennett Nemser and Nicholas Addofoh (2022), Contextual factors associated with contraceptive utilization and unmet need among sexually active unmarried women in Kenya: A multilevel regression analysis, PLOS ONE.	Kenya	Cross-sectional survey, sexually active women (15-49), Multilevel regression modeling.	Individual level factors (age of woman, education level, parity and exposure to family planning messages) and contextual factors (place of residence, household wealth quintile and female subgroups) were major determinants of contraceptive use.	Study population was limited to unmarried women
40	Laurie F. DeRose and Alex C. Ezeh (2010), Decision-Making Patterns and Contraceptive Use: Evidence from Uganda, Population Research and Policy Review.	Uganda	Cross-sectional survey, married women (20-44), Two-level logistic regression models.	Individual level factors (wife's age, wife's education level) and contextual factors (decision making, type of residence, community education and region) were major determinants of contraceptive use.	Study population was limited to married women (20-44).
41	Davis James Makupe et al (2019), An application of mixed-effect models to analyse contraceptive use in Malawian Women, Contraception and Reproductive Medicine.	Malawi	Cross-sectional survey, women (15-49), Multilevel models.	Individual level factors (age, parity, education, occupation, marital-status and religion) and contextual factors (region, place of residence) were major determinants of contraceptive use.	Study did not examine contraceptive use transition
42	Martha Decker and Norman A Constantine (2011), Factors Associated with Contraceptive Use in Angola, African Journal of Reproductive Health.	Angola	Cross-sectional survey, women (15-49), Hierarchical logistic regression.	Individual level factors (age, education level, wealth status) and contextual factors (residence and living in capital region) were major determinants of contraceptive use.	Study did not examine contraceptive use transition
43	Mumbi Chola et al (2020), Patterns, trends, and factors associated with contraceptive use among adolescent girls in Zambia (1996 to 2014): a multilevel Analysis, BMC Women's Health.	Zambia	Cross-sectional survey, adolescence women (15-19), Multilevel logistic regression models.	Individual level factors (age, education, marital status, and working status) and contextual factors (residence and region) were major determinants pf contraceptive use among adolescent girls.	Study population was limited to adolescence women 15-19
44	Oliva Safari Donni et al (2022), Application of variance components to the identification of determinants of modern contraceptive use in the Tanzania demographic and health survey data, BMC Public Health.	Tanzania	Cross-sectional survey, women (15-49), Single variance component and Random coefficient model.	Individual level factors (age of a woman, husband education level, desire to have children, exposure to media and wealth textiles) and contextual factors (region) were	Study did not examine contraceptive use transition

				major determinants of contraceptive use.	
45	Ronald Wasswa et al (), Multilevel mixed effects analysis of individual and community level factors associated with modern contraceptive use among married women in Uganda, BMC Public Health.	Uganda	Cross-sectional survey, married women (15-49), Multilevel mixed-effects logistic regression model.	Individual level factors (women's age, religion, level of education attainment, wealth index, spousal age difference and parity) and contextual factors (region, distance to health facility, community education, community poverty, community exposure to media messages, community women working, community mean age st first marriage and community mean age at sexual debut) were major determinants of contraceptive use.	Study population was limited to married women 15-49
46	Saleh Babazadeh et al (2020), The influence of health facility-level access measures on modern contraceptive use in Kinshasa, DRC, PLOS ONE.	Democratic Republic of Congo	Cross-sectional survey, women (15-49), Multilevel logistics regression.	Individual level factors (age, marital status) and Contextual factors (number of methods known, sexually active, desire for more children, parity, number of FP messages received, EA-level final decision on FP) were major determinants of contraceptive use.	Focus of analysis was limited to health level factors
47	Dieudonne Ndaruhuye Muhoza et al (2018), Regional Variations in Contraceptive Use in Rwanda: A Multilevel Analysis of Readiness, Willingness and Ability, Journal of Population and Social Studies.	Rwanda	Cross-sectional survey, married women (15-49), Multilevel logistic model.	Individual level factor (women's age, wealth status, education, number of children) and Contextual factors (desire for children, demand for family planning, religious denomination, and approval for family planning) were main determinants of contraceptive use.	Study population was limited to married women 15-49

48	Getu Debalkie Demissie et al (2022), Factors associated with decision-making power of married women to use family planning in sub-Saharan Africa: a multilevel analysis of demographic health surveys, BMC Public Heath.	Sub-Saharan Africa	Cross-sectional surveys, married women (15-49), Bi-variable and multi-variable multilevel logistic regression.	Individual level factor (women's age, region, education, occupation, husbands occupation, wealth status, media exposure, ANC visits, number of children, fertility preference, told about FP and husband's desire for children) were main determinants of contraceptive use.	Study population was limited to married women 15-49
49	Isaac Boadu (2022), Coverage and determinants of modern contraceptive use in sub-Saharan Africa: further analysis of demographic and health surveys, Reproductive Health.	Sub-Saharan Africa	Cross-sectional surveys, women (15-49), Multilevel logistic regression	Individual level factor (women's age, education, husband's education, marital status, residence, religion, wealth status, age at first birth, number of children living, number of sex partners minus husband, told about FP, media FP, knowledge of modern methods, visited by fieldworker and visited health facility) were main determinants of contraceptive use.	Study did not examine contraceptive use transition
50	Linnea A. Zimmerman et al (2019), Individual, community and service environment factors associated with modern contraceptive use in five Sub-Saharan African countries: A multilevel, multi-nominal analysis using geographically linked data from PMA2020, PLOS ONE.	Sub-Saharan Africa	Cross-sectional surveys, women (15-49), Multilevel multi-nominal logistic models.	Individual level factors (age, female education, parity, household wealth and residence) and Contextual factors (want to wait 2 or more years until next pregnancy, visited by health worker about family planning in last 12 months, heard family planning messages, distance to nearest family planning SDP) were main determinants of contraceptive use.	Study did not examine contraceptive use transition
51	Bright Opoku Ahinkorah et al (2021), Factors associated with modern contraceptive use among women with no fertility intention in sub-Saharan Africa: evidence from cross-sectional surveys of 29 Countries. Contraception and Reproductive Medicine.	Sub-Saharan Africa	Cross-sectional surveys, women (15–49) with no fertility intention, Multilevel logistic regression analysis.	Individual level factor (women's age, marital status, religion, employment status, age at fist sex, parity, wealth status, education and exposure to; newspaper, radio, television, residence) and Contextual factors (literacy level, socioeconomic status, knowledge	Analysis was limited to women with no fertility intention

				of modern contraceptives and sub-region) were main determinants of contraceptive use.	
52	Babayemi O. Olakunde et al (2020), Individual and country-level correlates of female permanent contraception use in subSaharan Africa, PLOS ONE.	Sub-Saharan Africa	Cross-sectional surveys, married or in-union women (15–49), Multilevel logistic regression models.	Individual level factor (women's age, wealth status, residence, decision maker, media exposure, number of children, ideal children) and Contextual factors (country level factors; birth attendant, density of medical doctors) were main determinants of contraceptive use.	Study population was limited to married or in union women 15-49
53	Sanni Yaya et al (2018), Women empowerment as an enabling factor of contraceptive use in sub-Saharan Africa: a multilevel analysis of cross sectional surveys of 32 countries, Reproductive Health.	Sub-Saharan Africa	Cross-sectional surveys, women (15-49), Multilevel logistic regression models.	Individual level factors (age, wealth status, partner's education, number of children, labour force participation, acceptance of wife beating, women's knowledge level and decision making power) and Contextual factors (Neighbourhood SES and human development index) were major determinants of contraceptive use.	Study did not examine contraceptive use transition
54	Zemenu Tadesse Tesema et al (2022), Determinants of modern contraceptive utilization among married women in sub-Saharan Africa: multilevel analysis using recent demographic and health survey, BMC Women's Health.	Sub-Saharan Africa	Cross-sectional survey, married women (15-49), Multilevel regression analysis.	Individual level factor (region, residence, maternal education, husbands education, wealth status, media exposure, women's health decision making autonomy, PNC utilization, place of delivery and birth order) were main determinants of contraceptive use.	Study population was limited to married women 15-49
55	Zemenu Tadesse Tessema et al (2021), Pooled prevalence and determinants of modern contraceptive utilization in East Africa: A Multi-Country Analysis of recent Demographic and Health Surveys, PLOS ONE.	East Africa	Cross-sectional surveys, women (15-49), Multilevel logistic regression model.	Individual level factor (women's age, marital status, maternal education, husband's education, maternal occupation, parity, wealth status, health facility delivery and postnatal care utilization) and Contextual factors	Study did not examine contraceptive use transition

				(country of residence) were main determinants of contraceptive use.	
56	Iván Mejía-Guevara et al (2020), Association of collective attitudes and contraceptive practice in nine sub-Saharan African countries, Journal of Global Health.	Sub-Saharan Africa	Cross-sectional surveys, women (15-49), Multilevel logistic models.	Individual factors ((education, unmarried women, work status, parity, and wealth status) t) and Contextual factors (premarital sex, wife-beating, educational achievement, early marriage, work status, and women's empowerment) were major determinants of contraceptive use.	Some variable like fertility preferences, and reproductive health practices were not included in the analysis.

Table 4: Matrix of Literatures Reviewed at Global Level

Serial No.	Citation/Journal	Country/Region	Data, Sample and Method	Finding	Gap
1.	Nkoka O et al. (2021), Multilevel analysis of the role of women's empowerment on use of contraceptive methods among married Cambodian women: evidence from demographic health surveys between 2005 and 2014.	Cambodia	Repeated Cross-sectional surveys, married women (15-49), Multilevel binary and multinomial logistic regression analysis.	Women's education level, workforce participation, age at first marriage, residence and access to health insurance were associated with contraceptive use.	Study population was limited to married women.
2.	Li Z. et al. (2020) Contraceptive Use in Adolescent Girls and Adult Women in Low- and Middle-Income Countries. Global Health.	Global	Repeated cross-sectional surveys, adolescent girls (15-19) and adult women (20-34), bootstrap test.	Inequalities in contraceptive use between adolescents and adult women persisted.	Study did not examine contraceptive use transitions.
3	Jabeen S. et al. (2020) Demand- and supply-side factors associated with the use of contraceptive methods in Pakistan: a comparative study of demographic and health surveys, 1990–2018. BMC Women's Health.	Pakistan	Repeated cross-sectional surveys, ever-married women (15–49), Multivariable binary logistic regression analysis.	Media exposure, access to transport and visits by family planning workers remained significantly associated with contraceptive use	Study population was limited to ever-married women.

4.	Kumar et al. (2020) Health workers' outreach and intention to use contraceptives among married women in India. BMC Public Health.	India	Repeated cross-sectional surveys, married women 15-49 years, multivariate logistic regression.	Health workers outreach was associated with contraceptive use.	Study population was limited to married women.
5	Kavanaugh M.L. et al. (2020) Use of contraception among reproductive-aged women in the United States, 2014 and 2016. American Society for Reproductive Medicine.	United States	Repeated cross-sectional surveys, women 15-49, simple and multivariable logistic regression analyses.	Access to sexual reproductive health care was associated with contraceptive use.	Study did not examine contraceptive use transitions.
6	Scott R.H. et al. (2019) Adolescent Sexual Activity, Contraceptive Use, and Pregnancy in Britain and the U.S.: A Multidecade Comparison. Journal of Adolescent Health.	Britain and United States	Repeated cross-sectional surveys, women aged 16-19 years, statistical decomposition.	There were changes in use of LARC over time.	Study population was limited to adolescents.
7	Zheng X. (2017) Provider-controlled or user-dependent contraceptive methods: Levels and pattern among married women of reproductive age in China, 1988– 2006. European Journal of Obstetrics & Gynecology and Reproductive Biology.	China	Repeated cross-sectional surveys, married women aged 15-49, exploratory analysis.	Women preferred provider-controlled contraceptive methods.	Study did not examine changes in contraceptive use.
8	R. Hussain and M.L. Kavanaugh (2021) Changes in use of emergency contraceptive pills in the United States from 2008 to 2015. Contraception	United States	Repeated cross-sectional surveys, Sexually active women aged 15 to 44, Simple logistic regression	Age, race, education, employment status, income, marital status and counselling on EC were determinants of changes in emergency contraceptive use	Study did not examine determinants of contraceptive use transition
9	Guttmacher Institute (2021) Trends in U.S. adolescent sexual behavior and contraceptive use, 2006-2019. Contraception	United States	Repeated cross-sectional surveys, adolescents aged 15-19, Kaplan- Meier failure analysis and Cox regression.	Use of LARC increased overtime.	Study population was limited to adolescents

10	Finn et al., (2020) Change and stability in contraceptive use patterns among US women over a 12-month period: analysis using the 2013–2015 National Survey of Family Growth life history calendar. Contraception	United States	Repeated cross-sectional surveys, Sexually active women aged 15-49 years, Multivariate logistic regression.	Contraceptive use patterns were dynamic and changed over a relatively short period of time.	Analysis was limited to a certain number of variables. Variables such as literacy, residence, husband/partners education, employment status and religious denomination were missing in the analysis.
11	MacQuarrie, Kerry L.D., and Azra Aziz. (2020). Trends, Differentials, and Determinants of Modern Contraceptive Use in Pakistan, 1990-2018. DHS Further Analysis Reports No. 129. Rockville, Maryland, USA: ICF.	Pakistan	Repeated cross-sectional surveys, Currently married women age 15-49, Multivariable regression analyses	Region, education, and wealth remained significantly associated with modern contraceptive use.	Analysis was restricted to currently married women.
12	C.I. Fowler et al., (2019) Patterns and trends in contraceptive use among women attending Title X clinics and a national sample of low-income women. Contraception	United States	Repeated Cross-sectional Surveys, Women of reproductive age (15-44) at risk of unintended pregnancy. Chi-square test for difference by survey period and t-test by comparing estimates for first and current period.	Use of LARC increased overtime.	Study did not apply multilevel analysis
13	Patel et al., (2019) Trends of Contraceptive Choices Among Young Women in Inner City Houston. HHS Public Access	United States	Repeated cross-sectional surveys, Sexually active women under the age of 25 years, Descriptive analysis.	Use of LARC increased overtime.	Findings cannot be generalizable to the whole population.
14	Megan L. Kavanaugh, Jenna Jerman (2018) Contraceptive method use in the United States: trends and characteristics between 2008, 2012 and 2014. Contraception.	United States	Repeated cross-sectional, Females aged 15-44, multivariable logistic regression analysis	Higher income levels and increased education were associated with lower levels of female sterilization use.	Study did not conduct multi-level analysis
15	Mutumba et al., (2018) Community influences on modern contraceptive use among young women in low and middle-income countries: a cross-sectional multi-country analysis. BMC Public Health	Global	Repeated Cross-section surveys, Young women aged 15–24 years, Multi-level logistic regression.	Education attainment, gender and fertility related norms influenced young women's contraceptive use.	Analyses only focused on young women

