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Traditional and modern contraceptive use in Malawi: A comparison of their demographic and socio-economic determinants among married female users

BY

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This dissertation is submitted to the schools of public health and social sciences in partial fulfilment of the Master of Arts in HEALTH DEMOGRAPHY at the University of the Witwatersrand, Johannesburg

31st MAY, 2019

DECLARATION

I, **Pierre Daniel Dindi,** declare that this research report is my own original work. This research work is being submitted in partial fulfilment for the degree of Master of Arts in Health Demography at the University of the Witwatersrand, Johannesburg. To the best of my knowledge, this work has not been submitted elsewhere for any degree or examination.

Signature: 

Date: 31st May, 2019

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ABSTRACT

Despite Malawi's policy goal of reaching a modern contraceptive prevalence rate of 60% by 2020, use of ineffective traditional methods of contraception still persists. Almost half (42%) of unintended pregnancies among female users in the country have been attributed to traditional method failure. This study seeks to compare the socio-demographic and economic factors associated with use of traditional and modern methods of contraception. Malawi's 2015-16 Demographic and Health Survey data comprising 9,386 married females aged between 15-49, and using any method of contraception were analysed. Descriptive statistics and binary logistic regressions were fit to determine the association. About 2.23% of the sample used traditional contraception out of which 93% did know a source for any method (traditional or modern). Traditional methods were highly prevalent than modern methods among females aged 35-44 years (37.56%), highly educated (8.92%) and Muslims (11.74%). Furthermore, being Muslim increased the odds of using traditional methods by 1.98 (CI:1.044-3.757; α=0.008) times higher than Catholic (reference category), whereas those who lived in the Central and Southern Malawi were 0.30 (CI:0.181-0.495; α=0.000) and 0.34 (CI:0.219-0.539; α=0.000) times less likely to use traditional methods than those in Northern Malawi (reference category). Married females with tertiary education were the most likely (OR:3.53; CI:1.215-10.271; α=0.000) to use traditional contraception. Therefore, there is an association between socio-demographic factors and use of traditional methods of contraception. Government should consider strengthening its engagement with stakeholders in implementing existing strategies to ensure demand creation and service delivery initiatives that reach contraceptive users of various socio-demographic characteristics.

CHAPTER 1: INTRODUCTION

1.1. Background

Contraceptive use has increased in Malawi over the last two decades. The contraceptive prevalence rate (CPR), the proportion of females currently using any method of contraception, increased from 13% in 1992 to 59% in 2015 among married females (National Statistical Office [Malawi] & ICF, 2017). Over the same period, global CPR similarly increased from 54.8% to 63.3% (Alkema et al., 2013). This drastic change has been accompanied by a shift in preference from traditional methods of family planning to more effective modern methods. According to the Malawi Demographic and Health Survey (MDHS) of 1992, about 43% of the currently married females using contraception relied on traditional methods (National Statistical Office [Malawi] & ICF, 2017). Among a number of African countries, preference for traditional methods over modern family planning has been ascribed to multiple reasons associated with modern methods including lack of knowledge, limited access, amenorrhoea, infrequent or no sexual activity, fear of sub-fecundity outcomes, side effects and other health concerns (Sedgh & Hussain, 2014).

Research has shown that a variety of factors have contributed to Malawi's increase in CPR including rise in female education and employment, improved child survival, increased access, increased knowledge of contraception methods and wealth status, among others (Adebowale et al., 2014; Gyimah & Fernando, 2004; Palamuleni, 2013; Rossier & Corker, 2017). The proportion of females attending formal education in Malawi has been increasing rapidly since the onset of the Free Primary Education Policy in 1994 (Grant, 2015). A comparative analysis of contraceptive use by level of education depicts a direct relationship between the two. A similar relationship can be observed among females with employment, as raising children increases the chances of exiting the labour force (Budig, 2003). As such, females who want to stay economically active are more likely to use contraception, because of the perceived benefits of limiting or postponing childbearing (Filmer & Fox, 2014). On the other hand, reduced child mortality increases contraception use, as parents become confident about the survival of their living children (Gyimah & Fernando, 2004). Malawi achieved Millenium Development Goal (MDG) number IV on child survival by 2013 (Kanyuka et al., 2016). This partly explains the increase in contraceptive uptake.

Of notable importance is the increase in use of modern contraception methods. A comparison between the 1992 and the 2015-16 MDHS shows a 51% rise in use of modern methods among currently married females (National Statistical Office [Malawi] & ICF, 2017; National Statistical Office/Malawi & Macro International, 1994). The highest rise, though, has been noted in injectables from a prevalence of 1.5% to 30% making it the most commonly used method (Burke et al., 2018). Implants precede in popularity at a current prevalence of 11% from an almost negligible rate of use. Despite female sterilisation increasing only by 9.2 % over the past two decades, the method still ranks third in terms of preference (Tweya et al., 2017). Pills, condoms and IUDs have had the least increase, and still contribute relatively less to the method distribution by use among currently married females (Lemani et al., 2018). Whereas male sterilisation has been by far the least commonly used modern method with a current prevalence rate of 0.1% (National Statistical Office [Malawi] & ICF, 2017).

1.2. Problem Statement

Despite the overall increase in the proportion of married females who use modern methods in Malawi, use of traditional methods still prevails. Out of all currently married females aged 15-19, and using contraception in Malawi, approximately 30,000 of them still relied on traditional contraception in 2018. Projections indicate an increase in this figure to 40,000 by 2030 (DeSA, 2017). About 45% of these females relied on the withdrawal method, 27% relied on the rhythm method, whereas the rest used other methods of traditional contraception (National Statistical Office [Malawi] & ICF, 2017).

There is a strong community perception about traditional methods among older females, who prefer drinking herbal potions or wearing strings as contraception. This is, however, more pronounced in the South and Eastern part of the country (Chipeta, Chimwaza, & Kalilani-Phiri, 2010; Maliwichi-Nyirenda & Maliwichi, 2010). The most common reason for shunning modern contraception still remains the fear of side effects (Yeatman & Trinitapoli, 2008).

However, traditional contraceptives are not as effective as modern methods in spacing and limiting births. Fertility awareness methods (e.g. rhythm), withdrawal and lactational amenorrhoea have failure rates as high as 30 pregnancies per 100 females in a year (Stoddard, McNicholas, & Peipert, 2011). Additionally, they require communication and cooperation between partners about periodic abstinence or use of alternate methods (e.g. condoms) during

fertile days (World Health Organization, 2006). Therefore, risk of pregnancy highly depends on the user, as the effectiveness of these methods rely on consistent precision during each sexual encounter (World Health Organization, 2007). On the other hand, failure rates of modern contraceptives can be as low as one pregnancy or less per 100 females per year for pills, Intra-Uterine Devices (IUDs) and sterilisation. Furthermore, these methods are less prone to human error (e.g. inability to withdraw, or abstain during fertile days), as procedures are performed usually once in a long period or permanently (Trussell & Guthrie, 2007).

In 2015, about 53% of pregnancies in Malawi were unintended, and 41% of births were either unwanted or mistimed (National Statistical Office [Malawi] & ICF, 2017; Polis et al., 2017). It was further noted that 30% of the unintended pregnancies ended in abortions – a procedure that may have medical and psychological risks, and for Malawi criminal risks as well (Polis et al., 2017). In Malawi, abortion is illegal, but can only be performed by a healthcare worker if there is sufficient evidence that the pregnancy poses fatal health risks to the woman's life (Levandowski et al., 2013). This is one of the consequences of contraceptive failure, a trait that is strongly associated with traditional methods (Marston & Cleland, 2003).

Unwanted pregnancies that lead to child birth have a resultant effect on rapid population growth, which compromises the quality of life through its impacts on social and economic development, and the environment (Lutz, Sanderson, & Scherbov, 2004). Contraceptive failure increases susceptibility to risky births, as pregnancies are more likely to occur too early, too late, too many or too frequently (McFarlane, 2015). This further indicates the consequence of unmet need for contraception, which currently stands at 19% among married females (National Statistical Office [Malawi] & ICF, 2017). That is, one in five married females would not like to get pregnant, but are either not on any contraception method or are using ineffective traditional methods (Digitale et al., 2016). A detailed analysis by Vlassoff & Tsoka (2014) indicates that meeting the need for modern contraception among females in Malawi could reduce maternal mortality by more than two-fifth and lower unintended pregnancies and unsafe abortions by 87%.

1.3. Justification

Malawi's Costed Implementation Plan (CIP) for family planning aims to achieve a modern contraceptive prevalence rate (mCPR) of 60% by 2020 (Government of Malawi, 2016a). Since 2012, Malawi has also been a signatory to global commitments that support the rights of females

and girls. These commitments have targets for the year 2020, and hence they are coined the family planning 2020 goals (FP2020) (Government of Malawi, 2017). In 2017 one the country's target was to increase the number of users of modern contraceptives by 344,000 (Government of Malawi, 2017). Furthermore, Malawi's national family planning programme aims to reduce the unmet need for contraception through provision of family planning services, whereas the adolescent sexual reproductive health programme serves to reduce the incidence of unplanned and unwanted pregnancies among young people (Government of Malawi, 2016b).

The policy and programmes are designed to promote use of effective contraception among all females regardless of marital status. This study brings to light the drivers of use of ineffective traditional contraceptive methods compared to those of modern methods, which will inform further implementation of policies and programmes. Thus, knowing the distinct differentials in socio-demographic characteristics of married females using traditional versus modern contraception will help determine the current contraceptive use landscape. This has implications for designing future policies and interventions that ensure a shift to more effective modern methods.

In addition, even though fertility is declining in Malawi, an estimated 522,000 married females are in high demand and need of effective family planning methods (United Nations, 2017). Among these females, there is a higher need for spacing (58%) than limiting (42%), with highest proportions recorded among married adolescents and lowest in the 45-49 age group (National Statistical Office (NSO) [Malawi] & ICF, 2017). While these proportions vary strongly by religious affiliation and level of education, variations by geography and wealth status are relatively modest (Mandiwa et al., 2018).

The study's focus on married females is driven by phenomenally higher reported sexual activity among this group in comparison to unmarried females (Ueffing et al., 2017), which is likely to increase their use of contraception use by far. Thus, in understanding the determinants of traditional methods, this study could inform policies and programmes for married females using ineffective traditional methods.

Malawi's current implementation of the family planning programme is guided by the 2016 Sexual Reproductive Health and Rights (SRHR) policy largely operationalized by the Family Planning Costed Implementation Plan (CIP) 2016-2020 and a National Youth-Friendly Health

Services (YFHS) strategy 2015-2020 (Government of Malawi, 2015, 2016b, 2016a). The Ministry of Health coordinates family planning service delivery that is decentralised across all 28 districts through high-level governance and policy development alongside various government and non-government stakeholders (Irani et al., 2015). This study provides an opportunity to inform further implementation of this program by focusing on addressing the socio-demographic barriers to modern contraception among users of traditional methods.

1.4. Research questions

This study has a main research question which anchors the main topic of research and sub-research questions.

1.4.1. Main research question

How do the demographic and socio-economic factors associated with the use of traditional contraception compare with those of modern contraception among married females in Malawi?

1.4.2. Sub questions

1. What are the levels of traditional, and modern contraception use among married females in Malawi?
2. What demographic and socio-economic factors are associated with the use of traditional, and modern contraception among married females in Malawi?
3. What are the differences in the factors that determine use of traditional and modern methods of contraception among married female users in Malawi?

1.5. Research objective

The main research objective was to determine the differences in demographic and socio-economic factors associated with the use of traditional and modern contraception among married females in Malawi.

1.5.1. Specific Objectives

The following were the specific objectives of the study:

1. To establish the levels of traditional, and modern contraception use among married females in Malawi

2. To determine the demographic and socio-economic factors associated with use of traditional and modern contraception among married females in Malawi
3. To compare the demographic and socio-economic determinants of traditional contraceptive use with those of modern contraceptive use

1.6. Definition of terms

Contraceptive Prevalence Rate: This is the number of females of reproductive age who are using contraception per 100 females of the reproductive age (Haupt, Kane, & Haub, 2011).

Family Planning 2020 (FP2020): A global partnership that supports the rights of females and girls to decide, freely, and for themselves, whether, when, and how many children they want to have (Government of Malawi, 2017).

Lactational amenorrhoea: A temporary family planning method based on the natural effect of breastfeeding on fertility. ("Lactational" means related to breastfeeding. "Amenorrhea" means not having monthly bleeding.) (World Health Organization, 2007)

Modern contraceptive method: A product or medical procedure that interferes with reproduction from acts of sexual intercourse (Hubacher & Trussell, 2015).

Traditional contraceptive methods: Methods of family planning that do not require clinical intervention, such as hormones, devices, or procedures, and may also be used to facilitate pregnancy planning (Oas, 2016).

Unmet need: The percentage of females who do not want to become pregnant but are not using contraception (Bradley et al., 2012).

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

This chapter reviews scientific and peer-reviewed publications on the drivers of traditional contraceptive use with a particular focus on Sub-Saharan Africa and Malawi. In order to get a picture of what is happening beyond this region, studies from other developing nations beyond sub-Saharan Africa were also included. The purpose was to provide a theoretical basis of the research problem while illustrating what previous studies have found on the topic. The overall flow of this literature review has been guided by the Health Belief Model, a theoretical framework which is introduced at the end of this chapter.

Between March and November 2018, relevant literature related to this study was retrieved through the Google search engine and electronic databases, some of which access was granted by the University of Witwatersrand Library. These included JSTOR, Google Scholar, PubMed, Wiley Online Library and the National Center for Biotechnology Information among others. MeSH terms and keywords for the literature search included: traditional contraception; socio-economic determinants and contraceptive use; demographic factors and contraceptive use. Studies were included only if they examined traditional contraceptive use in the context of socio-demographic factors.

2.2. Definition of traditional and modern contraception methods

The need for contraceptive use arises so that sexually active partners minimise or eliminate unwanted conception. One of the first written evidence of traditional methods of contraception dates as far back as 1550 B.C (O'reilly, 2010). These are methods that do not require clinical intervention, such as hormones, devices, or procedures, and may also be used to facilitate pregnancy planning (Oas, 2016). On the other hand, modern methods encompass products or medical procedures that interfere with conception resulting from sexual activity (Hubacher & Trussell, 2015). Proliferation of modern methods of contraception followed a movement that began in the 1700s ensuing from Thomas Malthus' suggestions about the "positive checks" to population growth (Broten, 2017).