16	Qin et al., (2017) Trends and Determinants of Contraceptive Method Choice in China. China Pop. & Dev. Studies	China	Repeated cross-sectional surveys, Married women of reproductive age, Multilevel logistic regression.	Choice of contraceptive method was influenced by institutional forces.	Analysis was limited to married women.
17	Bietsch et al., (2021) Shifting dynamics: Changes in the relationship between total fertility rate and contraceptive prevalence rate in Jordan between 2012 and 2017. Gates Open Research	Jordan	Cross-sectional surveys, Ever married women aged 15-49 years, Descriptive analysis	Changes in contraceptive use and fertility were driven by changes in Jordanian nationals.	Multilevel analysis was not done in this study
18	Marra et al., (2020) Changes in young women's contraceptive use in the Netherlands: findings from three sex under the age of 25 surveys. Genus	Netherlands	Cross-sectional surveys, Women aged 12 to 25 years, Multivariable multinomial logistic regression.	Religious affiliation and education level were the main factors contributing to increase contraceptive use increase	Study population was limited to young women.
19	Singh et al., (2020) The levels and trends of contraceptive use before first birth in India (2015–16): a cross-sectional analysis. BMC Public Health	India	Cross-sectional survey, ever married women aged 15–34 years, Multivariate analysis.	Contraceptive use before birth declined due to religion, caste, education, wealth index, media exposure, age at marriage and the zonal classifications.	Study population was limited to ever married women .
20	Slaymaker et al., (2020). Trends in sexual activity and demand for and use of modern contraceptive methods in 74 countries: a retrospective analysis of nationally representative surveys. Articles.	Global	Cross-sectional, women aged 15–49 years, Binary logistic regression and Principal component analysis	Gender equality and woman's level of education was associated with met need for contraception.	Analysis was limited to ever-married women only
21	M.M. Wai et al., Contraception (2020). Dynamics of contraceptive use among married women in North and South Yangon, Myanmar: findings from a cross-sectional household survey. Contraception	Myanmar	Cross-sectional Study, Married women aged 18–49, Simple Logistic regression	Contraceptive use increased with an increase in age and parity.	Study did not measure contribution effects to contraceptive use transitions.
22	Sarah Asada, Courtney Hebertb, Rebecca Andridgec, Nghia Nguyend, and Maria F. Galloa (2019) Changes in the use of effective and long-acting reversible contraception in Vietnam. HHS Public Access	Vietnam	Multiple Indicator Cluster Surveys (MICS) and cross-sectional surveys, married or cohabiting women of reproductive age, Multivariable logistic regression	Education, age, residence, and having at least one son are the main factors that contributed to the observed changes.	Analysis was limited to specific contraceptive methods

23	Abdulrahman M, Farajallah HM, Kazim MN, AlHammadi FE, AlZubaidi AS, Carrick FR (2019). Pattern and determinants of contraceptive usage among women of reproductive age in the United Arab Emirates. J Family Med Prim Care.	United Arab Emirates	Cross-sectional, Women of reproductive age 18-49 years, Multiple logistic regression.	Educational levels were associated with contraceptive use.	Study did not measure changes in contraceptive use
24	Khraif et al., (2016) Dynamics of contraceptive use: A study of King Saud University women staff, Riyadh. Middle east fertility society.	Saudi Arabia	Cross-sectional survey, Ever-married women employees, Binary logistic regression analysis	Age, number of marriages, age of husband at first marriage, continuing with first marriage; place grown up; type of family and type of job; and income were significantly associated with contraceptive use.	Study did not examine changes in contraceptive use
25	New et al., (2017) Levels and trends in contraceptive prevalence, unmet need, and demand for family planning for 29 states and union territories in India: a modelling study using the Family Planning Estimation Tool. Articles	India	Cross-sectional surveys, Married women of reproductive age (15-49 years), Polynomial regression curves.	Demand for family planning varied across regions	The study population excluded sexually active unmarried women.
26	Scott R. H. et al., (2020) Adolescent Sexual Activity, Contraceptive Use, and Pregnancy in Britain and the U.S.: A Multidecade Comparison. Journal of Adolescent Health.	Britain United States	Cross sectional surveys, women (16-19 years), Decomposition analysis	In both countries, there was a shift toward more effective contraception.	Study population was limited to adolescents.
27	Marra E. et al., (2020) Changes in young women's contraceptive use in the Netherlands: findings from three sex under the age of 25 surveys. Genus.	Netherlands	Cross-sectional representative surveys, young women (12-25 years), multivariable multinomial logistic regression	Religious groups and educational level were significantly associated with increased use of LARC.	Study population was limited to young women
28	Daniels K. et al., (2015) Current Contraceptive Use and Variation by Selected Characteristics Among Women Aged 15–44: United States, 2011–2013. National Health Statistics Reports.	United States	Cross sectional survey, women and men (15–44 years), two-tailed t tests.	There was an increase in LARC overtime.	Study sample excluded women 45-49

29	Musick K. et al., (2013) Education Differences in Intended and Unintended Fertility. NIH Public Access.	United States	Longitudinal surveys, white and black women (14-21 years), multinomial logistic regression	Unintended childbearing was influenced by access to contraception and abortion, relational and economic uncertainty, and consistency in the behaviors necessary to avoid unintended pregnancies.	Study did not examine community level factors
30	Ugaz A. et al., (2015) Regional trends in the use of short-acting and long-acting contraception accessed through the private and public sectors. International Journal of Gynecology and Obstetrics	Sub-Saharan Africa Asia Latin America and the Caribbean (LAC)	Repeated cross sectional surveys, married or living in union women (15-49 years), retrospective analysis.	Increased use of short-acting methods from both public and private sectors has driven the rise in contraceptive prevalence in Asia and LAC and Sub Saharan Africa.	Analysis was restricted to only married women
31	Slaymaker E. et al., (2020) Trends in sexual activity, demand for, and use of modern contraceptive methods in 74 countries: a retrospective analysis of nationally representative surveys.	Sub Saharan Africa Latin America and the Caribbean (LAC)	Cross sectional surveys, women (15-49 years) Retrospective analysis.	Increases over time in met need for contraception were correlated with increases in gender equality and with women's time in education.	Multilevel analysis was not done in this study
32	Bietsch K. et al., (2021) Shifting dynamics: Changes in the relationship between total fertility rate and contraceptive prevalence rate in Jordan between 2012 and 2017. Gates Open Research.	Jordan	Cross sectional survey, married women, FPET model.	Decline in fertility was driven by a reduction in mistimed or unwanted pregnancies and there was a significant increase in the share of reproductive aged women who are infecund.	Study did not examine community level factors

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POLICY BRIEF APPENDIX

Understanding the social context of contraceptive use transition in Zambia, 1992-2018: and its effect on fertility dynamics and reproductive health outcomes

By Million Phiri, 2490107
Demography and Population Studies Programme
University of the Witwatersrand

POLICY BRIEF

Policy Users: Ministry of Health, Ministry of Education, Ministry of Community Development and Social Services, Department of Gender, Cabinet Office, Parlimantary Committee on Health, National AIDS Council, United Nations Population Fund, Planned Parenthood Association of Zambia, Centre for Reproductive Health, Family Health International, Family Life Movement of Zambia

Introduction

This policy brief presents a study's conclusions and policy suggestions arising from a study that examined the influence of social context on contraceptive use transition in Zambia among sexually active women during the during the period 1992-2018 using the Zambia Demographic and Health Surveys data (DHS). The study applied multivariable decomposition analysis to delineate the factors contributing to the contraceptive usage change in the country. The purpose of this policy brief is to bring evidence to the attention of policy-makers, planners, and programme managers in government and related institutions as well as nongovernmental organisations, about how to strengthen FP strategies and interventions to speed up the use of contraceptive methods by women who are of reproductive age.

Context

Contraception is a global public health strategy aimed at preventing unwantend pregnancies, spacing children and avoiding risks pregnancies among women who are too young or too old. This, improving access to and utilisation of family planning (FP) commodities and services has been a major global goal of maternal health and development programming for over four decades now. Since then, significant progress has been made in increasing contraceptive prevalence rate, reducing unmet needs for FP, and preventing unintended pregnancies. Hence reducing maternal mortality among other maternal health progress indicators. This is because FP has significant implications for reducing maternal and child mortality and population growth especially in developing countries in line with the aspiration of achieving the Sustainable Development Goals (SGDs), specifically SDG 3 and 5.

In Zambia, fertility rate and teenage pregnancy has remained among the highest in sub-Saharan Africa (SSA) as noted by the National Population Policy of Zambia. On the other hand, contraceptive use

among sexually active women is still low, although a considerate increase was recorded between the period 1992 and 2018 (14.2% to 45%). Addressing maternal mortality has been an issue of public health concern for several decades now because of its impact at individual, household, community and national level in development terms as the consequences are immense to be neglected. Studies in SSA and elsewhere have shown that increasing contraception use has shown the potential to avert maternal mortality by reducing teenage teenage pregnancies and risk births. Furthermore, studies that have been done in some African countries have shown that improving social context of women plays a mediating role in influencing uptake of contraceptive methods which eventually impacts fertility and other maternal health outcomes like birth interval and unplanned births.

Previous studies on contraception in Zambia argued that social and demographic factors such as such as education, employment, household wealth status, parity and fertility preference influence utilisation of contraceptive methods among women. However, these studies are inadequate to inform what has been driving contraceptive use transition in Zambia. This is because the methodologies used by earlier studies cannot measure the contribution effects of various factors to contraceptive use increase. Additionally, earlier studies did not attempt to examine the impact of the observed increase in contraceptive use in the country on fertility reduction and improvement in maternal health outcomes. This study addresses these issues with special attention to their effects on explaining contraceptive use transition in the country by applying advanced decomposition analysis approach to delineate the drivers of contraceptive use, thus generate evidence to inform shaping of existing family planning policies and strategies.

Specific Findings

- This study found that the contraceptive prevalence rate in Zambia among sexually active women rose significantly by 30.8 percentage points between 1992 and 2018. This translates to an average of 1.2% change annually. The major share of contraceptive use increase in Zambia happened between 1992 and 1996 (10.3%) while the least increase was recorded during the period 2013-2018 (0.2%).
- In Zambian, contraceptive use transition varied by region. Eastern province recorded the highest contraceptive use increase between 1992 and 2018 (42.5%) while Western province recorded the lowest increase during the same period (18.3%).
- In terms of level of education, those with primary level education recoded the most increase in utilisation of contraceptive methods during the period 1992 to 2018 (34.8.0%) while those with tertiary education recoded the least increase in use of contraceptive (4.0%).
- Trend change in utilisation of injections or long-acting methods among sexually active women increased significantly by 63.7 percentage points between 1992 and 2018. The increase was more pronounced in rural (73.7%) compared to urban areas (54.9%).
- The study has revealed that both the individual and community-level factors were important in influencing contraceptive use transition in Zambia. At individual level, increasing level of

education was associated with increased probability of using contraceptive methods among sexually active women.

- Regional disadvantage was observed in terms of contraceptive use in Zambia. Women living in Luapula, Northern, Southern and Western provinces had significantly lower odds of using contraceptive methods compared to women living in Lusaka province
- The study found that both changes in women's compositional structure and changes in women's contraceptive behaviour significantly contributed to the change in contraceptive use in Zambia. However, change in contraceptive behaviour of women was the main contributor to the observed increase in contraceptive use in Zambia.
- This study further reveal that change in contraceptive behaviour of women whose desired large family size, those living in urban areas, those living in communities with high access to CHW visits, of women aged 35-49 years and of who were married in adolescence age contributed significantly to the increase in contraceptive use in Zambia.
- An association between an increase in contraceptive use and reduction in fertility rate in Zambia was observed. The results show that an increase in contraceptive use had a negative association with fertility rate in Zambia.

Policy Recommendations

- Findings suggest that family planning programmes in Zambia have been yielding intended results, as observed by the increasing CPR. This is despite the country not meeting its planned target of 58% CPR by 2020. Thus, there is a need to scale-up sexual reproductive health and family planning interventions to improve supply, demand and access of FP services and commodities, especially among the marginalised communities in Zambia.

- The variations in trend change in contraceptive use by region shows that there are inequalities in socio-economic conditions across the provinces in Zambia. Western, Luapula and Northern provinces have the lowest change in contraceptive use among women. There is a need for investment in education facilities and primary health care facilities for these regions to enable vulnerable women to have easy access family planning services. Further, strengthening of community health worker visits should be considered a priority for rural areas, as it has shown the potential to increase utilisation of contraceptive methods in such settings.

- This study has established that change in contraceptive use in Zambia was largely driven by changes in contraceptive behaviour of sexually active women during the period 1992 to 2018. This implies that SRH public health interventions being implemented by government and non-governmental organisations working in the family planning sector have been effective in driving contraceptive behaviour change of women. Therefore, SRH interventions aimed at changing contraceptive behavior among women should be strengthened in order to further speed up contraceptive use transition in Zambia

- Evidence show that education was one of the key compositional factor that has positively contributed to the increasing trend in utilisation of contraceptive methods among women in Zambia.

There is, therefore, a need for the Zambia government to continue increasing and sustaining the investments in the education sector, especially for the rural population. This investment will create a long-term positive impact on improving maternal health will eventually reduce maternal mortality in the country.

- Study found that reducing the child mortality rate in Zambia has the potential to increase contraceptive use trend. Reducing child mortality is also key to improving maternal health. This implies that investments in child health strategies such as vaccinations, detecting disease early, child nutrition support and growth monitoring through under five clinics is key for improving maternal health as it can enhance contraception uptake.

- The study established that the increase in contraceptive use during the period 1992 to 2018 significantly contributed to the reduction in fertility rate in the country. Furthermore, the observed reduction in teenage pregnancy rates was significantly impacted by the increase in contraceptive use among adolescent girls. Thus, these results have significant implications for strengthening family planning commodity supply and access in order to further reduce fertility rate and teenage pregnancies in the country.

Study Analysis Stata Do-File

THE STATA DO-FILE

```
/*
Project: CONTRACEPTIVE USE TRANSITION IN ZAMBIA 1992 - 2018
Authors: Million Phiri
Programme: PhD, Demography and Population Studies
Faculty: Humanities
School: Social Sciences
Instiution: University of the Witwatersrand, South Africa
Datasets: ZDHS 1992 2018 DHS data
*/
* Change work directory

 cd "C:\Users\LENOVO\Documents\My PhD\Demography\1. PHD THESIS"

set maxvar 32000, permanent

*Open dataset

use ZDHS1992_2018.dta, clear

* Apply weight to DHS dataset

svyset psu [pweight = perweight], strata(strata) singleunit(centered)

*Open dataset

*INCLUSION CRITERIA (Keep Sexually active women datasets)

keep if age1stsex>0

*Remove pregnant women

drop if pregnant==1

*Drop if declared infecund or stellized

drop if fertpref ==51 | fertpref==52

*******************************************************************************
*Variable recoding -Dependent variable creation
*******************************************************************************
*CONTRACEPTIVE USE
tab fptypnow

recode fptypnow (11/20=1 "Contraception use") (0=0 "Not using") (else=.), gen(contraception_use)

svy: tab year contraception_use, count row percent format (%8.0g)

tab contraception_use

*CONTRACEPTIVE METHOD USE
tab fpmethnow
recode fpmethnow (102 103 106 110 120 =2 "Long-acting methods") (0 998=.) (else=1 "Short-acting methods"),
gen(method_type)
tab year method_type, row
```

```
*Contraceptive method specific

recode fpmethnow  (101=1 "Pills") (102=2 "IUD") (110=3 "Injections") (104 =4 "Male condom") (103=5 "Implants")
(131 211 212 213 220 230 231 234 =8 "Traditional") (130=7 "LAM") (else=.), gen(Modern_types)
tab Modern_types
*******************************************************************************

*INDEPENDENT VARIABLES

rename urban Residence

rename currmarr Marital_status
recode Marital_status (8=.)
rename educlvl Education
recode Education (8=.)
rename husedlvl Partners_educaltion
recode Partners_educaltion (7/9=.)
rename cellphonself Phone_onwership
rename bhcdistance distance_facility
rename fphomvisity visited_communutyhealth_worker
recode visited_communutyhealth_worker (8/9=.)
rename fphcvisity visited_HF12months
recode visited_HF12months (8/9=.)
rename  fphctalkfp toldatbout_FP_healthfacility
recode toldatbout_FP_healthfacility (8/9=.)
rename husfertpref Family_size_concordance
recode Family_size_concordance (8/9=.)

*RECORDING OF INDEPENDENT VARIABLES

recode age (15/24=1 "15-24") (25/34=2 "25-34") (35/49=3 "35-49") (else=.), gen (Age)

recode age (15/19=1 "15-19") (20/24=2 "20-24") (25/29=3 "25-29") (30/34=4 "30-34") (35/39=5 "35-39") (40/44=6
"40-44") (45/49=7 "45-49"), gen(Age1)

recode age (15/19=1 "15-19") (20/24=2 "20-24") (else=.), gen(Age2)

recode religion (2100=1 "Catholic") (2300=2 "Protestant") (else=3 "Other"), gen(Religion)
tab Religion

**Wealth Status
recode wealthq (1/2=1 "Poor") (3=2 "Middle") (4/5=3 "Rich") (else=.), gen(wealth_status)

**Age at first sex
recode age1stsex (0/14=1 "Less than 15")(15/19=2 "15-19")(20/max=3 "20+") (else=.), gen(Age_first_sex)

*Age at first marriage

recode agefrstmar (0/14=1 "Below 15 years") (15/19=2 "15-19") (20/max=3 "20+") (else=.), gen(Agefirstmarriage)

**Employment status

recode currwork (0=0 "not working") (10=1 "working") (else=.), gen(Occupation)

**Children ever born
```

```
recode cheb (0/1=0 "0-1") (2/3=1 "2-3") (4/5=2 "4-5") (6/max=3 "6+") (else=.), gen(CEB)

recode cheb (0=0 "0") (1=1 "1") (2=2 "2") (3/max=3 "3+") (else=.), gen(CEB1)

**Living Children

recode chebalive (0/1=0 "0-1") (2/3=1 "2-3") (4/5=2 "4-5") (6/max=3 "6+") (else=.), gen(Livingchildren)

recode chebalive (0=0 "0") (1=1 "1") (2=2 "2") (3/max=3 "3+") (else=.), gen(Livingchildren1)

**Exposure to media FP messages
recode fpnewshr (0=0 "No") (1=1 "Yes") if fpnewshr!=., gen(P_1)
recode fpradiohr (0=0 "No") (1=1 "Yes") if fpradiohr!=., gen(P_2)
recode fptvhr (0=0 "No") (1=1 "Yes") if fptvhr!=., gen(P_3)
gen media_FP=0
replace media_FP=1 if (P_1==1 | P_2==1 | P_3==1)
recode media_FP (0=0 "No")(1=1 "Yes"), gen(FP_messages)
tab FP_messages

*Ideal family size
recode idealkid (0/1=1 "0-1")(2/3=2 "2-3") (4/5=3 "4-5") (6/max=4 "6+")(else=.), gen(Ideal_Nchildren1)
tab Ideal_Nchildren1

**Exposure to TV, Radio and Newspaper
*Reading_newspaper
*Listening_radio
*Watching_television

recode newsbrig (0/1=0 "No") (2/12=1 "Yes") (else=.), gen(Reading_newspaper)
recode radiobrig (0/1=0 "No") (2/12=1 "Yes") (else=.), gen(Listening_radio)
recode tvbrig (0/1=0 "No") (2/12=1 "Yes") (else=.), gen(Watching_television)

tab year Listening_radio
tab year Reading_newspaper
tab year Watching_television

recode Listening_radio (0=0 "No") (1=1 "Yes") if Listening_radio!=., gen(P_12)
recode Watching_television (0=0 "No") (1=1 "Yes") if Watching_television!=., gen(P_22)

gen TV_Radio=0
replace TV_Radio=1 if (P_12==1 | P_22==1)
recode TV_Radio (0=0 "No")(1=1 "Yes"), gen(Radio_TV_exposure)
tab Radio_TV_exposure

*Pregnancy loss

recode pregtermin (0=0 "No") (1=1 "Yes") (else=.), gen(Pregnancyloss)

*Unwanted children

recode fplchdesire (1=0 "No") (2/3=1 "Yes") (else=.), gen(Unwanted_child)

*Desire for more children

recode kiddesire (11/13=1 "Want another") (40=2 "Want no more") (30=3 "Undecided") (else=.),
gen(desiremore_children)
tab desiremore_children
```

```
recode distance_facility (10/11=2 "Not a big problem") (20=1 "A big problem") (else=.), gen(distance_facility1)

**ADDITIONAL INDEPENDENT VARIABLES

***Knowledge about ovulatory cycle***
gen knowledge_ovulationcycle=.
replace knowledge_ovulationcycle=1 if ovcycle==3
replace knowledge_ovulationcycle=0 if inlist(ovcycle,1,2,4,5,6,8)
recode knowledge_ovulationcycle (0=0 "Don't know")(1=1 "Knowledgeable") (else=.),
gen(knowledge_ovulation_cycle)
tab knowledge_ovulation_cycle

*Decision maker for contraception
recode fpdecider (0=1 "Partner") (1/2=2 "Woman/partner") (3=3 "Other") (else=.), gen(contaceptive_autonomy)

tab contaceptive_autonomy

recode fpdecider (0=1 "Partner") (1=2 "Woman") (2=3 "Joint") (3=4 "Other") (else=.), gen(contaceptive_autonomy1)
tab contaceptive_autonomy1

*Decider on health care
recode decfemhcare  (1=1 "Woman alone") (2=2 "Woman and partner") (4=3 "Partner") (3 5=4 "Others") (else=.),
gen(decideron_woman_health)
tab decideron_woman_health

*Decsion making autonomy
alpha decbighh decfamvisit decfemearn
pca decbighh decfamvisit decfemearn
generate female_autonomy=.
replace female_autonomy=1 if decbighh<=20 | decfamvisit<=20 | decfemearn<=20
replace female_autonomy=0 if decbighh>=30 & decbighh<=60 | decfamvisit>=30 & decfamvisit<=60  |
decfemearn>=30 & decfemearn<=60
label var female_autonomy "women's autonomy"
label def female_autonomy 0 "Low female autonomy" 1 "higher female autonomy"
label values female_autonomy female_autonomy
tab female_autonomy

*HUSBAND WORK STATUS

recode husjob (10=0 "Not working") (20/70=1 "Working") (else=.), gen(husbands_employment)
tab husbands_employment

* Child mortality experience

recode b5_01 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_1)
recode b5_02 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_2)
recode b5_03 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_3)
recode b5_04 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_4)
recode b5_05 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_5)
recode b5_06 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_6)
recode b5_07 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_7)
recode b5_08 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_8)
recode b5_09 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_9)
recode b5_10 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_10)
recode b5_11 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_11)
recode b5_12 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_12)
```

```
recode b5_13 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_13)
recode b5_14 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_14)
recode b5_15 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_15)
recode b5_16 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_16)
recode b5_17 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_17)
recode b5_18 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_18)
recode b5_19 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_19)
recode b5_20 (0=0 "No") (1=1 "Yes") if b5_01!=., gen(PA_20)

gen mortality_experience=0
replace mortality_experience=1 if (PA_1==1 | PA_2==1 | PA_3==1 | PA_4==1 | PA_5==1 | PA_6==1 | PA_7==1 |
PA_8==1 | PA_9==1 | PA_10==1 | PA_11==1 | PA_12==1 | PA_13==1 | PA_14==1 | PA_15==1 | PA_16==1 |
PA_17==1 | PA_18==1 | PA_19==1 | PA_20==1)
recode mortality_experience (0=0 "No")(1=1 "Yes"), gen(child_mortality_experience)
tab child_mortality_experience

recode child_mortality_experience (0=1 "Yes") (1=0 "No"), gen(child_mortality_experience1)
tab child_mortality_experience1
*******************************************************************************
* CHAPTER FOUR: BACKGROUND CHARACTERSITICS OF SURVEY RESPONDENT
*******************************************************************************
log using TABLE4.1.log, replace

*TABLE 4.1
 *AGE
svy: tabulate Age if year==1992, count col percent format (%6.0g)
svy: tabulate Age if year==1996, count col percent format (%6.0g)
svy: tabulate Age if year==2001, count col percent format (%6.0g)
svy: tabulate Age if year==2007, count col percent format (%6.0g)
svy: tabulate Age if year==2013, count col percent format (%6.0g)
svy: tabulate Age if year==2018, count col percent format (%6.0g)

*EDUCATION
svy: tabulate Education if year==1992, count col percent format (%7.0g)
svy: tabulate Education if year==1996, count col percent format (%7.0g)
svy: tabulate Education if year==2001, count col percent format (%7.0g)
svy: tabulate Education if year==2007, count col percent format (%7.0g)
svy: tabulate Education if year==2013, count col percent format (%7.0g)
svy: tabulate Education if year==2018, count col percent format (%7.0g)

*MARITAL STATUS
svy: tabulate Marital_status if year==1992, count col percent format (%7.0g)
svy: tabulate Marital_status if year==1996, count col percent format (%7.0g)
svy: tabulate Marital_status if year==2001, count col percent format (%7.0g)
svy: tabulate Marital_status if year==2007, count col percent format (%7.0g)
svy: tabulate Marital_status if year==2013, count col percent format (%7.0g)
svy: tabulate Marital_status if year==2018, count col percent format (%7.0g)

*PARTNERS EDUCATION
svy: tabulate Partners_educaltion if year==1992, count col percent format (%7.0g)
svy: tabulate Partners_educaltion if year==1996, count col percent format (%7.0g)
svy: tabulate Partners_educaltion if year==2001, count col percent format (%7.0g)
svy: tabulate Partners_educaltion if year==2007, count col percent format (%7.0g)
svy: tabulate Partners_educaltion if year==2013, count col percent format (%7.0g)
svy: tabulate Partners_educaltion if year==2018, count col percent format (%7.0g)

*WEALTH STATUS
```

```
*svy: tabulate wealth_status if year==1992, count col percent format (%7.0g)
svy: tabulate wealth_status if year==1996, count col percent format (%7.0g)
svy: tabulate wealth_status if year==2001, count col percent format (%7.0g)
svy: tabulate wealth_status if year==2007, count col percent format (%7.0g)
svy: tabulate wealth_status if year==2013, count col percent format (%7.0g)
svy: tabulate wealth_status if year==2018, count col percent format (%7.0g)
*RELIGION
svy: tabulate Religion if year==1992, count col percent format (%7.0g)
svy: tabulate Religion if year==1996, count col percent format (%7.0g)
svy: tabulate Religion if year==2001, count col percent format (%7.0g)
svy: tabulate Religion if year==2007, count col percent format (%7.0g)
svy: tabulate Religion if year==2013, count col percent format (%7.0g)
svy: tabulate Religion if year==2018, count col percent format (%7.0g)
*EMPLOYMENT STATUS
svy: tabulate Occupation if year==1992, count col percent format (%7.0g)
svy: tabulate Occupation if year==1996, count col percent format (%7.0g)
svy: tabulate Occupation if year==2001, count col percent format (%7.0g)
svy: tabulate Occupation if year==2007, count col percent format (%7.0g)
svy: tabulate Occupation if year==2013, count col percent format (%7.0g)
svy: tabulate Occupation if year==2018, count col percent format (%7.0g)
*AGE AT FIRST SEX
svy: tabulate Age_first_sex if year==1992, count col percent format (%7.0g)
svy: tabulate Age_first_sex if year==1996, count col percent format (%7.0g)
svy: tabulate Age_first_sex if year==2001, count col percent format (%7.0g)
svy: tabulate Age_first_sex if year==2007, count col percent format (%7.0g)
svy: tabulate Age_first_sex if year==2013, count col percent format (%7.0g)
svy: tabulate Age_first_sex if year==2018, count col percent format (%7.0g)

*AGE AT FIRST MARRIAGE
svy: tabulate Agefirstmarriage if year==1992, count col percent format (%7.0g)
svy: tabulate Agefirstmarriage if year==1996, count col percent format (%7.0g)
svy: tabulate Agefirstmarriage if year==2001, count col percent format (%7.0g)
svy: tabulate Agefirstmarriage if year==2007, count col percent format (%7.0g)
svy: tabulate Agefirstmarriage if year==2013, count col percent format (%7.0g)
svy: tabulate Agefirstmarriage if year==2018, count col percent format (%7.0g)

*WOMAN DECISION MAKING

*svy: tabulate female_autonomy if year==1992, count col percent format (%7.0g)
svy: tabulate female_autonomy if year==1996, count col percent format (%7.0g)
svy: tabulate female_autonomy if year==2001, count col percent format (%7.0g)
svy: tabulate female_autonomy if year==2007, count col percent format (%7.0g)
svy: tabulate female_autonomy if year==2013, count col percent format (%7.0g)
svy: tabulate female_autonomy if year==2018, count col percent format (%7.0g)

log close
*END

log using TABLE4.2.log, replace

***COMMUNITY CHARACTERSITICS

************1992-2018*****************************************************************
*RESIDENCE
svy: tabulate Residence if year==1996, count col percent format (%7.0g)
svy: tabulate Residence if year==1992, count col percent format (%7.0g)
svy: tabulate Residence if year==2001, count col percent format (%7.0g)
```

```
svy: tabulate Residence if year==2007, count col percent format (%7.0g)
svy: tabulate Residence if year==2013, count col percent format (%7.0g)
svy: tabulate Residence if year==2018, count col percent format (%7.0g)

*PROVINCE
svy: tabulate geo_zm1992 if year==1992, count col percent format (%6.0g)
svy: tabulate geo_zm1996 if year==1996, count col percent format (%6.0g)
svy: tabulate geo_zm2001 if year==2001, count col percent format (%6.0g)
svy: tabulate geo_zm2007 if year==2007, count col percent format (%6.0g)
svy: tabulate geo_zm2013 if year==2013, count col percent format (%6.0g)
svy: tabulate geo_zm2018 if year==2018, count col percent format (%6.0g)

*COMMUNITY EDUCATION

svy: tabulate community_education if year==1992, count col percent format (%6.0g)
svy: tabulate community_education if year==1996, count col percent format (%6.0g)
svy: tabulate community_education if year==2001, count col percent format (%6.0g)
svy: tabulate community_education if year==2007, count col percent format (%6.0g)
svy: tabulate community_education if year==2013, count col percent format (%6.0g)
svy: tabulate community_education if year==2018, count col percent format (%6.0g)

*COMMUNITY WEALTH

*svy: tabulate community_wealth if year==1992, count col percent format (%6.0g)
svy: tabulate community_wealth if year==1996, count col percent format (%6.0g)
svy: tabulate community_wealth if year==2001, count col percent format (%6.0g)
svy: tabulate community_wealth if year==2007, count col percent format (%6.0g)
svy: tabulate community_wealth if year==2013, count col percent format (%6.0g)
svy: tabulate community_wealth if year==2018, count col percent format (%6.0g)

*COMMUNITY EMPLOYMENT
svy: tabulate community_employment_status if year==1992, count col percent format (%6.0g)
svy: tabulate community_employment_status if year==1996, count col percent format (%6.0g)
svy: tabulate community_employment_status if year==2001, count col percent format (%6.0g)
svy: tabulate community_employment_status if year==2007, count col percent format (%6.0g)
svy: tabulate community_employment_status if year==2013, count col percent format (%6.0g)
svy: tabulate community_employment_status if year==2018, count col percent format (%6.0g)

*COMMUNITY DECISION MAKIING

svy: tabulate community_woman_autonomy if year==1992, count col percent format (%6.0g)
svy: tabulate community_woman_autonomy if year==1996, count col percent format (%6.0g)
svy: tabulate community_woman_autonomy if year==2001, count col percent format (%6.0g)
svy: tabulate community_woman_autonomy if year==2007, count col percent format (%6.0g)
svy: tabulate community_woman_autonomy if year==2013, count col percent format (%6.0g)
svy: tabulate community_woman_autonomy if year==2018, count col percent format (%6.0g)

*COMMUNITY CHW VISITS
svy: tabulate community_CHW_access if year==1992, count col percent format (%6.0g)
svy: tabulate community_CHW_access if year==1996, count col percent format (%6.0g)