Classification of contraceptive methods as traditional varies across various schools of thoughts. For instance, the Guttmacher Institute and the United Nations Population Fund (UNFPA)

classify lactational amenorrhoea as traditional, whereas the World Health Organisation (WHO) and the DHS programmes consider it as a modern method (Hubacher & Trussell, 2015; Singh et al., 2014; World Health Organization, 2012). While, the population division of the United Nations categorise all forms of periodic abstinence as traditional methods, the UNFPA identifies some forms of it as modern methods (United Nations, 2015). However, Hubacher & Trussell (2015) argue that the use of technological improvements to aid delivery of traditional methods (e.g. electronic calendars or cell phone applications to aid abstinence during fertile days more precisely) does not necessarily make them modern methods, as couples still have to avoid sexual activity.

In general, traditional methods are broken down into use of abstinence[1], lactational amenorrhoea[2], withdrawal[3] and broad fertility awareness approaches comprising Standard Days Method[4], Calendar Rhythm Method[5], Two-Day Method[6], Billings Ovulation Method[7], Sympto-thermal Method[8] and use of fertility period-awareness devices[9] (Hubacher & Trussell 2015). The DHS programme also recognises users of folkloric methods (potions, beads, herbs, etc.) and classifies them as "other traditional methods" (Rossier & Corker, 2017).

2.3. Demographic factors and their impact on traditional contraception use

A number of studies on the influence of demography on the use of traditional contraception have focused on age, marital status and number of living children (Adanu et al., 2012; Kabonga et al., 2010; Mathe et al., 2011; Okpani & Okpani, 2000). Specific literatures have also reported higher prevalence of traditional contraceptive use than what large-scale surveys, for instance the Demographic Health Survey, have stated (Rossier and Corker, 2017).

[1] Methods involving a couple's decision to not have sex at all (Mokwena & Morabe, 2016)
[2] A temporary method that relies on the natural inhibiting factor of exclusive breastfeeding on fertility - effective in the first six months postpartum (Abraha et al., 2018)
[3] A method that involves pulling out the penis out of the vagina before ejaculation (Lampiao, 2014)
[4] This method requires females to abstain from unprotected sex between days 8-19 of their menstrual cycle (Sinai et al., 2006)
[5] This method requires calculation of monthly fertile days on the calendar (Kaufa & Buleya, 2015)
[6] A female observes the presence vaginal secretions that span two consecutive days, and avoids sex (Sinai et al., 2006)
[7] A female observes changes in her cervical mucus to estimate their ovulation, and subsequently their fertile period (Kaufa & Buleya, 2015)
[8] A female observes multiple signs and symptoms of fertility (e.g. secretions, body temperature, ovulatory pain) in order to determine her fertile days (Kaufa & Buleya, 2015)
[9] These are gadgets or software applications that aid in tracking and providing reminders about fertile days (Hubacher & Trussell, 2015; Revelant, 2015)

A popular belief in Malawi about traditional contraception is its perceived commonness among older married females (Chipeta et al., 2010). Such a finding is not surprising considering that fecundity diminishes with age, as older females are approaching menopause (Senturk, 2017). This, in turn, may reduce uptake of modern methods among those who are sexually active. However, the case may be different with other countries in the region. Findings from a Nigerian study involving over 750 sexually active secondary school-going adolescent females with a median age of 16.3 years reported very high use of traditional contraceptive methods. Use of rhythm and withdrawal methods had a combined prevalence of 57.1% among this group (Okpani & Okpani, 2000).

Nevertheless, factors driving the uptake of traditional methods may be different for these younger females. These may range from limited access to modern methods as a result of unpleasant health provider attitudes, stigma and costs (Bankole & Malarcher, 2010). However, a mixed methods study in Zambia, a country with comparable socio-cultural and geographic setting to Malawi, concurs with the earlier finding by Chipeta et al. (2010). Out of the 411 females that were interviewed, use of traditional family planning methods was highest among those who were married and aged between 25 and 34 years (Kabonga et al., 2010). Thus, marital status equally has a role to play on influencing use of contraception.

The role of marital status, including other elements of nuptiality such as type of marriage (polygamy and monogamy) and duration of marriage, towards determining Malawi's variations in contraception use have been well elaborated by Palamuleni (2013). Likewise, the pattern can also be observed from the results of a longitudinal study in Northern Malawi, which sought to look at contraceptive adherence by recruiting females in a prospective cohort. Married females constituted by far the highest proportion (86%) compared to divorced (11%) and those who never married (2.8%) (Dasgupta, Zaba, & Crampin, 2015). This may be the case because of the well-established fact that sexual activity is equally higher among them (Ueffing et al., 2017). In terms of choice of methods, a critical notion to not be overlooked is the intent to use, as opposed to barriers to access alone. Often times, couples that have stayed longer in marriage experience improved spousal communication (Weigel & Ballard-Reisch, 1999). Such a characteristic is vital to determining a couple's adherence to contraception, particularly traditional methods (Perera, 2014).

Evidence from the three iterations of the MDHS conducted between 2000 and 2010 indicate that females with more living children had a higher contraceptive prevalence than those with fewer or no children (Chintsanya, 2013). By 2010, females with at least five children had a prevalence of 50% compared to 5% for those with no children, and 38% among those with at most two children.

A proxy to this concept is that of reduced child survival, which has been known to equally increase use of contraception, as couples become confident about the survival of existing children (Gyimah & Fernando, 2004). Both notions directly speak to the conceptual framework of this study given the socio-demographic factors' influence through fertility intention. Thus, in a nutshell, a common theme across the board is that these factors have a strong bearing on contraceptive use regardless of the magnitude of influence or the direction of that relationship.

2.4. The influence of socio-economic factors

Measures of socio-economic status such as education, employment and income status usually shape an individual's vital demographic experiences, including the size of family one ends up with (Kamuzora, 2001). In theory, Easterline's economic framework for fertility analysis would suggest larger family sizes among high earning populations considering the economic costs associated with childbearing (Easterlin, 1975). What we see in practice, however, are almost ubiquitously higher fertility levels among low earning couples implying low use of contraception among them (Kamuzora, 2001). Further analysis among users of contraception by Kabonga et al. (2010) shows traditional method use being considerably higher than modern methods among females in the lowest economic quintile. Such a finding may suggest that costs associated with modern methods are a driver to using traditional methods, as equally noted by (Najafi-Sharjabad et al., 2013). This pattern was also observed in Eastern Europe when modern contraception was just being introduced decades ago (Dereuddre, Van de Putte, & Bracke, 2016). Emerging trends now indicate that there are societies where overall contraception use does not vary by social class. Elite females from such settings have been reported to prefer using traditional methods than modern (Bajos et al, 2014; Basu, 2005).

Similarly, level of education attainment by both male and females is a strong predictor of contraception use, with that of the latter being more influential (Palamuleni, 2013). A pooled sample of African DHS country data analysed between 2008 and 2014 showed high use of

traditional contraception among females intending to limit births, and those who were better educated (Rossier & Corker, 2017). Additional findings indicated that transitioning to secondary school among females in demand for any contraception increased the proportion of users six fold compared to those with no education at all.

The propensity of socio-economic to influence access to family planning methods can also be seen through their effect on population distribution. Income level and employment status, among other factors, will often times determine someone's place of residence, which in itself can be a barrier or promoter of contraceptive access (Adebowale et al., 2014). About 40% of health services in Malawi are provided by the Christian Health Association of Malawi (CHAM), which has most of its health facilities located in rural areas (Zulu et al., 2012). This poses a challenge to family planning access among the 81% rural population in the country, as most of these health facilities do not offer family planning services, with exception of a handful Catholic-owned structures that only offer family planning counselling (Zulu et al., 2012). This reluctance by religious-affiliated service provision centres to provide contraception has been widely studied by Barden-O'Fallon (2017) having noted similar incidents in Kenya and Haiti. Such barriers may be insinuated to drive use of traditional contraception among Malawian females.

2.5. Kinship, community and dispositional influences

Delineating the relationships among socio-demography, household and attitudinal attribution on contraception use is often challenging considering their convoluted inter-association. For instance, a female's positive attitude towards family planning adoption may be influenced by increased duration of sexual exposure resulting from a change in marital status (Ueffing et al., 2017). On the other hand, it could also emanate from her increased knowledge through education or religious and traditional ideologies (Nsubuga et al., 2016). In Malawi, religion and culture drive social norms including reproductive behaviour. The perception of Catholicism and Islam as pronatalist can partly explain the disparities in contraceptive use across religious groups (Palamuleni, 2013). Likewise, an explanation for differences by ethnicity may follow this analogy as well.

These two elements explicitly prohibit use of contraception mainly because of misconceptions about them, and knowledge on their associated side effects, as noted in rural Central Malawi (Bisits-Bullen et al., 2017). This resonates with a qualitative study finding of 60 participants in

South-Eastern part of the country, which reported strong apathy for modern contraception despite the participants' high level of knowledge of the methods (Chipeta et al., 2010). Some of the side effects noted include prolonged menses, concerns about impotence among males, genital sores, gaining or losing of weight and subsequent infertility.

Such perspectives about contraception purported by communities and relations further trickle down to household level, and have been noted to influence contraceptive non-use more in settings where couples communicate less (Hartmann et al., 2012). These households are characterised by prohibitive male spouses, as they are most often not involved in family planning. It is quite not uncommon to come across households with non-shared decision making, as its occurrence in Malawi has been greatly noted in cases where the male spouse is lowly educated or did not attend any education, and does not have a formal job (Mbweza, Norr, & McElmurry, 2008). This, hence proliferates cases of spousal disapproval of modern family planning methods (Dasgupta, 2015), which is associated with either increase in traditional method use, or entirely not using contraception at all (Bisits-Bullen et al., 2017).

Besides misconceptions and prejudice, to a large extent, non-use of modern methods over traditional methods results from the well-known side effects reported among females using or those that stopped (Polis, Hussain, & Berry, 2018). Between 2006 and 2013, the proportion of females of child-bearing ages in Africa citing side effects or health risks as reasons for not using modern methods of contraception was 28% (Sedgh & Hussain, 2014). Additionally, a qualitative study of 60 participants in Mangochi District in Southern Malawi showed the existence of apathy for contraceptive methods despite their high levels of knowledge of family planning (Chipeta et al., 2010). This dislike emanated from perceived side effects like prolonged menstruation, men's concerns about impotence and genital sores, weight gain or loss, and subsequent infertility (Chipeta et al., 2010).

2.6. Comparisons with other developing regions

Analogous to the sub-Saharan Africa region, levels of contraceptive use in countries of other developing regions vary widely. The proportions of currently married females using any method range from 35%-79% in Latin America and the Caribbean countries, whereas Asian nations range from 22%-62% (Sedgh et al., 2016). In contrast, the majority of married females in Africa are not using any method, with CPRs ranging from 16%-49% in Cameroun, Congo, Gabon,

Ivory Coast, Liberia, Ghana, Nigeria, Sierra Leone, Mozambique and Tanzania (Wang et al., 2017). Nevertheless, Malawi's proportion of contraception users well compares with that of the majority Latin American and Asian countries alongside Kenya, Lesotho, Namibia and Zimbabwe, where CPR ranges from 53%-67% (Wang et al., 2017).

In terms of type of contraception, regional estimates from the United Nations show comparable levels of females in union using traditional methods. These females constitute to about 5.4% in Sub-Saharan Africa, 5.6% in Asia, and about 6.1% in Latin America and the Caribbean regions (Rossier & Corker, 2017). Unlike the two other regions, however, African countries depict the widest variations in these proportions. For instance, Central and West Africa report the highest use of traditional methods while having a relatively lower rate of uptake of modern methods as well (Sharan et al., 2011). These sub-region account for 12% of the contraceptive prevalence for traditional methods alone (Rossier & Corker, 2017). Thus, Africa's average proportion of traditional contraceptive use is largely outlied by Central and West Africa on the higher side. This can be further depicted by lower rates of traditional method use in Malawi, and other countries in East and Southern Africa (Sedgh et al., 2016).

The drivers of traditional contraception use have been reported to differ, owing to varying socio-demographic contexts across the three developing regions. For instance, the multi-racial composition of South American countries was an important predictor of type of method used. Over a quarter of users of traditional contraception in Guatemala were indigenous females. This proportion was slightly lower in Peru at 20% (Fagan et al., 2017).There, however, is an overlap in attitudinal and socio-economic drivers of traditional methods across the regions. Married females in Southeast Asia, South Central Asia and Sub-Saharan Africa cited common reasons for non-use of modern contraception ranging from Health concerns (23%), infrequent sex (21%), partner/self-opposition (16%) and limited access/high cost (8%) among others (Darroch et al., 2011).

Literature like Cleland et al. (2014) and Ewerling et al. (2018) argue that instances where intention to use traditional methods is factored in, socio-demographic characteristics of users of traditional contraception tend to be common. This owes to the notion that across all developing country regions, self-efficacy for traditional methods is lower than that of using modern contraception (Ewerling et al., 2018). As such, the higher likelihood of educated females in India

(Basu, 2005), and also Ghana (Machiyama & Cleland, 2014) to use traditional methods than modern rather points to a conscious intention to use, as opposed to limited options.

The key problem across the developing country regions is the high unmet need for modern contraception (Sedgh et al., 2016). Out of the 225 million females with unmet need in these regions, about 65 million of them use ineffective traditional methods (Singh et al., 2014). Also common in this region are large-scale surveys like the DHS, whose questions regarding unmet need are asked of females not using contraception leaving out users of traditional methods (Sedgh et al., 2016).