svy: tabulate community_CHW_access if year==2001, count col percent format (%6.0g)
svy: tabulate community_CHW_access if year==2007, count col percent format (%6.0g)
svy: tabulate community_CHW_access if year==2013, count col percent format (%6.0g)
svy: tabulate community_CHW_access if year==2018, count col percent format (%6.0g)

*COMMUNITY DESIRED FOR LARGE FAMULY
svy: tabulate community_desiredchildren if year==1992, count col percent format (%6.0g)
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svy: tabulate community_desiredchildren if year==1996, count col percent format (%6.0g)
svy: tabulate community_desiredchildren if year==2001, count col percent format (%6.0g)
svy: tabulate community_desiredchildren if year==2007, count col percent format (%6.0g)
svy: tabulate community_desiredchildren if year==2013, count col percent format (%6.0g)
svy: tabulate community_desiredchildren if year==2018, count col percent format (%6.0g)

*COMMUNITY FP EXPOSURE
svy: tabulate community_FP_access if year==1992, count col percent format (%6.0g)
svy: tabulate community_FP_access if year==1996, count col percent format (%6.0g)
svy: tabulate community_FP_access if year==2001, count col percent format (%6.0g)
svy: tabulate community_FP_access if year==2007, count col percent format (%6.0g)
svy: tabulate community_FP_access if year==2013, count col percent format (%6.0g)
svy: tabulate community_FP_access if year==2018, count col percent format (%6.0g)

*COMMUNITY YOUNG AGE AT FIRST MARRIAGE
svy: tabulate community_marriage if year==1992, count col percent format (%6.0g)
svy: tabulate community_marriage if year==1996, count col percent format (%6.0g)
svy: tabulate community_marriage if year==2001, count col percent format (%6.0g)
svy: tabulate community_marriage if year==2007, count col percent format (%6.0g)
svy: tabulate community_marriage if year==2013, count col percent format (%6.0g)
svy: tabulate community_marriage if year==2018, count col percent format (%6.0g)

*COMMUNITY YOUNG AGE AT FIRST BIRTH
svy: tabulate community_birth if year==1992, count col percent format (%6.0g)
svy: tabulate community_birth if year==1996, count col percent format (%6.0g)
svy: tabulate community_birth if year==2001, count col percent format (%6.0g)
svy: tabulate community_birth if year==2007, count col percent format (%6.0g)
svy: tabulate community_birth if year==2013, count col percent format (%6.0g)
svy: tabulate community_birth if year==2018, count col percent format (%6.0g)

log close
*****************************************************************************************

log using TABLE4.3.log, replace

*VISUTED HEALTH FACILITY IN LAST 12 MONTHS
*svy: tabulate visited_HF12months if year==1992, count col percent format (%6.0g)
svy: tabulate visited_HF12months if year==1996, count col percent format (%6.0g)
svy: tabulate visited_HF12months if year==2001, count col percent format (%6.0g)
svy: tabulate visited_HF12months if year==2007, count col percent format (%6.0g)
svy: tabulate visited_HF12months if year==2013, count col percent format (%6.0g)
svy: tabulate visited_HF12months if year==2018, count col percent format (%6.0g)

*RECEIVED FP INFORMATION FROM HEALTH PROVIDER

*svy: tabulate toldatbout_FP_healthfacility if year==1992, count col percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility if year==1996, count col percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility if year==2001, count col percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility if year==2007, count col percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility if year==2013, count col percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility if year==2018, count col percent format (%6.0g)

*VISITED BY CHW
*svy: tabulate visited_communutyhealth_worker if year==1992, count col percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker if year==1996, count col percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker if year==2001, count col percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker if year==2007, count col percent format (%6.0g)
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svy: tabulate visited_communutyhealth_worker if year==2013, count col percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker if year==2018, count col percent format (%6.0g)

*EXPOSURE TO RADIO

svy: tabulate Listening_radio if year==1992, count col percent format (%6.0g)
svy: tabulate Listening_radio if year==1996, count col percent format (%6.0g)
svy: tabulate Listening_radio if year==2001, count col percent format (%6.0g)
svy: tabulate Listening_radio if year==2007, count col percent format (%6.0g)
svy: tabulate Listening_radio if year==2013, count col percent format (%6.0g)
svy: tabulate Listening_radio if year==2018, count col percent format (%6.0g)

*EXPOSURE TO TELEVISION
svy: tabulate Watching_television if year==1992, count col percent format (%6.0g)
svy: tabulate Watching_television if year==1996, count col percent format (%6.0g)
svy: tabulate Watching_television if year==2001, count col percent format (%6.0g)
svy: tabulate Watching_television if year==2007, count col percent format (%6.0g)
svy: tabulate Watching_television if year==2013, count col percent format (%6.0g)
svy: tabulate Watching_television if year==2018, count col percent format (%6.0g)

*EXPOSURE TO NEWSPAPER
svy: tabulate Reading_newspaper if year==1992, count col percent format (%6.0g)
svy: tabulate Reading_newspaper if year==1996, count col percent format (%6.0g)
svy: tabulate Reading_newspaper if year==2001, count col percent format (%6.0g)
svy: tabulate Reading_newspaper if year==2007, count col percent format (%6.0g)
svy: tabulate Reading_newspaper if year==2013, count col percent format (%6.0g)
svy: tabulate Reading_newspaper if year==2018, count col percent format (%6.0g)

*EXPOSURE TO FP MESSAGES
svy: tabulate FP_messages if year==1992, count col percent format (%6.0g)
svy: tabulate FP_messages if year==1996, count col percent format (%6.0g)
svy: tabulate FP_messages if year==2001, count col percent format (%6.0g)
svy: tabulate FP_messages if year==2007, count col percent format (%6.0g)
svy: tabulate FP_messages if year==2013, count col percent format (%6.0g)
svy: tabulate FP_messages if year==2018, count col percent format (%6.0g)

 log close
*****************************************************************************************
log using TABLE4.4.log, replace

*LIVING CHILDREN
svy: tabulate Livingchildren if year==1992, count col percent format (%6.0g)
svy: tabulate Livingchildren if year==1996, count col percent format (%6.0g)
svy: tabulate Livingchildren if year==2001, count col percent format (%6.0g)
svy: tabulate Livingchildren if year==2007, count col percent format (%6.0g)
svy: tabulate Livingchildren if year==2013, count col percent format (%6.0g)
svy: tabulate Livingchildren if year==2018, count col percent format (%6.0g)

*CHILDREN EVER BORN
svy: tabulate CEB if year==1992, count col percent format (%6.0g)
svy: tabulate CEB if year==1996, count col percent format (%6.0g)
svy: tabulate CEB if year==2001, count col percent format (%6.0g)
svy: tabulate CEB if year==2007, count col percent format (%6.0g)
svy: tabulate CEB if year==2013, count col percent format (%6.0g)
svy: tabulate CEB if year==2018, count col percent format (%6.0g)

*AGE AT FIRST BIRTH
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svy: tabulate Age_first_birth if year==1992, count col percent format (%6.0g)
svy: tabulate Age_first_birth if year==1996, count col percent format (%6.0g)
svy: tabulate Age_first_birth if year==2001, count col percent format (%6.0g)
svy: tabulate Age_first_birth if year==2007, count col percent format (%6.0g)
svy: tabulate Age_first_birth if year==2013, count col percent format (%6.0g)
svy: tabulate Age_first_birth if year==2018, count col percent format (%6.0g)

*FAMILY SIZE CONCORDANCE
svy: tabulate Family_size_concordance if year==1992, count col percent format (%6.0g)
svy: tabulate Family_size_concordance if year==1996, count col percent format (%6.0g)
svy: tabulate Family_size_concordance if year==2001, count col percent format (%6.0g)
svy: tabulate Family_size_concordance if year==2007, count col percent format (%6.0g)
svy: tabulate Family_size_concordance if year==2013, count col percent format (%6.0g)
svy: tabulate Family_size_concordance if year==2018, count col percent format (%6.0g)

*IDEAL NUMBER OF CHILDREN
svy: tabulate Ideal_Nchildren if year==1992, count col percent format (%6.0g)
svy: tabulate Ideal_Nchildren if year==1996, count col percent format (%6.0g)
svy: tabulate Ideal_Nchildren if year==2001, count col percent format (%6.0g)
svy: tabulate Ideal_Nchildren if year==2007, count col percent format (%6.0g)
svy: tabulate Ideal_Nchildren if year==2013, count col percent format (%6.0g)
svy: tabulate Ideal_Nchildren if year==2018, count col percent format (%6.0g)

log close

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log using TABLE4.5.log, replace

*EXPERIENCED PREGNANCY LOSS
*svy: tabulate Pregnancyloss if year==1992, count col percent format (%6.0g)
*svy: tabulate Pregnancyloss if year==1996, count col percent format (%6.0g)
svy: tabulate Pregnancyloss if year==2001, count col percent format (%6.0g)
svy: tabulate Pregnancyloss if year==2007, count col percent format (%6.0g)
svy: tabulate Pregnancyloss if year==2013, count col percent format (%6.0g)
svy: tabulate Pregnancyloss if year==2018, count col percent format (%6.0g)

*EXPERIENCED UNPLANNED BIRTH
svy: tabulate unplannedbirth if year==1992, count col percent format (%6.0g)
svy: tabulate unplannedbirth if year==1996, count col percent format (%6.0g)
svy: tabulate unplannedbirth if year==2001, count col percent format (%6.0g)
svy: tabulate unplannedbirth if year==2007, count col percent format (%6.0g)
svy: tabulate unplannedbirth if year==2013, count col percent format (%6.0g)
svy: tabulate unplannedbirth if year==2018, count col percent format (%6.0g)

*EXPERIENCED EARLY CHILDBEARING
svy: tabulate teenbirth if year==1992, count col percent format (%6.0g)
svy: tabulate teenbirth if year==1996, count col percent format (%6.0g)
svy: tabulate teenbirth if year==2001, count col percent format (%6.0g)
svy: tabulate teenbirth if year==2007, count col percent format (%6.0g)
svy: tabulate teenbirth if year==2013, count col percent format (%6.0g)
svy: tabulate teenbirth if year==2018, count col percent format (%6.0g)

*DESIRE FOR MORE CHILDREN
svy: tabulate desiremore_children if year==1992, count col percent format (%6.0g)
svy: tabulate desiremore_children if year==1996, count col percent format (%6.0g)
svy: tabulate desiremore_children if year==2001, count col percent format (%6.0g)
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svy: tabulate desiremore_children if year==2007, count col percent format (%6.0g)
svy: tabulate desiremore_children if year==2013, count col percent format (%6.0g)
svy: tabulate desiremore_children if year==2018, count col percent format (%6.0g)

*EXPERIENCED CHILD MORTALITY
svy: tabulate child_mortality_experience1  if year==1992, count col percent format (%6.0g)
svy: tabulate child_mortality_experience1 if year==1996, count col percent format (%6.0g)
svy: tabulate child_mortality_experience1 if year==2001, count col percent format (%6.0g)
svy: tabulate child_mortality_experience1 if year==2007, count col percent format (%6.0g)
svy: tabulate child_mortality_experience1 if year==2013, count col percent format (%6.0g)
svy: tabulate child_mortality_experience1 if year==2018, count col percent format (%6.0g)

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* CHAPTER FIVE: DESCRIBING HOW CONTRACEPTIVE USE HAS CHANGED IN ZAMBIA
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*TREND ANALYSIS*******************************************
svy: tab year contraception_use if year<2001, count row percent format (%7.0g)
svy: tab year contraception_use if year==1996 | year==2001, count row percent format (%7.0g)
svy: tab year contraception_use if year==2001 | year==2007, count row percent format (%7.0g)
svy: tab year contraception_use if year==2007 | year==2013, count row percent format (%7.0g)
svy: tab year contraception_use if year==2013 | year==2018, count row percent format (%7.0g)
svy: tab year contraception_use if year==1992 | year==2018, count row percent format (%7.0g)

svy: tab year contraception_use if year<2001, ci row percent format (%7.0g)
svy: tab year contraception_use if year==1996 | year==2001, ci row percent format (%7.0g)
svy: tab year contraception_use if year==2001 | year==2007, ci row percent format (%7.0g)
svy: tab year contraception_use if year==2007 | year==2013, ci row percent format (%7.0g)
svy: tab year contraception_use if year==2013 | year==2018, ci row percent format (%7.0g)
svy: tab year contraception_use if year==1992 | year==2018, ci row percent format (%7.0g)

*TRENDS IN CONTRACEPTIVE METHOD USE

recode fptypnow (20=1 "Modern") (12=2 "Traditional") (11=3 "Folkloric") (0=0 "Not using"), gen(methoduse)

svy: tabulate year methoduse, count row percent format (%6.0g)

*AGE
svy: tabulate Age methoduse if year==1992, count row percent format (%6.0g)
svy: tabulate Age methoduse if year==1996, count row percent format (%6.0g)
svy: tabulate Age methoduse if year==2001, count row percent format (%6.0g)
svy: tabulate Age methoduse if year==2007, count row percent format (%6.0g)
svy: tabulate Age methoduse if year==2013, count row percent format (%6.0g)
svy: tabulate Age methoduse if year==2018, count row percent format (%6.0g)

*TABLE 5.1

log using Table5.2.log, replace

*TABLE 5.2

*AGE

svy: tabulate Age contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2007, count row percent format (%6.0g)
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svy: tabulate Age contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2018, count row percent format (%6.0g)

*RESIDENCE

svy: tabulate Residence contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==2018, count row percent format (%6.0g)

*PROVINCE

svy: tabulate geo_zm1992 contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate geo_zm1996 contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate geo_zm2001 contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate geo_zm2007 contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate geo_zm2013 contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate geo_zm2018 contraception_use if year==2018, count row percent format (%6.0g)

*EDUCATION LEVEL
svy: tabulate Education contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2018, count row percent format (%6.0g)

*MARITAL STATUS
svy: tabulate Marital_status contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2018, count row percent format (%6.0g)

*PARTNERS EDUCATION
svy: tabulate Partners_educaltion contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2018, count row percent format (%6.0g)

*RELIGION
svy: tabulate Religion contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2018, count row percent format (%6.0g)

*WEALTH

*svy: tabulate wealth_status contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==1996, count row percent format (%6.0g)
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svy: tabulate wealth_status contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2018, count row percent format (%6.0g)

*AGE AT FIRST SEX

svy: tabulate Age_first_sex contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2018, count row percent format (%6.0g)

*LIVING CHILDREN

svy: tabulate Livingchildren contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*CHILDREN EVER BORN

svy: tabulate CEB contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2018, count row percent format (%6.0g)

log close

log using TABLE5.2CONTINUED.log, replace

*TABLE 5.2 CONTINUED

*FAMILY SIZE CONCORDANCE

svy: tabulate Family_size_concordance contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2018, count row percent format (%6.0g)

*IDEAL NUMBER OF CHILDREN

*recode Ideal_Nchildren (1=2)

svy: tabulate Ideal_Nchildren contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2018, count row percent format (%6.0g)
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*RADIO

svy: tabulate Listening_radio contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2018, count row percent format (%6.0g)

*Television
svy: tabulate Watching_television contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2018, count row percent format (%6.0g)

*Newspaper
svy: tabulate Reading_newspaper contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2018, count row percent format (%6.0g)

*MEDIA FP MESSAGES

svy: tabulate FP_messages contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2018, count row percent format (%6.0g)

*TOLD ABOUT FP AT HEALTH FACILITY

*svy: tabulate At_HF_toldabout_FP contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2018, count row percent format (%6.0g)

*VISITED HEALTH FACILITY IN LAST 12 MONTHS
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2018, count row percent format (%6.0g)

*VISITED BY COMMUNITY HEALTH WORKER
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
```

```
svy: tabulate visited_communutyhealth_worker contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2018, count row percent format (%6.0g)

*DECISION MAKING AUTONOMY
*svy: tabulate  female_autonomy contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2018, count row percent format (%6.0g)

*FERTILITY PREFERENCE
svy: tabulate  desiremore_children contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2018 & Residence==1, count row percent format
(%6.0g)

*EXPERIENCE PREGNANCY LOSS

*svy: tabulate  Pregnancyloss contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
*svy: tabulate Pregnancyloss contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EXPERIENCE UPLANNED BIRTH
svy: tabulate  unplannedbirth contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EXPERIENCE CHILD MOTRALITY
svy: tabulate  child_mortality_experience1 contraception_use if year==1992 & Residence==1, count row percent
format (%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
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svy: tabulate child_mortality_experience1 contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

log close

*TABLE 2 - URBAN_1992_2018

log using TABLE2_URBAN_NEW.log, replace

*TABLE 2 - URBAN_1992_2018

*AGE
svy: tabulate Age contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

tab Education, nol
recode Education (0=0 "No education") (1=1 "Primary") (2/3=2 "Secondary/Tertiary"), gen(Education2)

svy: tabulate Education2 contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*MARITAL STATUS
svy: tabulate Marital_status contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EDUCATION LEVEL OF PARTNER
svy: tabulate Partners_educaltion contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

tab Partners_educaltion, nol

recode Partners_educaltion (0=0 "No education") (1=1 "Primary") (2/3=2 "Secondary/Tertiary"),
gen(Partners_educaltion2)

*EDUCATION LEVEL OF PARTNER
svy: tabulate Partners_educaltion2 contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
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svy: tabulate Partners_educaltion2 contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*RELIGION
svy: tabulate Religion contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*WEALTH
*svy: tabulate wealth_status contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*OCCUPATION
svy: tabulate Occupation contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*AGE AT FIRST SEX
svy: tabulate Age_first_sex contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*LIVING CHILDREN
svy: tabulate Livingchildren contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*CHILDREN EVER BORN
svy: tabulate CEB contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*FAMILY SIZE CONCORDANCE
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svy: tabulate Family_size_concordance contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*IDEAL NUMBER OF CHILDREN

svy: tabulate Ideal_Nchildren contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*RADIO

svy: tabulate Listening_radio contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*TELEVISION
svy: tabulate Watching_television contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*NEWSPAPER
svy: tabulate Reading_newspaper contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EXPOSURE TO FP MESSAGES
svy: tabulate FP_messages contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
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svy: tabulate FP_messages contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*TOLD FP MESSAGES AT HEALTH FACILITY
*svy: tabulate At_HF_toldabout_FP contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2018 & Residence==1, count row percent format
(%6.0g)

*VISITED HEALTH FACILITY IN LAST 12 MONTHS
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2018 & Residence==1, count row percent format
(%6.0g)

*VISITED BY COMMUNITY HEALTH WORKER
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==1996 & Residence==1, count row percent
format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2001 & Residence==1, count row percent
format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2007 & Residence==1, count row percent
format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2013 & Residence==1, count row percent
format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2018 & Residence==1, count row percent
format (%6.0g)

*DECISION MAKING AUTONOMY
*svy: tabulate  female_autonomy contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==1996, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2001, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2007, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2013, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2018, count row percent format (%6.0g)

*FERTILITY PREFERENCE
svy: tabulate  desiremore_children contraception_use if year==1992 & Residence==1, count row percent format
(%6.0g)
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svy: tabulate desiremore_children contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
svy: tabulate desiremore_children contraception_use if year==2018 & Residence==1, count row percent format
(%6.0g)

*EXPERIENCE PREGNANCY LOSS

*svy: tabulate  Pregnancyloss contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
*svy: tabulate Pregnancyloss contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EXPERIENCE UPLANNED BIRTH
svy: tabulate  unplannedbirth contraception_use if year==1992 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==1996 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2001 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2007 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2013 & Residence==1, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2018 & Residence==1, count row percent format (%6.0g)

*EXPERIENCE CHILD MOTRALITY
svy: tabulate  child_mortality_experience1 contraception_use if year==1992 & Residence==1, count row percent
format (%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==1996 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2001 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2007 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2013 & Residence==1, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2018 & Residence==1, count row percent format
(%6.0g)

log close

***RURAL
log using Table2_RURAL_NEW.log, replace
***RURAL

**AGE
svy: tabulate Age contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*PROVINCE
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svy: tabulate geo_zm1992 contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate geo_zm1996 contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate geo_zm2001 contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate geo_zm2007 contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate geo_zm2013 contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate geo_zm2018 contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*EDUCATION LEVEL
svy: tabulate Education contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

tab Education, nol
recode Education (0=0 "No education") (1=1 "Primary") (2/3=2 "Secondary/Tertiary"), gen(Education2)

svy: tabulate Education2 contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Education2 contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*MARITAL STATUS
svy: tabulate Marital_status contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*EDUCATION LEVEL OF PARTNER
svy: tabulate Partners_educaltion contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Partners_educaltion contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

svy: tabulate Partners_educaltion2 contraception_use if year==1992 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==1996 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2001 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2007 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2013 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Partners_educaltion2 contraception_use if year==2018 & Residence==2, count row percent format
(%6.0g)

*RELIGION
svy: tabulate Religion contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
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svy: tabulate Religion contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*WEALTH
*svy: tabulate wealth_status contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate wealth_status contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*OCCUPATION
svy: tabulate Occupation contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*AGE AT FIRST SEX
svy: tabulate Age_first_sex contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*LIVING CHILDREN
svy: tabulate Livingchildren contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Livingchildren contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*CHILDREN EVER BORN
svy: tabulate CEB contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*FAMILY SIZE CONCORDANCE
svy: tabulate Family_size_concordance contraception_use if year==1992 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==1996 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2001 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2007 & Residence==2, count row percent format
(%6.0g)
svy: tabulate Family_size_concordance contraception_use if year==2013 & Residence==2, count row percent format
(%6.0g)
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svy: tabulate Family_size_concordance contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*IDEAL NUMBER OF CHILDREN

svy: tabulate Ideal_Nchildren contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*RADIO

svy: tabulate Listening_radio contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*TELEVSION
svy: tabulate Watching_television contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*NEWSPAPER
svy: tabulate Reading_newspaper contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Reading_newspaper contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*EXPOSURE TO FP MESSAGES
svy: tabulate FP_messages contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*TOLD FP MESSAGES AT HEALTH FACILITY
*svy: tabulate At_HF_toldabout_FP contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
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svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*VISITED HEALTH FACILITY IN LAST 12 MONTHS
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*VISITED BY COMMUNITY HEALTH WORKER
*svy: tabulate  visited_HF12months contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*DECISION MAKING AUTONOMY
*svy: tabulate  female_autonomy contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*FERTILITY PREFERENCE
svy: tabulate  desiremore_children contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate desiremore_children contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate desiremore_children contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate desiremore_children contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate desiremore_children contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
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svy: tabulate desiremore_children contraception_use if year==2018 & Residence==2, count row percent format
(%6.0g)

*EXPERIENCE PREGNANCY LOSS

*svy: tabulate  Pregnancyloss contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
*svy: tabulate Pregnancyloss contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*EXPERIENCE UPLANNED BIRTH
svy: tabulate  unplannedbirth contraception_use if year==1992 & Residence==2, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==1996 & Residence==2, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2001 & Residence==2, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2007 & Residence==2, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2013 & Residence==2, count row percent format (%6.0g)
svy: tabulate unplannedbirth contraception_use if year==2018 & Residence==2, count row percent format (%6.0g)

*EXPERIENCE CHILD MOTRALITY
svy: tabulate child_mortality_experience1 contraception_use if year==1992 & Residence==2, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==1996 & Residence==2, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2001 & Residence==2, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2007 & Residence==2, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2013 & Residence==2, count row percent format
(%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2018 & Residence==2, count row percent format
(%6.0g)

log close

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*CONTRACEPTIVE METHOD USE TREND
******TABLE 5.2*****************************************************************
*****************1992*********
log using TABLE5.2.log, replace

*AGE
svy: tabulate Age method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Age method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Age method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Age method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Age method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Age method_type if year==2018, count row percent format (%6.0g)

*RESIDENCE
svy: tabulate Residence method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Residence method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Residence method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Residence method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Residence method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Residence method_type if year==2018, count row percent format (%6.0g)
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*PROVINCE
svy: tabulate  geo_zm1992 method_type  if year==1992, count row percent format (%6.0g)
svy: tabulate  geo_zm1996 method_type  if year==1996, count row percent format (%6.0g)
svy: tabulate  geo_zm2001 method_type  if year==2001, count row percent format (%6.0g)
svy: tabulate  geo_zm2007 method_type  if year==2007, count row percent format (%6.0g)
svy: tabulate  geo_zm2013 method_type  if year==2013, count row percent format (%6.0g)
svy: tabulate  geo_zm2018 method_type  if year==2018, count row percent format (%6.0g)

*EDUCATION
svy: tabulate Education method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Education method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Education method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Education method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Education method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Education method_type if year==2018, count row percent format (%6.0g)

*MARITAL STATUS
svy: tabulate Marital_status method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Marital_status method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Marital_status method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Marital_status method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Marital_status method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Marital_status method_type if year==2018, count row percent format (%6.0g)

*EDUCATION
svy: tabulate Partners_educaltion method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Partners_educaltion method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Partners_educaltion method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Partners_educaltion method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Partners_educaltion method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Partners_educaltion method_type if year==2018, count row percent format (%6.0g)

*RELIGION
svy: tabulate Religion method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Religion method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Religion method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Religion method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Religion method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Religion method_type if year==2018, count row percent format (%6.0g)

*WEALTH
*svy: tabulate wealth_status method_type if year==1992, count col percent format (%6.0g)
svy: tabulate wealth_status method_type if year==1996, count col percent format (%6.0g)
svy: tabulate wealth_status method_type if year==2001, count col percent format (%6.0g)
svy: tabulate wealth_status method_type if year==2007, count col percent format (%6.0g)
svy: tabulate wealth_status method_type if year==2013, count col percent format (%6.0g)
svy: tabulate wealth_status method_type if year==2018, count col percent format (%6.0g)

*OCCUPATION
svy: tabulate Occupation method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Occupation method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Occupation method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Occupation method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Occupation method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Occupation method_type if year==2018, count row percent format (%6.0g)
```