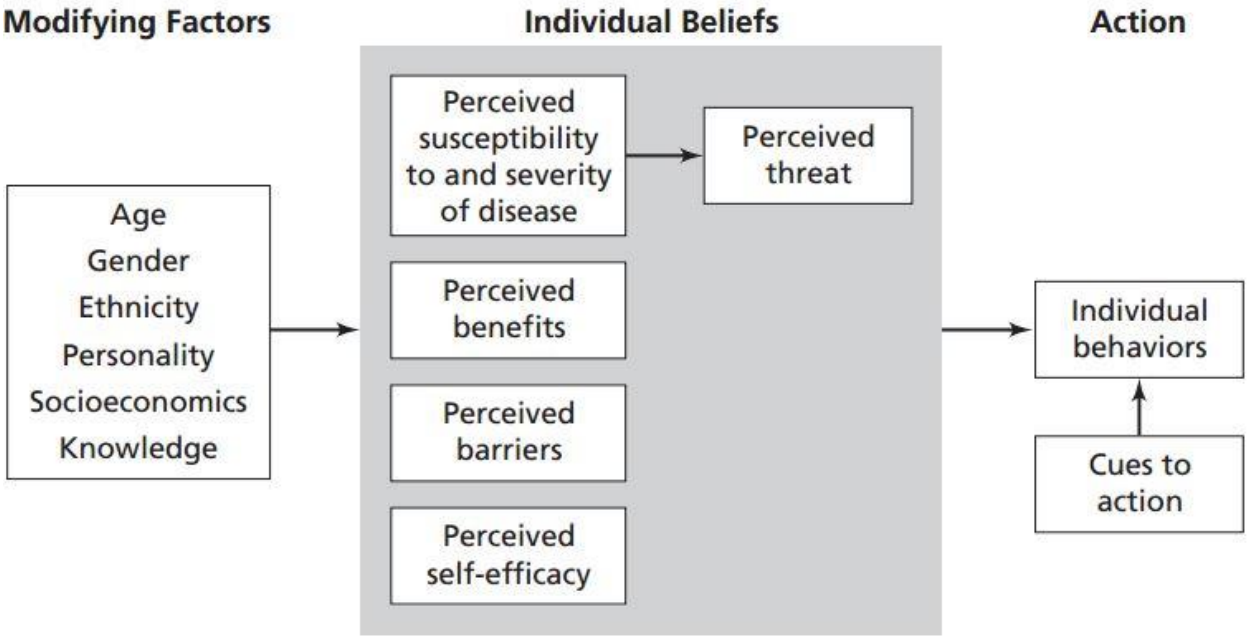
2.7. Contribution to the current knowledge base

This review suggests that there is a paucity of published literature on traditional contraception. Most publications covering this subject discuss it under broader themes, in turn, providing limited coverage on them. This study analyses use of traditional contraception as a primary outcome, while comparing its use-dynamics to that of modern methods. As such, it makes a valuable addition to the current knowledge base on this subject matter, particularly in Sub-Saharan Africa and Malawi. Additionally, a number of the Malawi-focused literature reviewed in this study (e.g. (Chipeta et al., 2010); (Mbweza et al., 2008); (Dasgupta, 2015); (Dasgupta et al., 2015)) are less generalisable at national level, as their study population was confined to smaller geographical spaces. This research uses a nationally representative sample from the DHS program, which makes its findings externally valid.

2.8. Theoretical and conceptual framework

This section introduces the Health Belief Model, a framework adopted for this study. The model ascribes an individual's likelihood of engaging in a health-related behaviour to perceived benefits of that behaviour and the perceived threat of an illness (Hochbaum, Rosenstock, & Kegels, 1952). Thus, the model strives to predict and describe individuals' preventive health behaviour by categorising personal motive into individual perceptions, modifying behaviours and likelihood of action (Hochbaum et al., 1952).

Figure 2.1: Components of the Health Belief Model theoretical framework



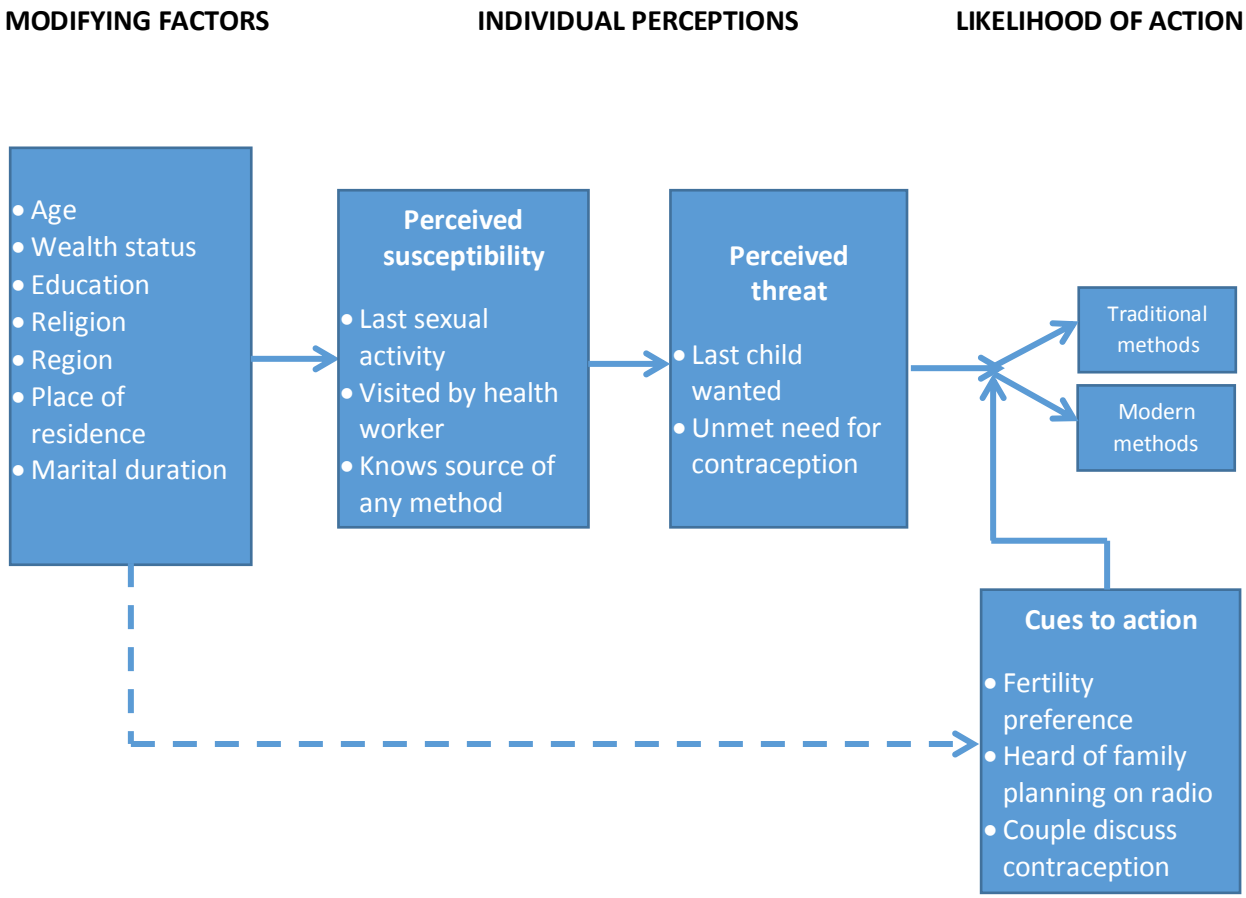
Source: (Glanz, Rimer, & Viswanath, 2008)

Perceptions may result from attitudes on, and knowledge of personal susceptibility to a health hazard including its severity, which determines the level of apparent threat (Rosenstock, Strecher, & Becker, 1994). Modifying factors hence, combines this perceived threat with a number of socio-demographic variables, and cues to action in order to determine likelihood of behaviour. This study, therefore, aims to explain use of traditional family planning methods among married females in Malawi by predicting the likelihood based on attitudinal factors while controlling for social and demographic variables. Figure 2.2 below summarises the determinants of traditional contraceptive use based on the Health Belief Model.

In the context of this study, it is assumed that the choice of a contraception method type (i.e. traditional vs modern) is ultimately influenced by a combination of cues to action (e.g. fertility preference, spousal communication) and a perceived threat about an unwanted pregnancy (stemming from their unmet need for contraception or a previous unwanted birth). While the cues to action are directly determined by a myriad socio-demographic characteristics referred to as modifying factors (e.g. age, wealth status, place of residence), one's threat of pregnancy is not directly dependent on them. Modifying factors, rather, determine the threat of a female's pregnancy through factors that alter her perceived susceptibility to getting pregnant. These include the timing of her most recent sexual activity, whether she recently had contact with a

health worker, or her knowledge of service delivery points for contraceptive methods. Thus, modifying social-demographics directly influence cues to action while distally determining one's threat of a pregnancy, both of which trigger the decision to either use traditional or modern methods of contraception among married females. Figure 2.2 is an illustration of the conceptual framework of this study. It provides a graphical representation of how the Health Belief Model fits into the study's context.

Figure 2.2: Conceptual framework of the determinants of traditional contraceptive use



Source: An adaptation of the Health Belief Model (1952)

CHAPTER 3: METHODOLOGY

3.1. Introduction

In this chapter, the methodology employed for this study is discussed. This includes an overview of the study design, data source, study population and sample size for the study. Data collection and analysis techniques are also discussed including questionnaire design and an outline of variables used for this study. Following this, the chapter concludes with the limitations of this study.

3.2. Study design

This is a cross-sectional quantitative study conducted among married females of the reproductive age (15-49 years) using any method of contraception. Analysis was conducted in 2018 with the principal aim of unravelling the relationship that exists between the use of traditional contraception, and socio-demographic factors. Given this study design, questions regarding use of contraception and existing factors were obtained at the same point in time.

3.3. Study location

Malawi lies in the South-Eastern part of sub-Saharan Africa. Bordering Tanzania to the northeast, Zambia to the Northwest and Mozambique on the East, South and Western part, the country is land-locked with no navigable route to the sea (Briggs & Connolly, 2013). The country is divided into three administrative regions namely North, Central and South (see Figure 3.1 below). The 2018 census by the National Statistical Office shows that the country has 17.5 million people (National Statistical Office [Malawi], 2018). The country sits on 118,000 square kilometres, and Lake Malawi takes up over 25% of this area (Mkondiwa, 2018). Malawi's average population density is estimated at 198 persons per km^2 (Ministry of Finance, Economic Planning and Development, 2017). Furthermore the country's annual population growth rate is estimated at 3.1%, largely attributable to fertility (Franklin et al., 2017). The current contraceptive prevalence rate stands at 46% among all females and 59% among married females that are married (National Statistical Office (NSO) [Malawi] & ICF, 2017).

Malawi's unprecedented journey in family planning use is remarkable having transpired from major hindrances in during the early years of post-colonisation. Following Malawi's independence from Britain in 1964, family planning was banned on the grounds that it

contradicted the country's culture. The then leadership believed a large population would be ideal for generating the necessary labour force for agriculture (Andrianaivosoa & Miary, 2016; Zulu et al., 2012). While other countries in the region made progress with their family planning programmes, the one-party political state of affairs was not conducive for discussion of family planning and contraception (Zulu et al., 2012). This was until the adoption of multi-party democracy in 1993, which saw the approval of the first population policy the following year (Chimbwete et al., 2005).

Figure 3.1: Map of Malawi showing the three regions of the country



Source: Map generated in ArcMap 10.5 using boundary data from the Spatial Data Repository of the DHS Program (The DHS Program, 2011).

Currently, Malawi's proportion of married female modern contraceptive users is one of the highest in Africa with a very successful national and community family planning delivery model as noted by Scott et al (2015). This has largely been ascribed to strong political will, which saw the establishment of the Reproductive Health Unit (formed after the 1994 International Conference on Population and Development conference) and Family Planning Association of Malawi (FPAM) in 1999 (Tsui et al., 2017; Zulu et al., 2012). Subsequent to the London Summit on Family Planning in 2012, Malawi fulfilled its commitments of: creating and funding a budget line for contraceptives using domestic resources; elevating the Reproductive Health Unit into a directorate within the Ministry of Health and raising the age of marriage from 16 to 18 years (Dennis, 2016).

3.4. Data source

This study used data from the nationally representative 2015-16 Malawi Demographic and Health Survey (National Statistical Office (NSO) [Malawi] & ICF, 2017). This is Malawi's fifth iteration of the survey, which collected information at the regional and national level, including urban and rural areas on households, fertility, family planning, infant and child health and mortality, maternal health and maternal and adult mortality, child and adult nutrition, malaria, HIV/AIDS, domestic violence, orphans, and vulnerable children.

The 2015/16 Malawi Demographic and Health Survey (MDHS) interviewed 26,361 households, 24,562 female respondents, and 7,478 male respondents totalling to 32,040 particiants (National Statistical Office (NSO) [Malawi] & ICF, 2017). Participants were identified using the 2008 census sampling frame with complete standard enumeration areas, and a final sample was determined through a two-stage cluster method. Thus, Malawi's 28 districts were stratified into urban and rural to yield a total of 56 sampling strata. Sample included all females aged 15 – 49 and males aged 15-54, who were either permanent residents or visitors who had spent a night at the household regardless of their marital status or use of contraception.

3.5. Study population and sample size

The population of interest for this study were married females in Malawi aged 15-49 years and using any method (modern or traditional) of contraception. Out of the 32,040 participants in the MDHS, 7,478 male observations were automatically excluded by virtue of this study using a Women's Recode file (Individual Recode). 13,368 female respondents were removed as they

were non-users of contraception, whereas 1,760 of the female respondents were excluded for having never married or being widowed, divorced or separated. An additional 38 females were removed, as they were declared infecund. Following this restriction a final sample size for analysis of 9,396 was realised. An illustration of this inclusion and exclusion criteria is illustrated in Annex I.

3.6. Questionnaire Design

The MDHS used four questionnaires: household, female, male and the biomarker questionnaire, all of which were adapted from the DHS Programme's standard questionnaire for Demographic and Health Surveys. The set of questionnaires were developed in collaboration with government and non-governmental stakeholders then translated from English to Malawi's two major languages (Chichewa and Chitumbuka) before being programmed into tablet computers for data collection (National Statistical Office (NSO) [Malawi] & ICF, 2017).

3.7. Study variables

3.7.1. Dependent variable

The dependent or outcome variable in this study was current contraception use by method type, which was categorised into modern and traditional methods. This was created by recoding the variable "current contraceptive method", which had fifteen categories (see Table 3.1 below) comprising a mixture of both modern and traditional methods. Thus, the outcome variable was binary, where modern methods were assigned a value of 0, and comprised users of pills, intrauterine device, injectables, male condoms, implants, female condoms, emergency contraception, male sterilisation, female sterilisation and other modern methods. The value 1 was assigned to traditional methods, which included a combination of users of periodic abstinence, withdrawal, lactational amenorrhoea, Standard Days Method and other traditional (folk) methods.

Table 3.1: Categorisation of the outcome variable

Categorisation	Current contraceptive method (v312)	Users (%)
Traditional Method	Standard Days Method (SDM)	0.2
	Periodic abstinence	0.5
	Lactational amenorrhea	0.1
	Other traditional (folk methods)	0.5
	Withdrawal	1.0
Modern Method	Pill	4.0
	Intra-Uterine Device (IUD)	1.8
	Injections	50.2
	Male condom	3.7
	Implants/Norplant	20.7
	Female condom	0.03
	Emergency contraception	0.01
	Other modern method	0.03
	Male sterilisation	0.2
	Female sterilisation	17.2

3.7.2. Independent variables

Table 3.2 below shows the complete list of independent or predictor variables included in this study. These include an array of socio-demographic variables based on the conceptual framework. Due to the small number of observations denoting use of traditional contraception, categories of most independent variables were combined using the recode command in Stata in order to minimise variability in the sample. The variable "age" was recoded from its original seven five-year categories to four ten-year groups as: 15-24 years, 25-34 years, 34-44 years and 45+ years. "Place of residence" and "region" were left as is with their original categories: rural and urban for the former, and: Northern Region, Central Region and Southern Region for the latter. On the other hand, the variable religion was recoded as: Catholic, other Christians, Muslims and no religion/other.

Similarly, wealth status was recoded into three categories: poor, middle and rich by combining the initial categories "poorest" and "poor" to form the first category, and "rich" and "richest" to form the third category. The variable "highest education level" variable was left as is with the categories: no education, primary school, secondary school and higher. This was the same with "fertility preference" which has categories: want another child, undecided, no more and sterilised. The variable "marital duration" re-categorised from its seven original five-year groups

to the following four ten-year groups as follows: 0-9 years, 10-19 years, 20-19 years and 30+ years.

The variable "time since last sex" was recoded from its original continuous form into a dichotomous variable with categories: within the past week, and over a week ago. Whereas "need for contraception" was left in its original form with categories: using for spacing and using for limiting. The variable "last child wanted" was equally left in its three original categories as follows: wanted then, wanted later and wanted no more. The variable "knows source of any method" has categories "yes" and "no" recoded from DHS variable v380. Respondents who cited any of the sources (government clinic/pharmacy, government home/community delivery, Non-Governmental Organisations (NGOs), private clinic/delivery, pharmacy, shop/church/ friend and other sources) were categorised as "yes", and those who did not know were categorised as "no". The following variables were left with their original response categories of "yes" and "no" as per DHS. These are "visited by family planning provider", "heard of family planning on the radio" and "couple discusses contraception use".

Table 3.2: Definition of independent variables as per recoded for this study

Independent variables	**Definition**	**DHS Code**	**Categories**
Age in ten-year groups	Current age in 5-year groups produced by grouping current age in completed years	Recode of v013	15-24 years (1)
			25-34 years (2)
			35-44 years(3)
			45+ years (4)
Place of residence	De facto type of place of residence. Type of place of residence where the respondent was interviewed as either urban or rural	v025	Urban (1)
			Rural (2)
Region	De facto region of residence. Region in which the respondent was interviewed.	v024	Northern region (1)
			Central region (2)
			Southern region (3)
Religion	Religious affiliation of the respondent	Recode of v130	Catholic (1)
			Other Christian (2)
			Muslim (3)
			No religion/other (4)
Level of education	Highest education level attended	v106	No education (0)
			Primary school (1)
			Secondary school (2)
			Higher (3)
Wealth status	Wealth index as a composite measure of a household's	Recode of v190	Poor (1)
			Middle (2)

	cumulative living standard		Rich (3)
*Marital duration	The number of years elapsed since the start of the first marriage or union until the date of interview	v513	0-9 years (1)
			10-19 years (2)
			20-29 years (3)
			30+ years (4)
Time since last sex	A measure of how long when last did the respondent had sex	Recode of v528	Within the past week (0)
			Over a week ago (1)
Need for contraception	Categorizes women according to whether they have an unmet need or a met need, to space or to limit their future births	v624	Using for spacing (3)
			Using for limiting (4)
Last child wanted	Whether the last child born in the last three/five years was wanted at that time, later or not at all	v367	Wanted then (1)
			Wanted later (2)
			Wanted no more (3)
Knows source for any method**	Whether the respondent knows any outlet for any contraception method	Recode of v380	Yes (0)
			No (1)
Visited by family planning provider	Whether the respondent was visited by a fieldworker in the twelve months preceding the interview	v393	No (0)
			Yes (1)
Fertility preference	A measure that records whether or not another child is desired.	v602	Want another child (1)
			Undecided (2)
			Want no more (3)
			Using permanent method (4)
Heard of family planning on radio	Whether the respondent has heard about family planning in the last few months from the radio	v384a	No (0)
			Yes (1)
Couple discusses contraception use	Women in union and using contraception are asked who decided on the use of contraception	Recode of v632	Yes (0)
			No (1)

** Not included in the adjusted regressions due to multi-collinearity with age (see Appendix B)*

*** Not included in regression model for not meeting the minimum sample requirements for Maximum Likelihood Estimation (see Table 4.2)*

3.8. Hypothesis

H_0 – there is no statistically significant relationship between demographic and socio-economic factors and the use of traditional contraception among married females aged between 15 and 49 in Malawi.

H_1 - there is a statistically significant relationship between demographic and socio-economic factors and the use of traditional contraception among married females aged between 15 and 49 in Malawi

3.9. Ethical issues

This study uses secondary data from the 2015-16 Malawi Demographic and Health Survey. The dataset was obtained from the DHS Program website. A user profile was created with the programme, which provided a gateway to seek permission to use the data. The request for access included a narrative of the project title and the purpose for which the datasets were needed. Access was granted 24 hours after a request for permission was logged.

As such, no ethical clearance was required for this study, as the data was secondary. Respondents' names were not available in the datasets, rather, users of contraception were only identified by unique numbers called case identifiers. This made the data anonymous such that there was no person-identifiable information or features for the respondents.

3.10. Data Analysis

Stata Special Edition (SE) software version 14.2 was used to run descriptive and inferential statistics at 5% significance and 95% confidence intervals. Microsoft Office excel 2010 was used to generate graphs and tables of results after exporting the data from Stata. Regional and residential comparisons were enhanced using maps generated in ArcMap version 10.5, part of the ArcGIS suite, by exporting results from Stata to ArcMap.

3.10.1. Data weighting

Prior to analysis, probability weights were generated based on the six-decimal sample weighting variable (DHS variable v005). A survey set was then defined based on the probability weight, primary sampling unit and strata (district and place of residence) used in sample design. The expression "svy" was then put before the regression command in Stata in order to produce weighted results. The sample of married females using traditional contraception was, however, small. As such, these weights were only applied in the inferential (regression) analysis in order to minimise variance, standard deviation and standard error, which result from applying weights to small samples (Lavallée & Beaumont, 2015).

Applying weights to inferential statistical analysis ensured generalizability of the results. Given the small weighted sample size, however, it is advisable to minimise the number of explanatory variables in order to avoid overfitting the model (Vittinghoff & McCulloch, 2007). Applying four different regression models, each parsimoniously fitted with a different number of predictor

variables, allowed cross-model comparisons of results. Similar variations in the margins of error across the models suggested that the sample was large enough to support the explanatory variables. This is further supported under model specification in section 3.11.2.

The analysis was done based on the three objectives of the study:

Objective 1: To establish the levels of traditional, and modern contraception use among married females in Malawi

Descriptives statistics were performed through frequency tables in order to inspect the distribution of the variables. This was to establish the prevalence of traditional and modern contraception among the study population. Results for this objective have been presented in form of tables and graphs.

Objective 2: To determine the demographic and socio-economic factors associated with use of traditional and modern contraception among married females in Malawi

Cross tabulations were performed between the outcome and all independent variable. Chi-square tests were run for each variable to examine the relationships between independent variable and current use of method type. Results for this have been presented in form of a table showing frequencies and percentages, and maps to show the regional variations.

Finally, since the outcome variable is categorical and dichotomous, binary logistic regression models were fit in order to examine the influence of socio-demography in predicting use of traditional contraception. Binary logistic regression analyses the effect of one or more independent variables on a binary-varying response variable by estimating the contribution of each independent variable (Stoltzfus, 2011). Besides the binary requirements of the outcome variable, the model also assumes that: there is a linear relationship between the logit of the response variable, and the independent variables; there are no influential outliers in the sample; and that there is absence of correlation among independent variables. Users of traditional contraception were assigned to one of the two variable categories, whereas users of modern contraception were assigned to the other category.

The regressions follow this formula below:

$$\ln\left(\frac{Pi}{1-Pi}\right) = \beta o + \beta 1Xi1 + \beta 2Xi2 + \beta 3Xi3 + \cdots + \alpha i$$

Source: (Kleinbaum & Klein, 2010)

Where:

$\ln\left(\frac{Pi}{1-Pi}\right)$ = log-odds ratio

β = parameters

β_o = beta for predictor variables

α_i = variation in the variable

In total of four regression models were fit as follows.

Model 1: This was the unadjusted logistic regression model, which estimated the odds of using traditional contraception by only considering the effects of one socio-demographic variable at a time. Crude odds ratios were estimated by running fourteen iterations of logistic regressions for the outcome variable across one predictor variable at a time.

Model 2: This model determined the association between traditional contraceptive use and modifying socio-economic and demographic factors alone as informed by the categorisation in the conceptual framework. The model yielded the odds of using traditional methods contraception while controlling for these modifying factors.

Model 3: This model built on model two and included individual influencers as categorised by the conceptual framework. The aim was to determine the association between traditional contraceptive use and a combination of modifying and individual characteristics. Likelihood of using traditional methods was determined in terms of odds ratios as a function of the said factors.

Model 4: This was the full regression model that considered the presence of all the socio-economic and demographic factors. The model controlled for modifying factors, individual influencers and cues to action as well, as per the categorisation provided in the conceptual

framework. The model yielded the odds of using traditional methods of contraception among married female users on any method while simultaneously controlling for the influence of all other factors in the study.

Objective 3: To compare the demographic and socio-economic determinants of traditional contraceptive use with those of modern contraceptive use

In order to make comparisons at descriptive statistics level, cross-tabulations were run within method types. That is, among users of traditional methods, proportions were obtained across various variable categories. Proportions within users of modern methods were obtained in a similar manner. The varying distributions of users of traditional methods were then compared with those of modern contraceptive users across corresponding variable categories that were statistically significant. Comparisons at inferential statistics level were made by computing the odds of using traditional methods in reference to using modern methods. Such comparisons were possible following the coding process of the dichotomous outcome variable as illustrated in section 3.7.1 (i.e. value 1 assigned for users of traditional methods, and value 0 for modern method users).

3.11. Model fitting

In order to ensure that the models were a good fit for the data, two types of diagnostic tests were performed. A test for multi-collinearity was done before the models were fit, and a test for model specification was done after model fitting.

3.11.1. Test for multi-collinearity

Multi-collinearity in regression analysis arises when two or more independent variables are strongly correlated with each other (Vatcheva et al., 2016). In studies like this one, whose focus dwells on determining the association between variables, multi-collinearity often obscures the calculation and identification of independent effects of predictor variables due to the common information they share (Kutner et al., 2005). An indicator of severely strong multi-collinearity is when correlation coefficients are greater than 0.8 (Franke, 2010).

In order to test for collinearity, a pairwise correlation involving all the variables was performed to produce a correlation matrix. The results of this test, as reported in Appendix B show evidence of strong collinearity between age and marital duration (r=0.8838). As such, the variable was

removed from the regression model. Following this, the highest correlation coefficient between predictor variables was only reported at 0.6447. Results of the multi-collinearity test have been reported in Annex II.

3.11.2. Test for specification error

Model specification error may occur in two instances. The first case is where variables included in the model are unimportant or those excluded from the model are crucial. The second instance is when a model has been "imposed" on the data (Starkweather, 2008). This can result in distrorted statistical inference about a population. Therefore, in order to test for specification error in Stata, the "linktest" command was performed immediately after a regression model was run. This test uses the linear predicted value (_hat) and the square of the linear predicted value (_hatsq) to establish that the predictors in the model are not just statistically significant by chance. The desired outcome of this test is for _hatsq to be statistically non-significant.

Overall, model was significant with *p*-value = 0.0000 for the fit. Results from the linktest p-value of the linear predicted value squared to be at 0.563. This implies that the independent variables included in the model were relevant, and that the model was correctly specified for the data. Results of this test have been reported in Annex III.

3.12. Limitations

3.12.1. Common source confounding

One of the challenges in the methodology is that both data on contraceptive use and that regarding socio-demography were obtained from respondents. This is likely to yield bias in the data based on the common source confounding rule (Platt e al., 2009). However, the analysis for this study was stratified by multiple categories of the predictor variables in order to minimise confounding. Fitting an adjusted regression model was also a necessary control for confounding during the inferential statistical analysis stage.

3.12.2. Underreporting of traditional methods

Secondly, as reported by Rossier and Corker (2017), approaches to probing about methods use tend to be less detailed in large surveys like the DHS when compared to smaller contraception-specific studies. This has been noted to underestimate use of traditional methods in relation to

actual current use. However, this study assumes this error to be evenly distributed across various socio-demographic characteristics, which should make the proportional distributions comparable.

3.12.3. Non-DHS variables

One of the findings from literature was that place of residence has an effect on type of contraception used through the varied distribution of health facilities between rural and urban areas among others (Adebowale et al., 2014). Much as the DHS contains data on place of residence, it does not contain the distribution of service delivery points. Similarly, information regarding experience of side effects, another determinant cited in literature like (Polis et al., 2018), was only available among females who discontinued using contraception. Thus, they did not form part of the study population. Additionally, a question regarding knowledge of side effects was only asked to users of long-acting or permanent modern contraceptive methods (pills, IUD, injection, female sterilisation and implants). As such, this study could not analyse access to health facilities or side effects as determinants of traditional contraception use. Lastly, the study considered including a DHS variable that reports the source where a female user of contraception got their current method. However, with regards to the context of this study, the variable only included one traditional method (standard days), thus giving it limited explanatory power and making it prone to bias. It was, hence, not included in this analysis.

3.12.4. Causality

Lastly, the common problem with cross-sectional studies is the inability to determine what came first between the exposure and the outcome – a concept known as temporality. This is because data regarding use of contraception and respondents' characteristics were obtained at the same time. This makes it difficult for the study to determine causality between correlates in question and the use of traditional contraception. As such, results for the inferential analysis can only be reported as associations.

CHAPTER 4: RESULTS

4.1. Introduction

This chapter presents results from this study following the analysis that was carried out. It begins with outlining the characteristics of the respondents through frequency tables, graphs and maps. This will largely form part of the univariate descriptives, whereas results of the bivariate analysis have been presented by cross-tabulating independent variables against the outcome variable. For the latter, a Chi Square (χ^2) distribution was used to determine the association between socio-economic and demographic factors, and use of contraception. Lastly, inferences about the target population have been made by fitting binary logistic regression models to determine the adjusted and unadjusted association between the outcome and independent variables. Thus, the results have been presented in terms of adjusted and unadjusted odds of using traditional methods of contraception given one's socio-demographic profile.