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*AGE FIRST SEX
svy: tabulate Age_first_sex method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Age_first_sex method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Age_first_sex method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Age_first_sex method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Age_first_sex method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Age_first_sex method_type if year==2018, count row percent format (%6.0g)

*AGE AT FIRST MARRIAGE
svy: tabulate Agefirstmarriage method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Agefirstmarriage method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Agefirstmarriage method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Agefirstmarriage method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Agefirstmarriage method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Agefirstmarriage method_type if year==2018, count row percent format (%6.0g)

*LIVING CHILDREN
svy: tabulate Livingchildren method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Livingchildren method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Livingchildren method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Livingchildren method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Livingchildren method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Livingchildren method_type if year==2018, count row percent format (%6.0g)

*CHILDREN EVER BORN
svy: tabulate CEB method_type if year==1992, count col percent format (%6.0g)
svy: tabulate CEB method_type if year==1996, count col percent format (%6.0g)
svy: tabulate CEB method_type if year==2001, count col percent format (%6.0g)
svy: tabulate CEB method_type if year==2007, count col percent format (%6.0g)
svy: tabulate CEB method_type if year==2013, count col percent format (%6.0g)
svy: tabulate CEB method_type if year==2018, count col percent format (%6.0g)

*FAMILY SIZE CONCORDANCE
svy: tabulate Family_size_concordance method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Family_size_concordance method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Family_size_concordance method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Family_size_concordance method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Family_size_concordance method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Family_size_concordance method_type if year==2018, count row percent format (%6.0g)

*IDEAL FAMILY SIZE
svy: tabulate Ideal_Nchildren1 method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 method_type if year==2018, count row percent format (%6.0g)

*RADIO

svy: tabulate  Listening_radio method_type if year==1992, count row percent format (%6.0g)
svy: tabulate  Listening_radio method_type if year==1996, count row percent format (%6.0g)
svy: tabulate  Listening_radio method_type if year==2001, count row percent format (%6.0g)
svy: tabulate  Listening_radio method_type if year==2007, count row percent format (%6.0g)
svy: tabulate  Listening_radio method_type if year==2013, count row percent format (%6.0g)
svy: tabulate  Listening_radio method_type if year==2018, count row percent format (%6.0g)
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*TELEVSION
svy: tabulate  Watching_television method_type if year==1992, count row percent format (%6.0g)
svy: tabulate  Watching_television method_type if year==1996, count row percent format (%6.0g)
svy: tabulate  Watching_television method_type if year==2001, count row percent format (%6.0g)
svy: tabulate  Watching_television method_type if year==2007, count row percent format (%6.0g)
svy: tabulate  Watching_television method_type if year==2013, count row percent format (%6.0g)
svy: tabulate  Watching_television method_type if year==2018, count row percent format (%6.0g)

*NEWSPAPER

svy: tabulate  Reading_newspaper method_type if year==1992, count row percent format (%6.0g)
svy: tabulate  Reading_newspaper method_type if year==1996, count row percent format (%6.0g)
svy: tabulate  Reading_newspaper method_type if year==2001, count row percent format (%6.0g)
svy: tabulate  Reading_newspaper method_type if year==2007, count row percent format (%6.0g)
svy: tabulate  Reading_newspaper method_type if year==2013, count row percent format (%6.0g)
svy: tabulate  Reading_newspaper method_type if year==2018, count row percent format (%6.0g)

*EXPOSURE TO FP MESSAGES
svy: tabulate FP_messages method_type if year==1992, count row percent format (%6.0g)
svy: tabulate FP_messages method_type if year==1996, count row percent format (%6.0g)
svy: tabulate FP_messages method_type if year==2001, count row percent format (%6.0g)
svy: tabulate FP_messages method_type if year==2007, count row percent format (%6.0g)
svy: tabulate FP_messages method_type if year==2013, count row percent format (%6.0g)
svy: tabulate FP_messages method_type if year==2018, count row percent format (%6.0g)

*TOLD ABOUT FP AT HEALTH FACILITY
*svy: tabulate toldatbout_FP_healthfacility method_type if year==1992, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility method_type if year==1996, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility method_type if year==2001, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility method_type if year==2007, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility method_type if year==2013, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility method_type if year==2018, count row percent format (%6.0g)

*VISITED HEALTH FACILITY IN THE PAST
*svy: tabulate visited_HF12months method_type if year==1992, count row percent format (%6.0g)
svy: tabulate visited_HF12months method_type if year==1996, count row percent format (%6.0g)
svy: tabulate visited_HF12months method_type if year==2001, count row percent format (%6.0g)
svy: tabulate visited_HF12months method_type if year==2007, count row percent format (%6.0g)
svy: tabulate visited_HF12months method_type if year==2013, count row percent format (%6.0g)
svy: tabulate visited_HF12months method_type if year==2018, count row percent format (%6.0g)

*VISITED BY COMMUNITY HEALTH WORKER
*svy: tabulate visited_communutyhealth_worker method_type if year==1992, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker method_type if year==1996, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker method_type if year==2001, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker method_type if year==2007, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker method_type if year==2013, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker method_type if year==2018, count row percent format (%6.0g)

*DECISION MAKING AUTONOMY
*svy: tabulate female_autonomy method_type if year==1992, count row percent format (%6.0g)
svy: tabulate female_autonomy method_type if year==1996, count row percent format (%6.0g)
svy: tabulate female_autonomy method_type if year==2001, count row percent format (%6.0g)
svy: tabulate female_autonomy method_type if year==2007, count row percent format (%6.0g)
svy: tabulate female_autonomy method_type if year==2013, count row percent format (%6.0g)
svy: tabulate female_autonomy method_type if year==2018, count row percent format (%6.0g)
```

```
*FERTILITY PREFERENCE
svy: tabulate desiremore_children method_type if year==1992, count row percent format (%6.0g)
svy: tabulate desiremore_children method_type if year==1996, count row percent format (%6.0g)
svy: tabulate desiremore_children method_type if year==2001, count row percent format (%6.0g)
svy: tabulate desiremore_children method_type if year==2007, count row percent format (%6.0g)
svy: tabulate desiremore_children method_type if year==2013, count row percent format (%6.0g)
svy: tabulate desiremore_children method_type if year==2018, count row percent format (%6.0g)

*EXPERIENCED PREGNANCY LOSS
*svy: tabulate Pregnancyloss method_type if year==1992, count row percent format (%6.0g)
*svy: tabulate Pregnancyloss method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Pregnancyloss method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Pregnancyloss method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Pregnancyloss method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Pregnancyloss method_type if year==2018, count row percent format (%6.0g)

*EXPERIENCED UNPLANNED BIRTH
svy: tabulate Unwanted_child  method_type if year==1992, count row percent format (%6.0g)
svy: tabulate Unwanted_child  method_type if year==1996, count row percent format (%6.0g)
svy: tabulate Unwanted_child  method_type if year==2001, count row percent format (%6.0g)
svy: tabulate Unwanted_child  method_type if year==2007, count row percent format (%6.0g)
svy: tabulate Unwanted_child  method_type if year==2013, count row percent format (%6.0g)
svy: tabulate Unwanted_child  method_type if year==2018, count row percent format (%6.0g)

log close

*******************************************************************************
*******************************************************************************
* CHAPTER SIX: EXPLAINING THE PREDICTORS OF CONTRACEPTIVE USE TRANSITION IN ZAMBIA, 1992-2018
*******************************************************************************
***CREATING COMMUNITY LEVEL VARIABLES****************************

*COMMUNITY WEALTH

ta wealth_status, nol
recode wealth_status (1=0 "Poverty") (2/3=1 "No poverty")(else=.), gen(Poverty)
bysort psu: egen povertyclus=mean(Poverty)
tab povertyclus [iw=perweight]

sum povertyclus, detail

recode povertyclus (0/.6022727 =0 "Low wealth") (.6022726/.7564102=1 "Medium wealth") (.7564101/1=2 "high wealth"), gen(community_wealth)
ta community_wealth

*COMMUNITY EDUCATION
ta Education, nol
recode Education (0/1=0 "Low education") (2/3=1 "High education") (else=.), gen(education)
bysort psu: egen educationclus=mean(education)
tab educationclus [iw=perweight]

sum educationclus, detail

recode educationclus (0/.3372093=0 "Low") (.3372092/.4320988  =1 "Medium") (.4320987/1=2 "High"), gen(community_education)
ta community_education
```

```
*COMMUNITY EMPLOYMENT STATUS
tab Occupation, nol
recode Occupation (0=0 "No employment") (1=1 "Have employment") (else=.), gen(community_employment)
bysort psu: egen employment_acessclus=mean(community_employment)
tab employment_acessclus [iw=perweight]

sum employment_acessclus, detail

recode employment_acessclus (0/.5333334 =0 "Low") (.5333333/.6116505 =1 "Medium") (.6116504/1=2 "High"),
gen(community_employment_status)
ta community_employment_status

*COMMUNITY AGE AT FIRST MARRIAGE

ta agefrstmar
recode agefrstmar (0/20=1 "Child marriage") (21/48=0 "Adult marriage")(else=.), gen(marriage)
bysort psu: egen marriageclus=mean(marriage)
tab marriageclus[iw=perweight]
sum marriageclus, detail

recode marriageclus (0/.8205128=0 "Low") (.8205127/.8709677=1 "Medium") (.8709676/1=2 "High"),
gen(community_marriage)
ta community_marriage

*COMMUNITY ACCESS TO VISITS BY COMMUNITY HEALTH WORKERS
tab visited_communutyhealth_worker, nol
recode visited_communutyhealth_worker (0=0 "No access") (1=1 "Have access") (else=.), gen(CHW_access)
bysort psu: egen CHW_acessclus=mean(CHW_access)
tab CHW_acessclus [iw=perweight]

sum CHW_acessclus, detail

recode CHW_acessclus (0/.0921053=0 "Low") (.0921052/.1363636=1 "Medium") (.1363635/1=2 "High"),
gen(community_CHW_access)
ta community_CHW_access

*COMMUNITY ACCESS TO FP MESSAGES
tab FP_messages, nol
recode FP_messages (0=0 "No access") (1=1 "Have access") (else=.), gen(FP_access)
bysort psu: egen FP_acessclus=mean(FP_access)
tab FP_acessclus [iw=perweight]

sum FP_acessclus, detail

recode FP_acessclus (0/.1666667 =0 "Low") (.1666666/.2553191 =1 "Medium") (.2553190/1=2 "High"),
gen(community_FP_access)
ta community_FP_access

*COMMUNITY desire for large number of children
tab idealkid, nol
recode idealkid (0/4=0 "low children") (5/61=1 "high children") (else=.), gen(community_numberchildren)
bysort psu: egen  desired_childrenclus=mean(community_numberchildren)
tab desired_childrenclus [iw=perweight]

sum desired_childrenclus, detail
```

```
recode desired_childrenclus (0/.5604396 =0 "Low") (.5604396/.6388889=1 "medium") (.6388888/1=2 "High"),
gen(community_desiredchildren)
ta community_desiredchildren

*COMMUNITY large CEB
tab cheb
recode cheb (0/4=0 "low children") (5/16=1 "high children") (else=.), gen(community_ceb)
bysort psu: egen  cebclus=mean(community_ceb)
tab cebclus [iw=perweight]

sum cebclus, detail

recode cebclus (0/.3137255 =0 "Low") (.3137254/.3636364 =1 "medium") (.3636363/1=2 "High"),
gen(community_parity)
ta community_parity

*COMMUNITY UNPLANNED BIRTH

tab Unwanted_child , nol
recode Unwanted_child  (0=0 "no") (1=1 "yes") (else=.), gen(unplannedbirth)
bysort psu: egen birth_acessclus=mean(unplannedbirth)
tab birth_acessclus [iw=perweight]

sum birth_acessclus, detail

recode birth_acessclus (0/.4262295 =0 "Low") (.4262294/.4814815  =1 "Medium") (.4814814/1=2 "High"),
gen(community_unplannedbirth)
ta community_unplannedbirth

* COMMUNITY AGE AT FIRST BIRTH

ta ageat1stbirth
recode ageat1stbirth (0/17=1 "Child birth") (18/42=0 "Adult birth")(else=.), gen(birth)
bysort psu: egen birthclus=mean(birth)
tab birthclus[iw=perweight]
sum birthclus, detail

recode birthclus (0/.433735 =0 "Low") (.433734/.4761905=1 "Medium") (.4761904/1=2 "High"),
gen(community_birth)
ta community_birth

* COMMUNITY EXPOSURE TO RADIO/TELEVSION
tab Radio_TV_exposure, nol
recode Radio_TV_exposure  (0=0 "No access") (1=1 "Have access") (else=.), gen(Radio_access)
bysort psu: egen Radio_acessclus=mean(Radio_access)
tab Radio_acessclus [iw=perweight]

sum Radio_acessclus, detail

recode Radio_acessclus (0/.6209677 =0 "Low") (.6209676/ .7227723=1 "Medium") (.7227722/1=2 "High"),
gen(community_Radio_exposure)
ta community_Radio_exposure