4.2. Descriptive results

4.2.1. Characteristics of married females who use any method of contraceptives in Malawi

Table 4.1 below shows the socio-demographic characteristics of the 9,396 sampled population. Among the married females aged between 15 and 49 years currently using any method of contraception, the largest proportion was aged between 25 and 34 years, which accounted for 41.29% of the sample. The age groups 15-24 years and 35-44 years comprised similar proportions of about a quarter of the sample, whereas those aged over 45 years constituted the least proportion (6.10%). Contraceptive users were predominantly rural (80.12%) than urban (19.88%), and were mostly Christians (72.83%). Catholics comprised the highest proportion of these Christians (17.65%), whereas Muslims made up 8.93% .Those with no religion comprised a negligible a proportion (0.6%). About two-thirds of contraceptive-users had attained primary-level schooling. Secondary school attainers came second at 20.84%, whereas smaller proportions were reported by those with higher education (2.34%) or no education at all (11.96%).

Table 4.1: Socio-demographic characteristics of married females ages 15-49 using any method of contraception in Malawi between 2015-16

Socio-Demographic Factors	Frequency	Percentage
TOTAL	**9,396**	**100.00%**
Age		
15-24	2,454	26.12
25-34	3,870	41.19
35-44	2,499	26.60
45+	573	6.10
Place of residence		
Urban	1,868	19.88
Rural	7,528	80.12
Region		
Northern	1,850	19.69
Central	3,441	36.62
Southern	4,105	43.69
Religion		
Catholic	1,658	17.65
Other Christian	6,843	72.83
Muslim	839	8.93
No religion/Other	56	0.60
Level of education		
No education	1,124	11.96
primary	6,094	64.86
secondary	1,958	20.84
higher	220	2.34
Wealth status		
Poor	3,290	35.01
Middle	1,862	19.82
Rich	4,244	45.17
Marital duration		
0-9	3880	41.29
10-19	3491	37.15
20-29	1792	19.07
30+	233	2.48
Time since last sex		
Within the past week	7,432	79.10
Over a week ago	1,964	20.90
Need for family planning		
Using for spacing	4,308	45.85
Using for limiting	5,088	54.15
Last child wanted		
wanted then	4,188	44.57
wanted later	2,111	22.47
wanted no more	850	9.05
Fertility preference		

Socio-Demographic Factors	Frequency	Percentage
TOTAL	**9,396**	**100.00%**
have another	3,977	42.33
undecided	331	3.52
no more	3,456	36.78
Using permanent method	1,632	17.37
Knows source for any method		
Yes	9,195	97.98
No	190	2.02
Visited by FP provider		
No	7,867	83.73
Yes	1,529	16.27
Heard of FP on radio		
no	4,987	53.08
yes	4,409	46.92
Couple discusses contraception use		
Yes	7,457	79.36
No	1,939	20.64

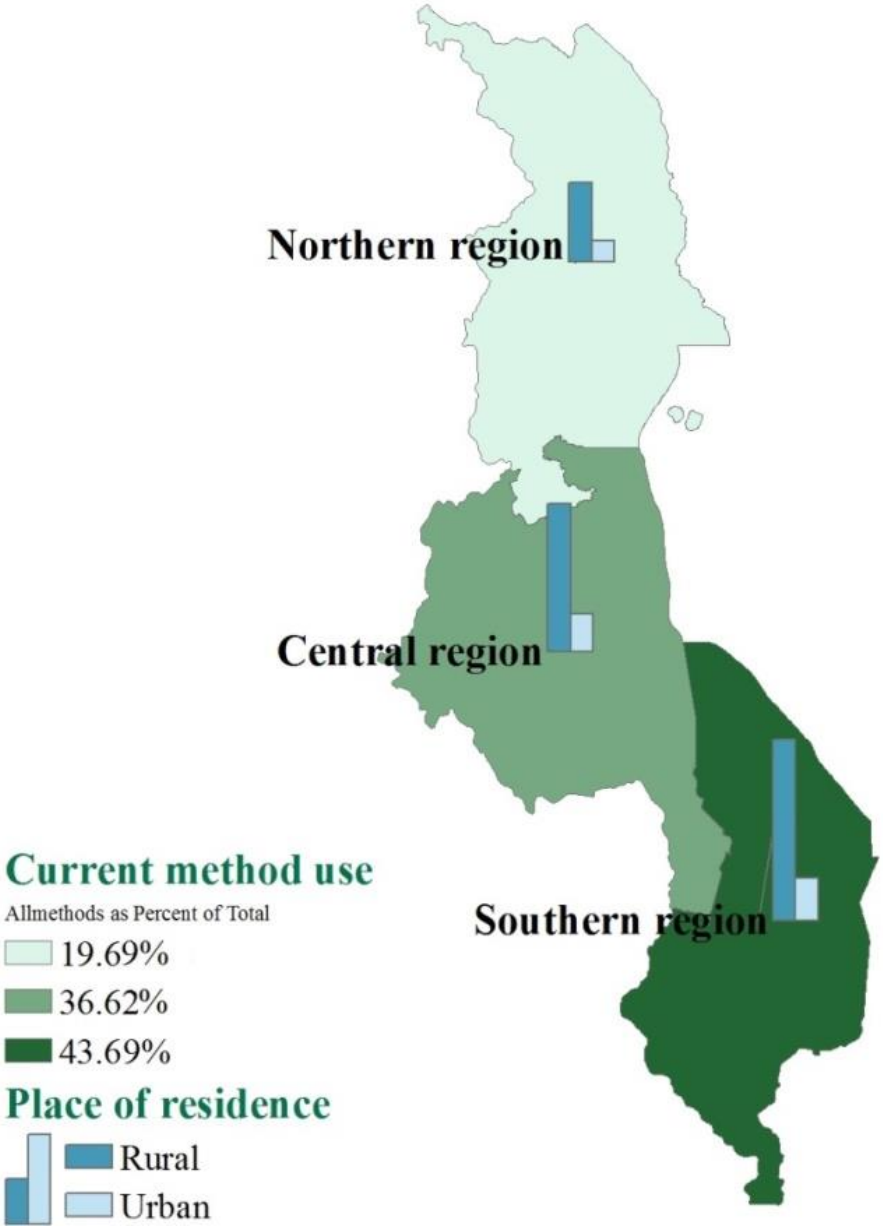
About 45.17% of the study sample had a rich income status compared to those classified as middle class (19.82). Only 2.48% of the sample had been in union for more than 30 years, whereas majority 41.29% and 37.15% were married for 0-9 years and 10-19 years respectively. About eight in every ten females were sexually active within seven days preceding the survey, and 20.90% had stayed for more than a week without sexual activity. More than half of the users of contraception were using it limiting than spacing despite most users wanting a child then (44.57%) than later (22.47%).

Additionally, the highest (45.57%) proportion of the sample wanted to have their most recent child at the time of their birth. About 22.47% had wanted to postpone it. About 40.20% of contraception users were either undecided about their fertility intentions, or did not want any more children, whereas 17.37% of them were on a permanent method. Knowledge about where to get any method of contraception was almost universal among users of any method despite only 46.92% of the sample having heard of family planning on the radio.

Figure 4.1 below shows the regional disparities among married female users of any method. Results indicate that the Northern region had the least (19.69%) proportion of contraceptive users followed by the Central region (36.62%). The highest proportion of contraceptive users was reported in Southern Malawi at 43.69%. The figure also illustrates the disproportionate use of

contraception by place of residence, whereby use was strongly dominated by users in the rural. This was the case across all three regions.

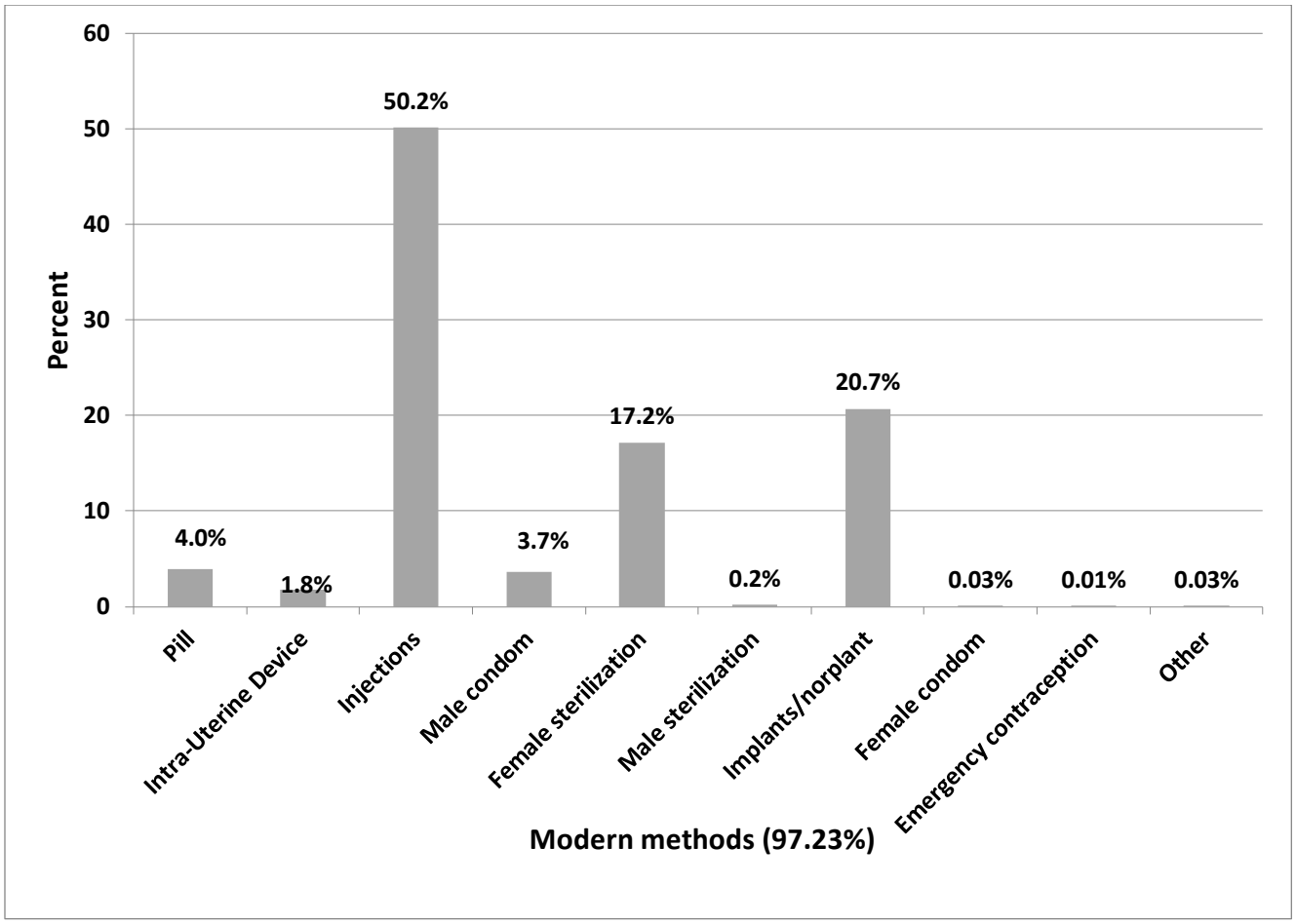
Figure 4.1: Map of Malawi showing the regional distribution and place of residence of married female users of any contraception aged 15-49 in Malawi



In terms of choice of contraceptive method used by married females, results indicate a highly disproportionate distribution between users of modern and traditional methods. According to the results reported in Figures 4.2 and 4.3 below, 97.73% of married females in Malawi currently use modern contraception whereas traditional methods comprise the remaining 2.27%. Specific

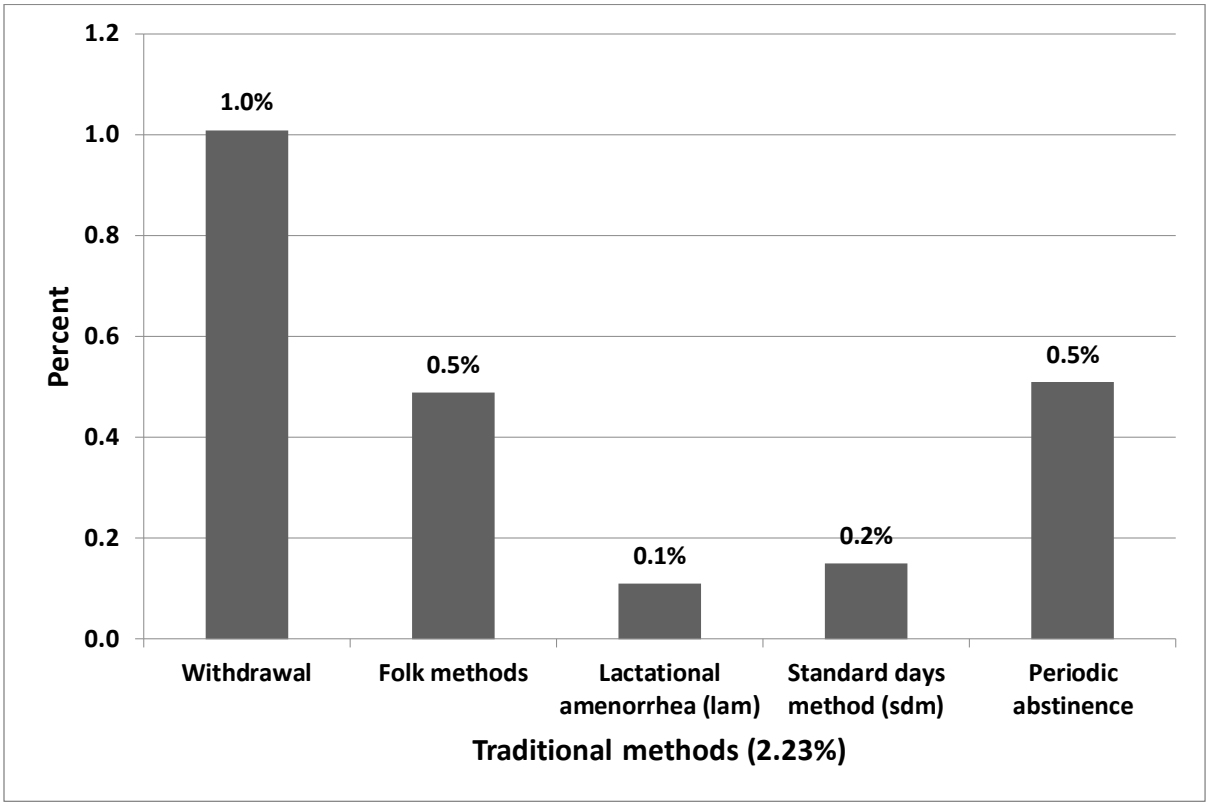
method distribution indicates that half of the sample (50.3%) currently uses injections followed by implants at 20.7%. Pills, intrauterine device and male condoms comprise 4.0%, 1.8% and 3.7% respectively. Furthermore the respondents reported withdrawal as the most common traditional method at 1.0% followed by folkloric methods (0.5%), periodic abstinence (0.5%), standard days method (0.2%) and lactation (0.1%).

Figure 4.2: Percentage distribution of users of modern contraception among married female ages 15-49 using any method of contraception in Malawi between 2015-16



Thus, there was high preference for modern methods of contraception among currently married females using contraception in Malawi. The most preferred method among users of traditional methods was the withdrawal method, and the least popular method was lactation. Among users of modern methods, the most popular were the injectables, whereas the least preferred was the emergency contraception, female condoms and other modern methods of contraception.

Figure 4.3: Percentage distribution of users of traditional contraception among married female ages 15-49 using any method of contraception in Malawi between 2015-16



4.2.2. Use of traditional contraception in relation to modern methods by socio-demographic characteristics

Figure 4.4 below shows the distribution of age groups among users of any method by type of contraceptive method used. The figure shows a similar age-pattern in contraceptive use among both users of traditional and modern methods, which increases steadily with age from 15-34 years then decreases with older age. While traditional contraceptive use was lower than modern contraceptive use in younger ages, its prevalence increased in older ages surpassing the latter. The highest level of traditional method use was reported among females aged 35-44 years (37.6%) whereas the proportion of modern contraceptive users had reduced to 26.3% for this age group. The proportion of users of traditional contraception in the oldest age group (45+ years) was 4.4% higher than that of modern method users. This was a sharp contrast to the method distribution in younger aged (15-24 years), which showed a lower prevalence of traditional contraception (17.4%) compared to modern methods (26.3%).

Figure 4.4: Age distribution of married females ages 15-49 using any method of contraception in Malawi between 2015-16 by type of contraceptive method

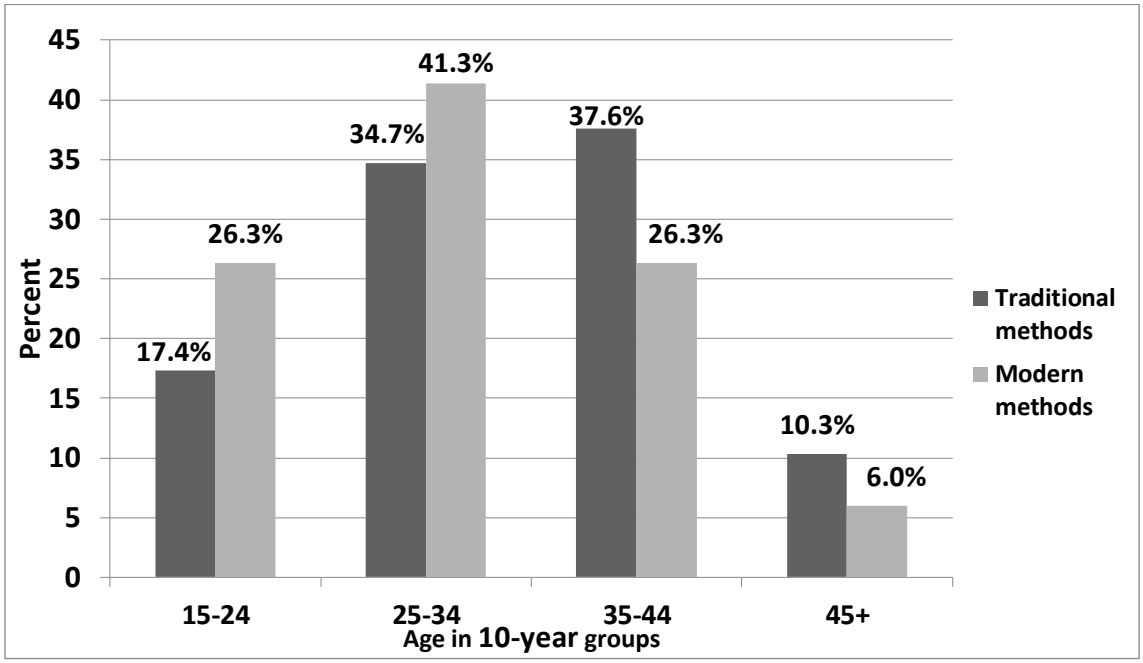


Table 4.2 below shows the cross-tabulation of use of traditional methods and modern methods of contraception by various demographic and socio-economic characteristics. It serves to illustrate and compare the variations in the characteristics of married females using traditional methods of contraception against those using modern methods.

Overall, results of the cross-tabulations showed a significant relationship (p=0.05) between the type of method used by married females and age, region, level of education, wealth status, marital duration, last child wanted, fertility preference and knowledge of source of any method. It was however marginally significant with the variable "need for family planning".

Both users of traditional (76.53%) and modern (80.20%) contraception were predominantly rural-based and largely with a Christian religious affiliation (traditional: 88.26%; modern: 90.52%). Out of this, Catholics comprised 15.96% of traditional method users and 17.68% of modern method users. Other Christian denominations constituted the remaining proportions. Most Muslims users reported using traditional methods (11.74%) than modern (8.86%). While the pattern of use was similar across levels of education, females with the highest education attainment had higher level of traditional contraceptive use (8.92%) compared to modern method users (2.19%). Those with secondary-level education equally had a higher proportion of traditional method use (23.94%) than modern (20.77%).

Table 4.2: Cross-tabulation of traditional and modern methods of contraception by demographic and socio-economic characteristics among married females aged 15-49 in Malawi.

Socio-Demographic Factors		Traditional		Modern	
		n	Percentages	n	Percentages
TOTAL		**213**	**%**	**9,183**	**%**
Age					
15-24 Years	Pr > Chi2 0.000	37	17.37	2,417	26.12
25-34 Years		74	34.74	3,796	41.19
35-44 Years		80	37.56	2,419	26.60
45+ Years		22	10.33	551	6.10
Place of residence					
Urban	Pr > Chi2 0.184	50	23.47	1,818	19.80
Rural		163	76.53	7,365	80.20
Religion					
Catholic		34	15.96	1,624	17.68
Other Christian	Pr > Chi2 0.160	154	72.30	6,689	72.84
Muslim		25	11.74	814	8.86
No religion/Other		0	0.00	56	0.61
Level of education					
No education		24	11.27	1,100	11.98
primary	Pr > Chi2 0.000	119	55.87	5,975	65.07
secondary		51	23.94	1,907	20.77
higher		19	8.92	201	2.19
Wealth status					
Poor	Pr > Chi2 0.015	62	29.11	3,228	35.15%
Middle		34	15.96	1,828	19.91
Rich		117	54.93	4,127	44.94
Marital duration*					
0-9		69	32.39	3,811	41.50
10-19	Pr > Chi2 0.003	78	36.62	3,413	37.17
20-29		57	26.76	1,735	18.89
30+		9	4.23	224	2.44
Time since last sex					
Within the past week	Pr > Chi2 0.673	166	77.93	7,266	79.12

Socio-Demographic Factors		Traditional		Modern	
		n	Percentages	n	Percentages
TOTAL		**213**	**%**	**9,183**	**%**
Over a week ago		47	22.07	1,917	20.88
Need for family planning	Pr > Chi2 0.057				
Using for spacing		84	39.44	4,224	46.00
Using for limiting		129	60.56	4,959	54.00
Last child wanted	Pr > Chi2 0.001				
wanted then		88	41.31	4,100	44.65
wanted later		42	19.72	2,069	22.53
wanted no more		10	4.69	840	9.15
Not applicable		73	34.27	2,174	23.67
Fertility preference	Pr > Chi2 0.000				
have another		79	37.09	3,898	42.45
undecided		5	2.35	326	3.55
no more		129	60.56	3,327	36.23
Using permanent method		0	0.00	1,632	17.77
Knows source for any method**	Pr > Chi2 0.000				
Yes		14	6.90	9,181	99.99
No		189	93.10	1	0.01
Visited by FP provider	Pr > Chi2 0.007				
No		164	77.00	7,703	83.88
Yes		49	23.00	1,480	16.12
Heard of FP on radio	Pr > Chi2 0.483				
No		108	50.70	4,879	53.13
Yes		105	49.30	4,304	46.87
Couple discusses contraception use					
Yes	Pr > Chi2 0.858	168	78.87	7,289	79.37
No		45	21.13	1,894	20.63

* = *Highly collinear variable, not included in the regressions*

****** = *Variable not included in regression for having a category not meeting minimum sample size requirements for Maximum Likelihood Estimates* Hart & Clark, (1999) – *Yields inflated odds ratios*

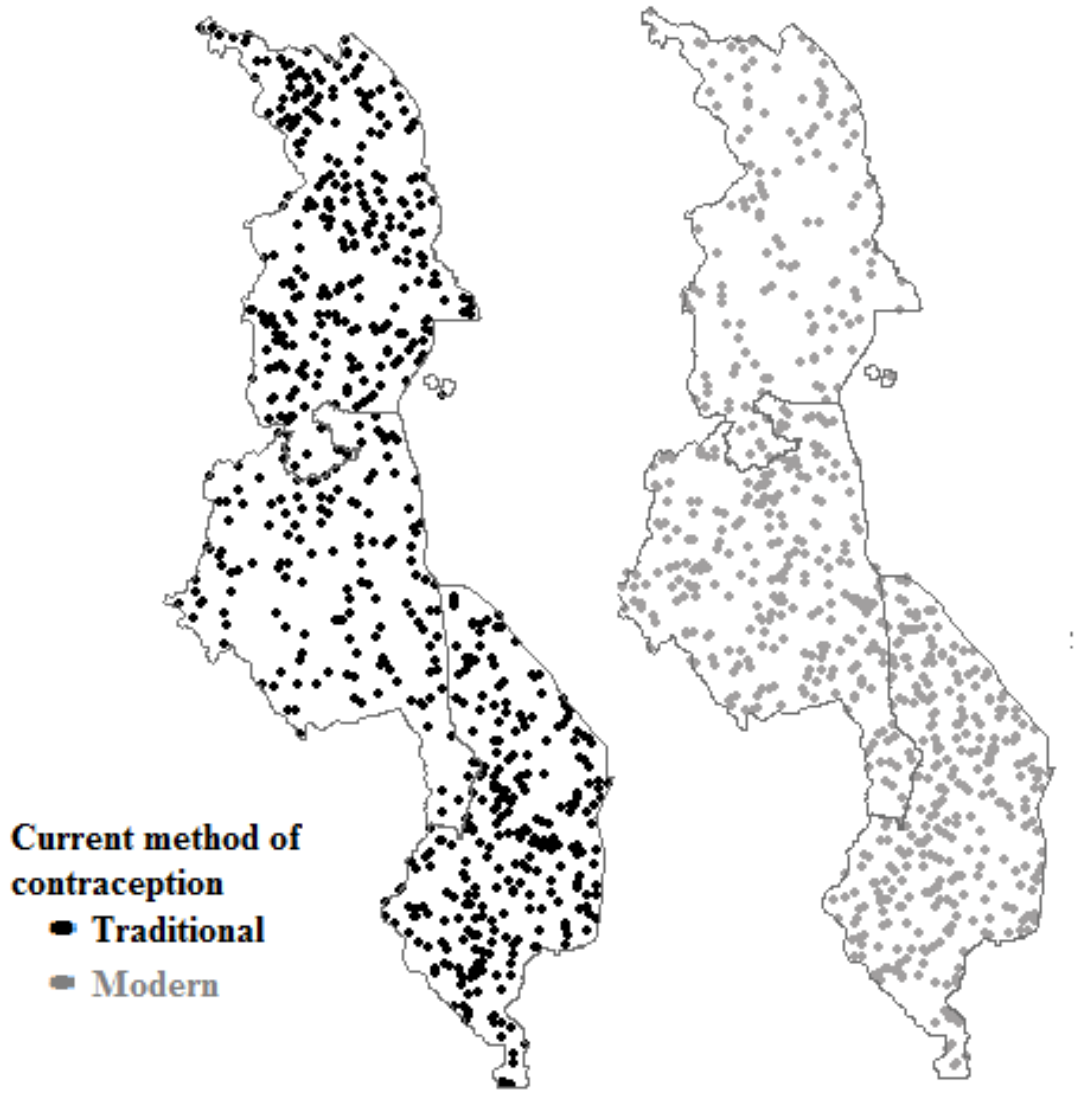
Majority of users of both method types had a rich wealth status category with over half (54.93%) of traditional methods reporting being rich and 44.94% of modern method users reporting the same. Similarly, there was no much variation in method use among females that intended to have another child. On the other hand, those who did not have preference for any more children in the future had the highest use of traditional methods (60.56%) than modern methods (30.23%).

On the other hand, use of traditional methods was lower among those who had been in union for 0-9 years (traditional: 32.39%; modern: 41.50%) and 10-19 years (traditional: 36.62%; modern: 37.17%). More females with longer marital durations, however reported using traditional methods than modern. The proportions were 26.76% and 4.23% for marital durations of 20-29 and 30+ years respectively among traditional method users, compared to 18.89% and 2.44% for the same respective year groups among uses of modern methods. Again, slightly lower proportions of traditional method users (77.93%) reported sexual activity within the previous week that preceded the survey compared to modern method users (79.12%). Married females who had stayed sexually abstinent for over a week indicated a slightly higher (22.07%) use of traditional methods than modern methods of contraception (20.88%).

Nevertheless, users of either type of method needed contraception for spacing than limiting births although a higher (60.56%) proportion of traditional users reported use them for spacing compared to modern method users (54.00%). Use of traditional methods was lower among females who had wanted their last child then, later or did not want any more children. An astonishing 93.1% of users of traditional methods did not know a source of any method of contraception where as 99.9% of modern method users knew at least one source. There were low provider outreach visits covering only 23% of traditional method users. Additionally, there was little variation in type of method used among married females who had either heard about family planning on the radio or discussed family planning with their spouses.

Figure 4.5 below shows two maps illustrating the countrywide proportional distribution of users of modern and traditional methods of contraception. The illustration visually compliments some of the findings in the table above, which show that the Northern Region had a high proportion of traditional contraception users (38.97%) compared to users of modern methods (19.24%). This can be visualised in the figure below by noticing the fewer number of dots representing users of modern methods in the northern part of the country.

Figure 4.5: A comparison of the proportional number of users of traditional vs. modern methods among married female users of any method aged between 15 and 49 in Malawi in 2015-16



Pr > Chi2 0.000

4.3. The relationship between contraception use and socio-demographic factors

Odds ratios were used to determine the association between socio-demographic variables and use methods of contraception. In order to do this, four binary logistic regression models were applied. Overall, the analysis included a total of 14 independent variables. Table 4.3 below shows the results of the unadjusted and adjusted in order to test the relationship between socio-demographic variables and the use of traditional contraception in comparison to modern methods among married female users in Malawi.