*DECISION MAKING AUTONOMY/WOMAN EMPOWERMENT

tab female_autonomy, nol
recode female_autonomy  (0=0 "low ") (1=1 "High") (else=.), gen(woman_autonomy)
```

```
bysort psu: egen woman_autoclus=mean(woman_autonomy)
tab woman_autoclus [iw=perweight]

sum woman_autoclus, detail

recode woman_autoclus (0/.6760563 =0 "Low") (.6760562/.7469879 =1 "Medium") (.7469878/1=2 "High"),
gen(community_woman_autonomy)
ta community_woman_autonomy

*******************************************************************************
svy: tabulate community_education contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_wealth contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_employment_status contraception_use  if year==1992, count row percent format (%6.0g)
svy: tabulate community_distance1 contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_woman_autonomy contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_CHW_access contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_desiredchildren contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_parity contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_FP_access contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_Radio_exposure contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_unplannedbirth contraception_use if year==1992, count row percent format (%6.0g)
svy: tabulate community_birth contraception_use if year==1992, count col percent format (%6.0g)
svy: tabulate community_age_sex contraception_use if year==1992, count row percent format (%6.0g)

*******************************************************************************
* TABLE 2.2 MULTILEVEL ANALYSIS OF CURRENT CONTRACEPTIVE USE
*MULTILEVEL ANALYSIS OF ODDS AND VARIANCE/STANDARD ERRORS

*******************************************************************************
svy: tabulate Partners_educaltion contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2018, count row percent format (%6.0g)