Table 4.3: Unadjusted and adjusted odds ratios of the association between use of traditional methods of contraception, and socio-demographic factors

Socio-Demographic Factors	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Odds Ratio	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**
MODIFYING FACTORS								
Age [Ref: 15-24]								
25-34	0.83	[0.465-1.501]	0.81	[0.450-1.461]	0.86	[0.459-1.594]	0.80	[0.426-1.492]
35-44	1.87*	[1.055-3.324]	1.97*	[1.099-3.531]	2.12	[0.923-4.860]	2.49*	[1.148-5.400]
45+	1.71	[0.871-3.343]	1.88	[0.944-3.730]	1.81	[0.668-4.905]	3.68*	[1.429-9.467]
Place of residence [Ref: Urban]								
Rural	0.64*	[0.413-0.981]	0.70	[0.389-1.252]	0.71	[0.396-1.272]	0.76	[0.417-1.367]
Region [Ref: Northern region]								
Central region	0.31**	[0.197-0.491]	0.27**	[0.170-0.445]	0.28**	[0.173-0.461]	0.30**	[0.181-0.495]
Southern region	0.49**	[0.335-0.705]	0.42**	[0.284-0.626]	0.42**	[0.275-0.649]	0.34**	[0.219-0.539]
Religion [Ref: Catholic]								
Other Christian	0.84	[0.530-1.347]	0.82	[0.508-1.321]	0.83	[0.517-1.326]	0.83	[0.524-1.316]
Muslim	1.90*	[1.016-3.571]	2.14*	[1.138-4.043]	2.23*	[1.199-4.130]	1.98*	[1.044-3.757]
No religion/Other	1.00	[0.000-0.000]	1.00	[0.000-0.000]	1.00	[0.000-0.000]	1.00	[0.000-0.000]
Level of education [Ref: No Education]								
Primary school	0.95	[0.590-1.520]	1.10	[0.673-1.784]	1.09	[0.673-1.776]	1.10	[0.668-1.828]
Secondary school	1.11	[0.641-1.912]	1.35	[0.785-2.330]	1.33	[0.770-2.295]	1.20	[0.680-2.107]
Higher	3.19*	[1.294-7.842]	3.60*	[1.342-9.634]	3.40*	[1.264-9.125]	3.53*	[1.215-10.271]
Wealth status [Ref: Poor]								
Middle	0.97	[0.555-1.680]	0.85	[0.486-1.481]	0.84	[0.480-1.458]	0.86	[0.494-1.512]
Rich	1.40	[0.984-1.996]	0.88	[0.574-1.360]	0.85	[0.543-1.321]	0.93	[0.588-1.461]
Marital duration [Ref: 0-9]								
10-19	0.23	[-0.245-0.699]	–	–	–	–	–	–
20-29	0.68*	[0.178-1.175]	–	–	–	–	–	–
30+	0.56	[-0.237-1.364]	–	–	–	–	–	–
INDIVIDUAL INFLUENCERS								
Last sexual activity [Ref: Within the past week]								

Socio-Demographic Factors	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	Odds Ratio	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**	**Odds Ratio**	**[95% Conf. Interval]**
Over a week ago	1.24	[0.836-1.845]			1.11	[0.746-1.644]	1.05	[0.706-1.556]
Need for family planning [Ref: for spacing]								
Using for limiting	1.17	[0.816-1.664]			0.84	[0.497-1.419]	1.08	[0.675-1.728]
Last child wanted [Ref: Wanted then]								
Wanted later	0.81	[0.507-1.297]			0.87	[0.533-1.412]	0.85	[0.528-1.379]
Wanted no more	0.63	[0.279-1.401]			0.54	[0.238-1.233]	0.51	[0.224-1.155]
Visited by FP provider [Ref: No]								
Yes	1.24	[0.836-1.838]			0.99	[0.646-1.518]	0.79	[0.513-1.229]
CUES TO ACTION								
Fertility preference [Ref: Want another child]								
Undecided	0.15	[-0.881-1.176]					0.71	[0.243-2.098]
No more	0.59*	[0.229-0.957]					1.03	[0.644-1.649]
Using permanent method	0.00	[0.000-0.000]					1.00	[0.000-0.000]
Heard of FP on radio [Ref: No]								
Yes	0.95	[0.665-1.346]					0.82	[0.559-1.210]
Couple discusses contraception use [Ref: Yes]								
No	1.23	[0.822-1.855]					1.07	[0.691-1.656]

Model 1 : Unadjusted model

Model 2 : Controlled for modifying factors alone

Model 3 : Controlled for modifying factors and individual influencers

Model 4 : Controlled for modifying factors, individual influencers and cues to action

* *: $\alpha<0.05$*

** *: $\alpha<0.000$*

– *: Variable omitted on basis of collinearity with age*

4.3.1. Model 1: Unadjusted odds ratios

Model one, which included the outcome variable and one independent variable at a time, had a total of fourteen iterations. Its results have been presented in Table 4.3 above. Overall, the model provided sufficient evidence on the influence of age, place of residence, region, level of education, religion, marital duration and fertility preference on the type of contraception method used.

The findings show that the odds of using traditional contraception than modern methods among married females in Malawi were 1.87 [CI: 1.055-3.324] times higher among those aged 35-44 years than those aged 15-24 years. Conversely, the odds were 0.64 [CI: 0.413-0.981] times lower in the rural areas than in the urban areas.

Regional comparisons indicate that females from the Central and Southern regions were 0.31 [CI: 0.197-0.491] and 0.49 [CI: 0.335-0.705] times less likely to use traditional methods than modern methods when compared to those in the northern part of Malawi. On the other hand, the odds of using traditional contraception were 3.19 [CI: 1.294-7.842] times among females with higher level of education compared to those with no education at all. All these relationships were statistically significant.

Additionally, in terms of religion, Muslims were 1.90 [CI: 1.016-3.571] times more likely to use traditional methods compared to Catholics whereas the association with other Christian denominations showed a statistically non-significant relationship. Nevertheless, statistically significant odds were reported among females who had stayed in union for 20-29 years, as they were 0.68 [CI: 0.178-1.175] times less likely to use traditional methods than modern methods in relation to those with marital durations of between 0-9 years. Similarly, females who never wanted any more children in the future were 0.59 [CI: 0.229-0.957] times less likely to use traditional methods than modern methods of contraception in comparison to those who wanted another child.

On the other hand, non-statistically significant results were reported on variables: wealth status, last sexual activity, need for family planning, last child wanted, visited health facility, heard family planning on the radio, and intra-couple discussion.

4.3.2. Model 2: Adjusted odds of using contraception based on modifying factors

Model two controlled for the following six modifying factors: age, place of residence, region, religion, level of education and wealth status. Marital duration was automatically dropped from the model due to collinearity with the variable age. Results from this model indicate that having adjusted for modifying factors, females aged 35-44 years were 1.97 [CI: 1.099-3.531] times more likely to use traditional methods than modern methods when compared with those aged 15-24 years. Married female users of contraception living in the Central and Southern regions were respectively 0.27 [CI: 0.170-0.445] and 0.42 [CI: 0.284-0.626] times less likely to use traditional methods compared to those living in the Northern Region of the country. Muslim females were twice as much more likely to use traditional methods than Catholics were [OR=2.14; CI: 1.138-4.043].

The highest likelihood of using traditional methods was observed among females with the highest level of education, whose odds were 3.60 [CI: 1.342-9.634] times more likely compared to those with no education at all. However, this model did not report a statistically significant relationship between type of contraception used and either place of residence or wealth status

4.3.3. Model 3: Adjusted odds of using contraception based on modifying factors and individual influencers

Following this model application, variables age and place of residence were no longer statistically significant. However, region, religion and education showed a significant relationship. Married female users of contraception in the Central region were 0.28 [CI: 0.173-0.461] times less likely to use traditional methods, whereas those in the South were 0.42 [0.275-0.649] times less likely when all were compared with females residing in northern Malawi. Muslim females were 2.23 [CI: 1.199-4.130] times more likely to use traditional contraception than Catholics. In this model, the odds of using traditional methods among married females with the highest educational attainment dropped to 3.40 [CI: 1.264-9.125] times more likely when compared to those with no education.

4.3.4. Model 4: Adjusted odds of using contraception based on modifying factors, individual influencers and cues to action

Model four was the fully adjusted model, which examined the independent associations of traditional contraceptive use and predictors while controlling for all other covariates listed in

Table 3.1. In the presence of all the socio-economic and demographic factors, the following variables were statistically significant: age, region, religion and education. Findings indicate that conditioning for the presence of these factors significantly increased the odds of using traditional contraception among married females aged 35-44 years [OR=2.49; CI: 1.148-5.400] and 45+ years [OR=3.68; CI: 1.429-9.467] in relation to those aged 15-24 years.

Conversely, there was a slight change in the odds of traditional contraceptive use among females living in the Central and Southern regions of the country to 0.30 [CI: 0.181-0.495] and 0.34 [CI: 0.219-0.539] less likely compared to those in the Northern region.

The influence of religion on determining type of contraception used in this model dropped, as Muslim females were 1.98 [CI: 1.044-3.757] times more likely to use traditional than modern methods in comparison with Catholics. In terms of level of education, the odds of using traditional contraception were 3.53 [CI: 1.215-10.271] times higher among married females with the highest educational attainment in relation to those with no education.

Non-statistically significant relationships were noted with all other variables except age, region, religion and level of education. Controlling for all other variables increased the odds of traditional contraception use among females living in rural areas from 0.64 [CI: 0.413-0.981] in the unadjusted model to 0.76 [CI: 0.417-1.367] times lower than those living in urban areas. The odds among wealth status categories were almost similar, as both females with middle and rich statuses were 0.86 [CI: 0.494-1.512] and 0.93 [CI: 0.588-1.461] times less likely to use traditional contraception in comparison with those from poor backgrounds.

Compared to those who were sexually active within the preceding week, females who had been sexually abstinent for over a week were 1.05 [CI: 0.706-1.556] times more likely to use traditional methods than they were to use modern methods of contraception. Similarly, those who used contraception for limiting than spacing had an odds ratio of 1.08 [CI: 0.675-1.728] times more likely to use traditional methods than modern methods. Females who either wanted to postpone their last birth or did not want any more children were respectively 0.85 [CI: 0.528-1.379] and 0.51 [CI: 0.224-1.155] times less likely to use traditional methods compared to those that wanted their most recent child at the time of its birth.

Additionally, being visited by a family planning provider reduced the likelihood of using traditional contraception to 0.79 [CI: 0.513-1.229] times less. More likelihood for using

traditional methods was reported among females that had never discussed family planning with their spouses [OR:1.07; CI: 0.691-1.656]. However, the odds were lower for females that had ever heard of family planning on the radio with an odds ratio of 0.82 [CI: 0.559-1.210] times less likely. Table 4.3 above summarises these results.

4.4. Testing research hypothesis

Results of the hypothesis test were based on outputs of the full binary logistic regression model with an assumed significance level of α=0.05.

H_0 – there is no statistically significant relationship between demographic and socio-economic factors and the use of traditional contraception among married females aged between 15 and 49 in Malawi.

H_1 - there is a statistically significant relationship between demographic and socio-economic factors and the use of traditional contraception among married females aged between 15 and 49 in Malawi

Following application of the full model, a number of socio-economic and demographic variables in the full model showed a significant relationship with type of method of contraception used, with p-value less than 0.05. Therefore this study failed to accept the null hypothesis and concludes that there is a significant association between demographic and socio-economic factors and the use of traditional contraception among married females aged between 15 and 49 in Malawi. Although this is the case, statistically significant results of this should be interpreted with caution for programmatic purposes, as the sample size of users of traditional methods was very small.

CHAPTER 5: DISCUSSION

Overall, this study sought to determine the relationship between demographic and socio-economic factors and the use of traditional contraception among married females aged 15-49 years in Malawi. This has been achieved by first establishing the level of traditional contraception use among married female users in the country. Secondly, associations between traditional method use and socio-economic and demographic factors were determined and examined. This chapter therefore serves to interpret and discuss the findings of this study in the context of findings from other studies in Malawi, the region and globally.

5.1. Discussion of study findings

The study's theoretical and conceptual frameworks hypothesise that an individual has to have enough knowledge about a perceived threat (unplanned pregnancy) in order to engage in preventive health behaviour (use of effective contraception) (Rosenstock et al., 1994). Findings of this study were aligned with this hypothesis, as having no knowledge of where to source contraception was significantly associated with use of traditional methods. However, since these were females already on a traditional method of contraception, this finding may imply that these users were using methods that were not provided for by a service provider. It could also suggest that these users did not aid their current traditional method with techniques from a skilled professional.

Results reveal a significantly higher likelihood of using traditional methods than modern methods among highly educated females. Schools of thought that support this finding have likened it to improved spousal communication and better self-rated efficacy to using traditional methods among educated females (Perera, 2014; Peyman et al., 2007). It is argued that married females who are highly educated better engage their partners, and this helps enhance understanding, and adherence to using traditional methods (Perera, 2014). Additional adherence to traditional methods among literate and educated females may also emanate from their ability to better understand the nuances associated with these methods (e.g. knowledge of symptoms and menstrual cycle calendar). Such skills are said to improve the confidence in using traditional methods (Peyman et al., 2007).

Findings of this study show that there is prevalence of traditional contraception of about 22 per 1000 married females. Patterns across the three regions of the country reveal significantly higher

use of traditional methods in the Northern Region whereas residential comparisons surprisingly show higher use proportions and likelihood of using these methods in urban areas than rural. Such findings yield various rationales in the context of this study. The high prevalence of traditional methods in Northern Malawi can be linked to the region's low overall contraceptive use (Palamuleni, 2013). Areas with lower overall use of contraception have been associated with higher chances of using traditional methods due to the high unmet need in such settings (World Bank, 2010). Northern Malawi, is the most underdeveloped with poor infrastructure and limited social services (Dunga, 2014). This can also be associated with limited access to modern contraception, which drives the likelihood of using of traditional methods in this area.

Users of all methods were mostly Christian, as that should be following the overall population composition of the country. According to the Malawi Religion Project, Christians constitute 77% of the country's population, Muslims make up 15%, whereas the remaining 8% consists of traditional African religion believers (Adams & Trinitapoli, 2009). Proportionally higher rates of using traditional contraception among Muslims were substantiated by a significantly higher likelihood as well. While Islamic doctrines do not explicitly condemn use of modern methods, there is documented evidence of the use of the withdrawal method by early adopters of the religion (Roudi-Fahimi, 2004). Additionally, Muslim teachings that promote prolonged breastfeeding can be likened to the promotion of lactational amenorrhoea method (Mir & Shaikh, 2013). Both notions may justify a conducive environment for proliferation of traditional method use among Muslims.