*UNIVARIATE LOGISTIC REGRESSION OF INDIVIDUAL AND COMMUNITY VARIABLES IN 2018

*COLUMN 1 -

log using univariatelogistics.log, replace

svy: tabulate Age contraception_use if year==2018, count row percent format (%7.0g)
svy: tabulate Education contraception_use if year==2018, count row percent format (%7.0g)
svy: tabulate wealth_status contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Occupation contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Age_first_sex contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Marital_status contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Religion contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate CEB contraception_use if year==2018, count col percent format (%6.0g)
svy: tabulate desiremore_children contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Ideal_Nchildren1 contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate distance_facility1 contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate toldatbout_FP_healthfacility contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate visited_communutyhealth_worker contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate visited_HF12months contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate female_autonomy contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Pregnancyloss contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Unwanted_child contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Listening_radio contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Watching_television contraception_use if year==2018, count row percent format (%6.0g)
```

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svy: tabulate Reading_newspaper contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Phone_onwership contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate FP_messages contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate child_mortality_experience1 contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate Residence contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate  geo_zm2018 contraception_use  if year==2018, count row percent format (%6.0g)
svy: tabulate community_education contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_wealth contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_employment_status contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_woman_autonomy contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_CHW_access contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_desiredchildren contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_birth contraception_use if year==2018, count row percent format (%6.0g)
svy: tabulate community_FP_access contraception_use if year==2018, count row percent format (%6.0g)
log close

*UNIVARIATE LOGISTIC REGRESSION

log using univariatelogistics1.log, replace

svy: logistic contraception_use i.Age  if year==2018
svy: logistic contraception_use i.Education  if year==2018
svy: logistic contraception_use i.wealth_status  if year==2018
svy: logistic contraception_use i.Occupation  if year==2018
svy: logistic contraception_use i.Age_first_sex  if year==2018
svy: logistic contraception_use i.Religion  if year==2018

svy: logistic contraception_use i.Marital_status  if year==2018
svy: logistic contraception_use i.CEB  if year==2018
svy: logistic contraception_use i.desiremore_children  if year==2018
svy: logistic contraception_use i.Ideal_Nchildren1  if year==2018
svy: logistic contraception_use i.distance_facility1  if year==2018

svy: logistic contraception_use i.toldatbout_FP_healthfacility  if year==2018
svy: logistic contraception_use i.visited_communutyhealth_worker  if year==2018
svy: logistic contraception_use i.visited_HF12months if year==2018
svy: logistic contraception_use i.woman_autonomy  if year==2018
svy: logistic contraception_use i.Pregnancyloss  if year==2018
svy: logistic contraception_use i.Unwanted_child  if year==2018

svy: logistic contraception_use i.Listening_radio  if year==2018
svy: logistic contraception_use i.Watching_television  if year==2018
svy: logistic contraception_use i.Reading_newspaper  if year==2018
svy: logistic contraception_use i.Phone_onwership  if year==2018
svy: logistic contraception_use i.FP_messages  if year==2018
svy: logistic contraception_use i.child_mortality_experience1  if year==2018

svy: logistic contraception_use i.Residence  if year==2018
svy: logistic contraception_use ib5. geo_zm2018  if year==2018
svy: logistic contraception_use i.community_education  if year==2018
svy: logistic contraception_use i.community_wealth   if year==2018
svy: logistic contraception_use i.community_employment_status  if year==2018
svy: logistic contraception_use i.community_woman_autonomy  if year==2018
svy: logistic contraception_use i.community_CHW_access  if year==2018
svy: logistic contraception_use i.community_desiredchildren  if year==2018
svy: logistic contraception_use i.community_birth  if year==2018
svy: logistic contraception_use i.community_FP_access  if year==2018
```

```
*****************************************************************************************
***********MULTIVARIATE ANALYSIS
*****************************************************************************************
*NATIONAL

use idhs_000181.dta, clear

log using MODEL_1_2018.log, replace

* MODEL 0 - OUTCOME VARIABLE ONLY

melogit contraception_use if year==2018 [pweight=perweight] || psu:, or
estat icc
estat ic

nlcom exp(sqrt(2*.1882867)*invnormal(0.75)), cformat(%9.2f)
*****************************************************************************
log using MODEL_1.log, replace

*MODEL 1- INDIVIDUAL LEVEL VARIABLES
melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex i.Marital_status i.Religion
i.CEB  i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy
i.Pregnancyloss i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
i.child_mortality_experience1 if year==2018 [pweight=perweight] || psu:, or
estat icc
estat ic

nlcom exp(sqrt(2*.1775239)*invnormal(0.75)), cformat(%9.2f)

log close

*****************************************************************************
log using MODEL_2.log, replace

*MODEL 2 - COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Residence ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status i.community_woman_autonomy  i.community_CHW_access
i.community_desiredchildren i.community_birth i.community_FP_access if year==2018 [pweight=perweight]  || psu:,
or

estat icc
estat ic

nlcom exp(sqrt(2*.1235745 )*invnormal(0.75)), cformat(%9.2f)

log close

*****************************************************************************
log using MODEL_3.log, replace

*MODEL 3 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status i. Religion
i.CEB  i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy
i.Pregnancyloss i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
```

```
i.child_mortality_experience1 i.Residence ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status i.community_woman_autonomy   i.community_CHW_access
i.community_desiredchildren i.community_birth i.community_FP_access if year==2018 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.1228048 )*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
*******************************************************************************
*URBAN

log using MODEL_0urban.log, replace

* MODEL 0 - OUTCOME VARIABLE ONLY

melogit contraception_use if year==2018 & Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2* .1022598 )*invnormal(0.75)), cformat(%9.2f)

log close

*******************************************************************************
log using MODEL_1urban.log, replace

*MODEL 1- INDIVIDUAL LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status i.CEB
i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy i.Pregnancyloss
i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
i.child_mortality_experience1 if year==2018 & Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.0781985 )*invnormal(0.75)), cformat(%9.2f)

log close

*******************************************************************************
*******************************************************************************
log using MODEL_2urban.log, replace

*MODEL 2 - COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Residence ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status  i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access if year==2018 & Residence==1 [pweight=perweight]  || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.0794336)*invnormal(0.75)), cformat(%9.2f)
```

```
log close

*****************************************************************************
log using MODEL_3urban.log, replace

*MODEL 3 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status i.CEB
i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy i.Pregnancyloss
i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
i.child_mortality_experience1 ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status  i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access if year==2018 & Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.060962)*invnormal(0.75)), cformat(%9.2f)

log close
*****************************************************************************
**RURAL
*****************************************************************************
log using MODEL_0rural.log, replace

* MODEL 0 - OUTCOME VARIABLE ONLY

melogit contraception_use if year==2018 & Residence==2 [pweight=perweight] || psu:, or

melogit contraception_use if year==2018 & Residence==2 [pweight=perweight] || psu:, mro

estat icc
estat ic

nlcom exp(sqrt(2*.2761168)*invnormal(0.75)), cformat(%9.2f)

log close

*****************************************************************************
log using MODEL1_rural.log, replace

*MODEL 1- INDIVIDUAL LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status i.CEB
i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy i.Pregnancyloss
i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
i.child_mortality_experience1 if year==2018 & Residence==2 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.2698374)*invnormal(0.75)), cformat(%9.2f)

log close

*****************************************************************************
*****************************************************************************
```

```
log using MODEL_2rural.log, replace

*MODEL 2 - COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Residence ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status i.community_woman_autonomy  i.community_CHW_access
i.community_desiredchildren i.community_birth i.community_FP_access if year==2018 & Residence==2
[pweight=perweight]  || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.2172354)*invnormal(0.75)), cformat(%9.2f)

log close

*******************************************************************************
log using MODEL_3rural.log, replace

*MODEL 3 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES
melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status i.CEB
i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.woman_autonomy i.Pregnancyloss
i.Listening_radio i.Watching_television i.Reading_newspaper  i.Phone_onwership  i.FP_messages
i.child_mortality_experience1 ib5.geo_zm2018 i.community_education i.community_wealth
i.community_employment_status i.community_woman_autonomy i.community_CHW_access
i.community_desiredchildren i.community_birth i.community_FP_access if year==2018 & Residence==2
[pweight=perweight] || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.2001121 )*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
*POOLED MULTILEVEL ANALYSIS

log using MODEL_1.log, replace

*MULTILEVEL ANALYSIS OF ODDS AND VARIANCE/STANDARD ERRORS

* MODEL 1 - OUTCOME VARIABLE ONLY

melogit contraception_use [pweight=perweight] || psu:, or

melogit contraception_use if Residence==1 [pweight=perweight] || psu:, or
melogit contraception_use if Residence==2 [pweight=perweight] || psu:, or
estat icc
estat ic
*******************************************************************************
* Median odds-ratio (MOR)

nlcom exp(sqrt(2*.1636073)*invnormal(0.75)), cformat(%9.2f)

svyset v001, weight(wt2) strata(v022) , singleunit(centered) || _n, weight(wt1)

svy: melogit modern_method || v001:, or
estat icc
```

```
estadd scalar icc = r(icc2)

*melogit modern_method [pweight=sampwt] || v001:, or

estat ic
*estat icc
*estat ic

*****************************************************************************
*OVERALL
log using MODEL_0.log, replace

*MULTILEVEL ANALYSIS OF ODDS AND VARIANCE/STANDARD ERRORS

* MODEL 1 - OUTCOME VARIABLE ONLY

melogit contraception_use [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.1763194 )*invnormal(0.75)), cformat(%9.2f)
log close
*******************************************************************************************
log using MODEL_1.log, replace

*MODEL 2- INDIVIDUAL LEVEL VARIABLES
melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status    i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 [pweight=perweight] || psu:, or
estat icc
estat ic

nlcom exp(sqrt(2*.1303772)*invnormal(0.75)), cformat(%9.2f)
log close
*******************************************************************************************
log using MODEL_2.log, replace

*MODEL 3 - COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Residence i.community_education i.community_wealth  i.community_employment_status
i.community_marriage  i.community_birth   i.community_CHW_access i.community_desiredchildren
i.community_FP_access [pweight=perweight]  || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.1307874)*invnormal(0.75)), cformat(%9.2f)

log close
*****************************************************************************
log using MODEL_3.log, replace

*MODEL 4 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES
```

```
melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status   i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 i.Residence i.community_education i.community_wealth
i.community_employment_status i.community_marriage  i.community_birth   i.community_CHW_access
i.community_desiredchildren     i.community_FP_access  [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.1169772)*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
*URBAN

log using MODEL_1urban.log, replace

* MODEL 1 - OUTCOME VARIABLE ONLY

melogit contraception_use if Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2* .1907117 )*invnormal(0.75)), cformat(%9.2f)
log close
*******************************************************************************
log using MODEL_2urban.log, replace

*MODEL 2- INDIVIDUAL LEVEL VARIABLES
melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status    i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 if Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic

nlcom exp(sqrt(2*.1501654 )*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
*******************************************************************************
log using MODEL_3urban.log, replace

*MODEL 3 - COMMUNITY LEVEL VARIABLES

melogit contraception_use i.community_education i.community_wealth  i.community_employment_status
i.community_marriage  i.community_birth   i.community_CHW_access i.community_desiredchildren
i.community_FP_access if Residence==1 [pweight=perweight]  || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.1591635)*invnormal(0.75)), cformat(%9.2f)
log close
*******************************************************************************
```

```
log using MODEL_4urban.log, replace

*MODEL 4 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status    i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 i.community_education i.community_wealth  i.community_employment_status
i.community_marriage  i.community_birth   i.community_CHW_access i.community_desiredchildren
i.community_FP_access if Residence==1 [pweight=perweight] || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.1334553 )*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
**RURAL
log using MODEL_0rural.log, replace

* MODEL 1 - OUTCOME VARIABLE ONLY

melogit contraception_use if Residence==2 [pweight=perweight] || psu:, or

estat icc
estat ic
nlcom exp(sqrt(2*.2776426)*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
log using MODEL_1rural.log, replace

*MODEL 2- INDIVIDUAL LEVEL VARIABLES
melogit contraception_use  i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status    i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 if Residence==2 [pweight=perweight] || psu:, or
estat icc
estat ic
nlcom exp(sqrt(2*.2029301 )*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
log using MODEL_2rural.log, replace

*MODEL 3 - COMMUNITY LEVEL VARIABLES

melogit contraception_use  i.community_education i.community_wealth  i.community_employment_status
i.community_marriage  i.community_birth   i.community_CHW_access i.community_desiredchildren
i.community_FP_access if Residence==2 [pweight=perweight]  || psu:, or
estat icc
estat ic
nlcom exp(sqrt(2*.2142546)*invnormal(0.75)), cformat(%9.2f)

log close
*******************************************************************************
log using MODEL_3rural.log, replace
```

```
*MODEL 4 - INDIVIDUAL AND COMMUNITY LEVEL VARIABLES

melogit contraception_use i.Age i.Education i.wealth_status i.Occupation  i.Age_first_sex   i.Marital_status    i.CEB
i.desiremore_children i.Ideal_Nchildren ib2.distance_facility1  i.visited_communutyhealth_worker i.Listening_radio
i.Watching_television i.Reading_newspaper i.FP_messages  i.woman_autonomy  i.Pregnancyloss i.unplannedbirth
i.child_mortality_experience1 i.community_education i.community_wealth  i.community_employment_status
i.community_marriage  i.community_birth   i.community_CHW_access i.community_desiredchildren
i.community_FP_access if Residence==2  [pweight=perweight] || psu:, or
estat icc
estat ic
nlcom exp(sqrt(2*.1666314 )*invnormal(0.75)), cformat(%9.2f)
log close
*******************************************************************************
*DECOMPOSITION OF CONTRACEPTIVE USE ZAMBIA -1992-2018
*******************************************************************************
use idhs_000181.dta, clear

keep if year==1992 | year==2018

recode year (1992=0 "1992") (2018=1 "2018"), gen(year1)

recode Partners_educaltion (0=0 "None") (1=1 "Primary") (2/3=2 "Secondary/Tertiary"), gen(Partners_educaltion1)

recode b11_01 (0/32=1 "Short interval") (33/max=0 "Long interval"), gen(short_birth_interval)
*******************************************************************************

use decomposition_overall, clear
gen province =.
replace province =1 if geo_zm1992==1 | geo_zm2018==1
replace province =2 if geo_zm1992==2 | geo_zm2018==2
replace province =3 if geo_zm1992==3 | geo_zm2018==3
replace province =4 if geo_zm1992==4 | geo_zm2018==4
replace province =5 if geo_zm1992==5 | geo_zm2018==5
replace province =6 if geo_zm1992==6 | geo_zm2018==6 | geo_zm2018==7
replace province =7 if geo_zm1992==7 | geo_zm2018==8
replace province =8 if geo_zm1992==8 | geo_zm2018==9
replace province =9 if geo_zm1992==9 | geo_zm2018==10

recode province (1=1 "Central") (2=2 "Copperbelt") (3=3 "Eastern") (4=4 "Luapula") (5=5 "Lusaka") (6=6 "Northern")
(7=7 "North=western") (8=8 "Southern") (9=9 "Western"), gen(Province)
tab Province
tab province year
*******************************************************************************
*UNIVARIATE LOGISTIC REGRESSION
*******************************************************************************
log using decomposition_univariate.log, replace

mvdcmp year1: logit contraception_use i.Age  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Residence  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Education  [pw=perweight], cluster(psu)

mvdcmp year1: logit contraception_use ib5.geo_zm1992_2018  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use ib5.Province  [pw=perweight], cluster(psu)

mvdcmp year1: logit contraception_use i.Partners_educaltion1  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Occupation  [pw=perweight], cluster(psu)
```

```
mvdcmp year1: logit contraception_use i.Religion  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Age_first_sex  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Agefirstmarriage  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Livingchildren  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.CEB  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Family_size_concordance  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Ideal_Nchildren1  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.desiremore_children  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Listening_radio  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Watching_television  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.Reading_newspaper  [pw=perweight], cluster(psu)

mvdcmp year1: logit contraception_use i.FP_messages  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.child_mortality_experience1  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_education  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_wealth  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_employment_status  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_woman_autonomy [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_CHW_access  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_desiredchildren  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_birth  [pw=perweight], cluster(psu)
mvdcmp year1: logit contraception_use i.community_FP_access  [pw=perweight], cluster(psu)

log close

* FINAL 1992 -2018
log using multipledecomposition.log, replace

mvdcmp year1: logit contraception_use i.Age ib2.Residence ib5.Province i.Education i.Partners_educaltion1
i.Occupation  i.Religion i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.Family_size_concordance
i.Ideal_Nchildren1 i.desiremore_children   i.Listening_radio i.Watching_television i.Reading_newspaper
i.FP_messages   i.child_mortality_experience1 i.community_education i.community_employment_status
i.community_woman_autonomy i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access [pw=perweight], cluster(psu)

log close

mvdcmp year1: logit contraception_use i.Age ib2.Residence ib5.Province i.Education i.Partners_educaltion1
i.Occupation  i.Religion i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.Family_size_concordance
i.Ideal_Nchildren1 i.desiremore_children  i.Listening_radio i.Watching_television i.Reading_newspaper
i.FP_messages   i.child_mortality_experience1 i.community_education i.community_employment_status
i.community_woman_autonomy i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access [pw=perweight], cluster(psu)

*****RURAL DECOMPOSITION*****************************************************************
*****************************************************************************************
* FINAL 1992 -2018
*****************************************************************************************
use DHS1992_2018_URBAN, clear
log using RURAL_decomposition.log, replace

mvdcmp year1: logit contraception_use i.Age ib5.Province  i.Education i.Partners_educaltion1  i.Occupation  i.Religion
i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.Family_size_concordance i.Ideal_Nchildren
i.desiremore_children   i.Listening_radio i.Watching_television i.Reading_newspaper  i.FP_messages
i.child_mortality_experience1   i.community_education i.community_employment_status
i.community_woman_autonomy i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access [pw=perweight], cluster(psu)
```

```
log close
*******************************************************************************
*****URBAN DECOMPOSITION*****************************************************************
use DHS1992_2018_RURAL, clear

log using URBAN_decomposition.log, replace

mvdcmp year1: logit contraception_use i.Age ib5.Province  i.Education i.Partners_educaltion1  i.Occupation  i.Religion
i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.Family_size_concordance i.Ideal_Nchildren
i.desiremore_children   i.Listening_radio i.Watching_television i.Reading_newspaper  i.FP_messages
i.child_mortality_experience1   i.community_education i.community_employment_status
i.community_woman_autonomy i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access [pw=perweight], cluster(psu)

log close

*******************************************************************************
*DECOMPOSITION OF CONTRACEPTIVE USE ZAMBIA -2007-2018
*******************************************************************************
use DHS2007_2018.dta, clear

log using decomposition2007_2018.log, replace

mvdcmp year1: logit contraception_use i.Age ib2.Residence ib5.Province i.Education i.Partners_educaltion1
i.wealth_status i.Occupation i.female_autonomy i.Religion i.Age_first_sex i.Agefirstmarriage  i.Livingchildren
i.Family_size_concordance i.Ideal_Nchildren1 i.desiremore_children   i.Listening_radio i.Watching_television
i.Reading_newspaper i.FP_messages i.visited_HF12months i.visited_by_CHW  i.Pregnancyloss
i.child_mortality_experience1 i.community_education i.community_wealth i.community_employment_status
i.community_woman_autonomy i.community_CHW_access i.community_desiredchildren i.community_birth
i.community_FP_access [pw=perweight], cluster(psu)

log close

*****************************************************************************************
*******************************************************************************************
*URBAN -15-49 years

use Urban, replace

log using TABLE_URBAN.log, replace

mvdcmp year1: logit contraception_use i.Age i.Education i.Partners_educaltion1 i.Occupation  i.Religion
i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.CEB  i.Family_size_concordance i.Ideal_Nchildren1
i.desiremore_children  i.Listening_radio i.Watching_television  i.FP_messages i.child_mortality_experience1
i.community_education i.community_birth i.community_CHW_access i.community_desiredchildren [pw=perweight] ,
cluster(psu)

log close

****URBAN*************************************
use Urban, replace

log using TABLE_URBAN_ADWY.log, replace

mvdcmp year1: logit contraception_use i.Age i.Education i.Partners_educaltion1 i.Occupation  i.Religion
i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.CEB  i.Family_size_concordance i.Ideal_Nchildren1
```

```
i.desiremore_children  i.Listening_radio i.Watching_television  i.FP_messages i.child_mortality_experience1
i.community_education i.community_birth i.community_desiredchildren [pw=perweight] , cluster(psu)

log close
*****************************************************************************************

*RURAL

use Rural, replace

log using TABLE9_RURAL.log, replace

mvdcmp year1: logit contraception_use i.Age i.Education i.Partners_educaltion1 i.Occupation  i.Religion
i.Age_first_sex i.Agefirstmarriage  i.Livingchildren i.CEB  i.Family_size_concordance i.Ideal_Nchildren2
i.desiremore_children  i.Listening_radio i.Watching_television  i.FP_messages   i.child_mortality_experience1
i.i.community_education i.community_birth   i.community_CHW_access i.community_desiredchildren
[pw=perweight], cluster(psu)

log close

*****************************************************************************************
* CHAPTER SEVEN: EFFECT OF CONTRACEPTIVE USE TRANSITION ON FERTILITY DYNAMICS AND
MATERNAL HEALTH OUTCOMES
*****************************************************************************************
* TABLE 3.1 DECOMPOSE CONTRACEPTION ON FERTILITY 1992-2018

use idhs_000181.dta, clear

*Model 1
mvdcmp year1, reverse: poisson cheb ib2.Residence i.Education i.Marital_status  i.Agefirstmarriagei.Age_first_sex
i.contraception_use ib1.short_birth_interval  i.Ideal_Nchildren [pw=perweight], cluster(psu)

mvdcmp year1, reverse: poisson cheb  i.Age_first_sex ib2.Residence  i.Education i.contraception_use
ib1.short_birth_interval  i.Ideal_Nchildren [pw=perweight], cluster(psu)

*Model 2

mvdcmp year1, reverse: poisson cheb i.Marital_status i.Agefirstmarriage i.contraception_use ib1.short_birth_interval
i.Ideal_Nchildren [pw=perweight], cluster(psu)

mvdcmp year1, reverse: poisson cheb i.Age_first_sex i.contraception_use ib1.short_birth_interval  i.Ideal_Nchildren
[pw=perweight], cluster(psu)

*****************************************************************************************
mvdcmp year1, reverse: poisson cheb ib2.Residence i.Education i.Partners_educaltion1   i.Agefirstmarriage
i.Occupation i.contraception_use ib1.short_birth_interval  i.Ideal_Nchildren2  i.FP_messages [pw=perweight],
cluster(psu)

save, replace

log using TABLE3_RURAL_1992_2018.log, replace

mvdcmp year1, reverse: poisson cheb i.Education i.Partners_educaltion1 i.Agefirstmarriage i.Occupation
i.contraception_use ib1.short_birth_interval  i.Ideal_Nchildren  i.FP_messages  [pw=perweight], cluster(psu)
log close
*****************************************************************************************
* TABLE 3.4 DECOMPOSE CONTRACEPTION ON BIRTH INTERVAL 1992- 2018
```

```
use idhs_00018.dta, clear

log using TABLE3_2007_2018.log, replace

mvdcmp year1: logit short_birth_interval i.Age i.Residence i.Education i.Partners_educaltion1 i.Occupation  i.CEB
i.contraception_use   i.Family_size_concordance i.Ideal_Nchildren1 i.desiremore_children i.Listening_radio
i.Watching_television i.FP_messages  [pw=perweight], cluster(psu)

log close
*****************************************************************************************
*****************************************************************************************
* TABLE 3.3 DECOMPOSE CONTRACEPTION ON UNWANTED BIRTH 1992- 2018
use dhs2001_2018.dta, clear

mvdcmp year1: logit Unwantedbirth i.Age ib2.Residence i.Education i.wealth_status i.Occupation i.Age_first_sex
i.contraception_use  i.ToldFP_HF i.visited_by_CHW  i.Listening_radio i.Watching_television  i.FP_messages
[pw=perweight], cluster(psu)
*****************************************************************************************
mvdcmp year1: logit Unwantedbirth i.Age ib2.Residence i.Education i.wealth_status i.Occupation i.Age_first_sex
i.contraception_use  i.ToldFP_HF i.visited_by_CHW  i.Listening_radio i.Watching_television  i.FP_messages
[pw=perweight], cluster(psu)

*****************************************************************************************
* TABLE 3.4 DECOMPOSE CONTRACEPTION ON PREGNANCY LOSS 1992- 2018
log using TABLE3_2001_2018.log, replace

use dhs2001_2018PL.dta, clear

mvdcmp year1: logit Pregnancyloss i.Residence i.Education i.wealth_status  i.contraception_use i.Listening_radio
i.Watching_television i.FP_messages  [pw=perweight], cluster(psu)

mvdcmp year1: logit Pregnancyloss  ib2.Residence i.Education i.wealth_status i.Occupation i.Age_first_sex
i.female_autonomy   i.contraception_use  i.Listening_radio i.Watching_television  i.FP_messages   [pw=perweight],
cluster(psu)
mvdcmp year1: logit Unwantedbirth i.Education i.wealth_status i.ToldFP_HF i.visited_by_CHW  i.contraception_use
i.Listening_radio i.Watching_television  i.FP_messages  [pw=perweight], cluster(psu)
mvdcmp year1: logit Unwantedbirth i.Education i.wealth_status i.ToldFP_HF i.visited_by_CHW  i.contraception_use
i.Listening_radio i.Watching_television  i.FP_messages  [pw=perweight], cluster(psu)
*****************************************************************************************
* TABLE 3.4 DECOMPOSE CONTRACEPTION ON TEENAGE PREGNANCY 1992- 2018

use idhs_00018_teenage.dta, clear

*Keep Adolescents

keep if age<20

*Teenage pregnancy

gen pregmotherhood=.
replace pregmotherhood=1 if pregnant==1 | pregtermin==1 | cheb>0
replace pregmotherhood=0 if pregmotherhood==.

label var pregmotherhood "pregnancy status"
lab define pregmotherhood  0 "never been pregnant" 1 "pregnancy/motherhood"
lab val pregmotherhood pregmotherhood
```

```
tab pregmotherhood

tab year pregmotherhood, row

recode fptypnow (11/20=1 "Contraception use") (0=0 "Not using") (else=.), gen(contraception_use)

tab contraception_use

tab year contraception_use, row

log using teenage_pregnancy.log, replace

mvdcmp year1: logit pregmotherhood1 i.contraception_use ib2.Residence ib5.Province i.Religion
ib2.Early_sexualdebut  i.Education i.Occupation i.Ideal_Nchildren1 i.FP_messages  [pw=perweight], cluster(psu)

log close
```
**********THE END OF THE DO FILE**********