Within Sub-Saharan Africa, Muslims in Kenya have equally been noted to have less likelihood of using modern methods of contraception when compared to Christians (Abdulla, 2014). One of the explanations is the differences in key socio-economic characteristics between Muslims and Christians. Across many developing countries, married Muslim females have reported lower wealth status when compared to Christians (Heaton, 2013). Such a factor may perpetuate use of traditional methods than modern methods. Muslim females in Malawi were equally reported to have the lowest wealth status and comprised the least proportions in urban areas (Heaton, 2013). These may pose as barriers to modern contraception use among Muslim females in the country.

Another interesting finding was observed when patterns of traditional contraception use were explored in relation to age. Traditional method use was higher and more likely among females who were older (aged 35-44 years). There are several explanations to this finding, which concurs

to the evidence by Chipeta et al (2010)'s exploration of contraceptive knowledge, beliefs and attitudes in rural Southern Malawi. Participants in that study, among others, believed that traditional methods are more prevalent among older and married females as they are perceived to be less fertile, hence less susceptible to pregnancy. This may be the case in particular with females on the higher end of this age group, as they would be approaching menopause. Secondly, other findings indicate that certain traditional contraception, especially folkloric methods, are perceived to cure infertility among these older females (Chipeta et al., 2010). As such, this finding should be somewhat representative to the majority of the country's population, which is predominantly rural as well (Ricker-Gilbert et al., 2014).

Examining nuptiality dynamics among married females, especially regarding the duration of marriage, provided strong evidence of high traditional method use among those that have stayed longer in marriage. Studies like Perera (2014) have ascribed rising levels of traditional method use to improved couple communication, an attribute that increases with marital duration (Weigel & Ballard-Reisch, 1999). Such traits, combined with reduced sexual activity among older couples increases adherence to and confidence in traditional contraception - particularly rhythm-based methods (Perera, 2014; Uddin, 2007). This may explain why the present study reports higher use of traditional methods among females with longer marriage durations.

In terms of residential differentials, higher use of traditional methods compared to modern methods in urban areas is in contrast to a number of studies that have reported otherwise (Hoq, 2016). Thus, ideally, use of traditional methods is expected to be higher in rural areas, as these areas are characterised with a number of barriers that limit access to modern methods (Ajayi et al, 2018). Therefore, lower use of traditional methods in rural Malawi can be ascribed to the existence of a community health outreach network, which prioritises provision of modern methods (Scott et al., 2015). Such community family planning programmes have increased use of modern methods in resource-constrained areas through service provision and demand creation (Scott et al., 2015). Much as rural communities were significantly less likely to use traditional contraception, when the analysis controlled for modifying factors, individual influencers and cues to action, the relationship was only marginally significant.

Similarly, results of the unadjusted regression model show a lower likelihood of using traditional methods among females who did not want any more children in the future. Adjusting for the presence of other factors, however, provided little evidence of this association. On the other

hand, a chi square association shows statistically significant proportions of females who did not want any more children using traditional contraception as opposed to long-acting or permanent modern methods. Fertility preference among females has been noted to be less of a predictor of choice of method when male spouses desire a higher number of children than the wife (Prata et al., 2017). As such, it is argued that non-use of long-acting or permanent methods despite the desire to limit among females comes in to cover for future changes in fertility preference by either her or the male spouse (Bankole & Audam, 2011).

Surprisingly, most females on traditional methods were using them for limiting rather than spacing children. Ideally, the need to limit births calls for long-acting or permanent methods of contraception, which fall in the modern methods category unlike the need for spacing, where short-acting methods have proven to be equally effective (Haile et al., 2016). Such concerns raise questions on whether a wide range of contraception options are readily accessible to postpartum females when needed most. An analysis of DHS results for 18 sub-Saharan African countries shows that females that have achieved their desired parity still have an unmet need for limiting future births citing fear of side effects and other health concerns as the principal reason for non-use (Van Lith et al, 2013). However, noting that use of traditional methods is higher in older ages - a phase where limiting births is more likely, it is surprising to note that married females still use ineffective methods instead of long-acting modern methods.

There was sufficient evidence to note that users that were visited by a healthcare provider were more in number, with three out of four using traditional methods of contraception. Besides this finding providing further evidence on the coverage of Malawi's network of community-based health providers as noted by Tsui et al., (2017), it also provides an opportunity understand what influences use of traditional methods in the presence of access to outreach health services. Malawi's community family planning services are provided by low-cadre health workers (Health Surveillance Assistants [HSAs] and Community-Based Distribution Agents [CBDAs]) who are only mandated to administer counselling services and selected contraception methods (Richardson et al., 2009). This may limit the options of modern methods available for females, and could be part of the reasons behind continued use of traditional contraceptive methods.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The study confirmed the hypothesis that there is a statistically significant relationship between socio-economic and demographic factors, and the use of traditional methods of contraception among married females aged 15-49 years in Malawi. Overall, levels and likelihood of using traditional contraception vary by a myriad of these characteristics. The study shows that preference to use traditional methods over modern methods of contraception is mainly driven by age, geographical region, religious affiliation and level of education. The conceptual framework categorises these factors characteristics as modifying factors. Thus, we note that modifying factors play a far much bigger contribution towards driving individual choice of contraception through their influence on individual perceptions and cues to action.

The results point to a number of policy and programme implications including the need to further understand diverse phenomena pointed out towards the end of this chapter. This is particularly important considering that access to modern methods of contraception is one of the key indicators of achieving SDG goal number III (ensure healthy lives and promote well-being for all at all ages).

A number of policy recommendations can be drawn from the study. Firstly, the Ministry of Heath's directorate for reproductive health, as the overall policy lead for the national sexual reproductive health programme, should consider broadening the range of services provided by community health workers besides counselling, oral contraception, condoms and injectables. This will widen the choice of methods available to females. This could be done by revising a number of policies and guidelines, including the 2016 Sexual Reproductive Health and Rights (SRHR), the Family Planning Costed Implementation Plan (CIP) 2016-2020 and the National Youth-Friendly Health Services (YFHS) strategy 2015-2020 (Government of Malawi, 2015, 2016b, 2016a). Currently, Malawi has just integrated issues of population and family planning in its recent medium-term development strategy (the Malawi Growth and Development Strategy for 2017-2022), which provides a fertile environment for such an initiative.

Secondly, with services being provided by various stakeholders, the directorate for reproductive health, as a national convener of various sub-technical committees, should ensure continued participation of such diverse members in technical working groups. Furthermore, members in these forums should report on use of traditional methods as well so as to determine levels of unmet need for modern methods in this context. Participation of religious leaders and religious-

affiliated service delivery institutions should also be ensured to enable development of strategies that determine positive adoption of effective methods among all religious beliefs. This stems from the finding that religion is one of the key drivers of method choice.

At the programme level, the first recommendation calls for the need to implement a multi-sectoral family planning behaviour change communication programme that reaches both males and females with age-specific messages about contraception. The current Costed Implementation Plan for Family Planning (2016-2020) (Government of Malawi, 2016a) contains a comprehensive component on demand creation and advocacy. Involvement of multiple development sectors towards implementation of this plan will ensure contraception users from various demographic and socio-economic backgrounds are reached. For instance, with traditional method use being higher in older ages, messaging for such groups should be tailored to influence a shift to modern methods. Such efforts can involve the Ministry of Education and religious institutions to work towards promoting modern contraception over traditional. Having messages tailored to specific age groups will ensure that demand for modern methods is created for older females, who are the likely users of traditional methods.

Secondly, having noted the poor uptake of modern methods in Northern Malawi, building more health facilities may not be immediately feasible considering the sparsely distributed population in the region. The department of environmental health in the Ministry of Health, which coordinates community health services programmes (Kok et al., 2016), should further intensify the coverage outreach health programmess as an interim solution for the Northern region.

There is also need to increase demand for modern methods in all urban areas of Malawi through information, education and communication campaigns. With use being associated with high educational attainment, there is need for targeted programing in places where such a demographic would typically be found.

Health facilities in tertiary level educational institutions should actively engage their communities in demand-creation and education campaigns that increase uptake of effective contraception. There is also need to create programmes targeting workplaces as well as communities around central business districts of the country. Strategies targeting older couples should also devise ways of reaching out to them, for instance, through marriage counselling programmes, community neighbourhood programmes or involvement of community/traditional

leaders. Lastly, it is imperative that religious leaders are trained to interpret scriptures without condemning use of modern contraceptive methods especially considering that some of the holy books (e.g. the Quran) do not explicitly denounce such.

At service delivery-level, service institutions need to ensure that family planning services are integrated with most services. Such initiative ensures that more clients are reached with family planning information including modern methods regardless of their purpose of visit. For instance, Malawi's national guidelines for HIV recommend that providers should initiate family planning discussion with HIV patients. Such initiative can be practiced in other health programmes as well. Service delivery institutions like government health facilities, Christian Health Association of Malawi (CHAM), Population Services International (PSI), Marie Stopes International (MSI) and the Family Planning Association of Malawi (FPAM) can play a huge role in taking up this initiative. The further study recommends training community health workers to enhance their capacity in providing long-acting methods that are relatively easier to administer like implants (currently, implants are administered by higher-level cadres). This will ensure that communities have broad options of modern contraception to choose from. Such level of access may go a long way at minimising the regional disparities in access to contraception.

Given that this study is limited in its ability to determine why married females are still using traditional contraception, future studies may need to explore the relationships observed in this study using a more qualitative approach. Such a design will go beyond the present study by understanding the underlying reasons, opinions and motivations behind why married females of certain characteristics use traditional methods over modern.

Again, given the absence of a proxy measure for gender empowerment in the dataset, the study could not directly analyse the effects of male influence on method choice in varying power dynamics. As such, studies could also explore the influence of gender dynamics towards traditional method use. It could also be beneficial to conduct a comparative analysis of the coverage of Malawi's community family planning programmes across the three regions of the country. This emanates from the finding that overall contraception uptake in the region is low, coupled with relatively higher prevalence of traditional methods. Additionally, with contraceptive use significantly varying across geographical spaces, a more detailed spatial analysis would help inform policies and programmes to target populations at risk at finer geographical detail. This will help improve service delivery characteristics associated with non-

use of modern methods of contraception. Lastly, given that the study did not explore the differences in socio-economic characteristics across users of various religions, future studies should also look at the extent to which such differences influence the type of contraceptive method used.

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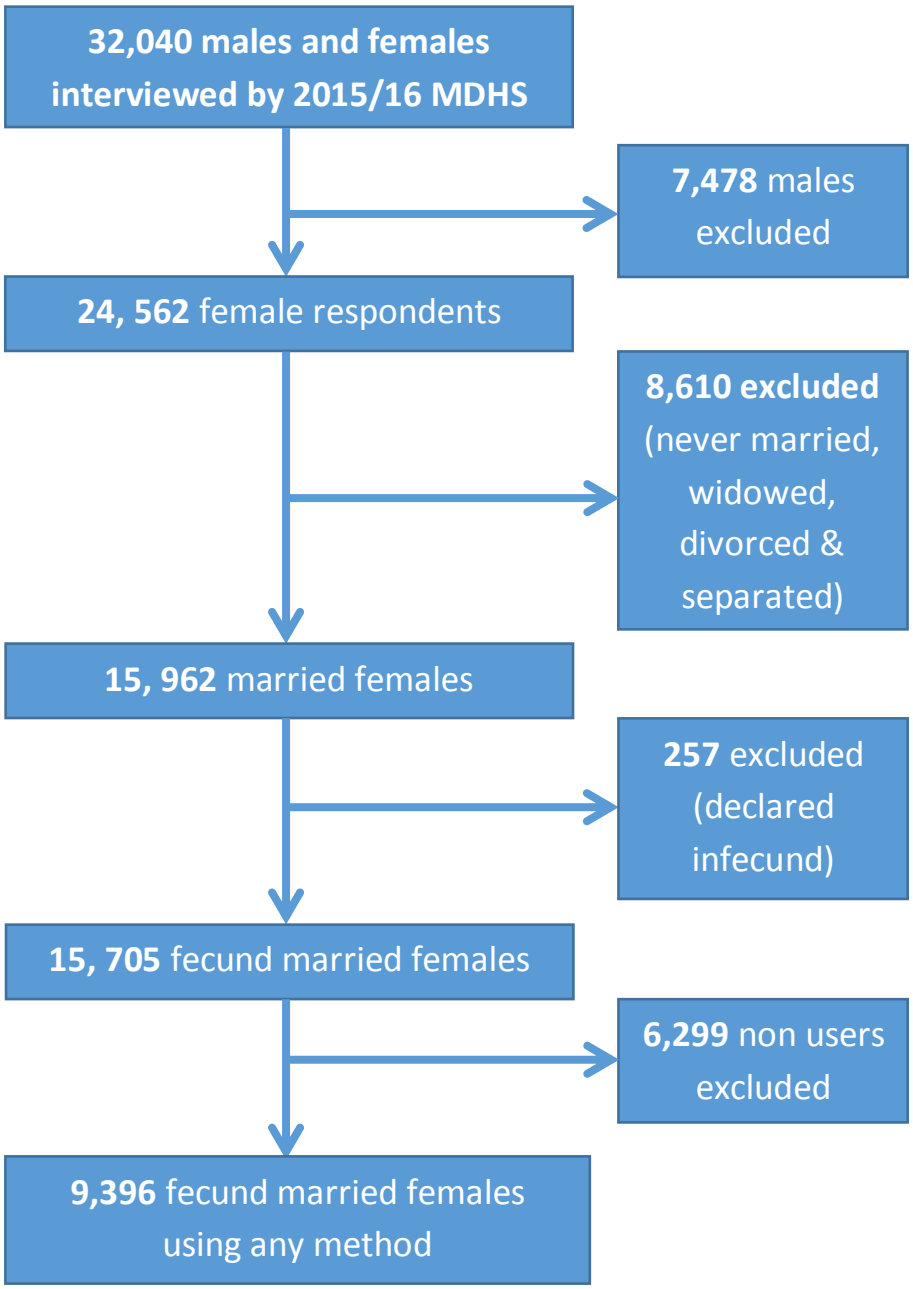
ANNEXES

Annex I: Inclusion and exclusion criteria for the analysis sample



Annex II: Results of the multi-collinearity test

```
. do "C:\Users\Pierre\AppData\Local\Temp\STD00000000.tmp"

. pwcorr methodtype agecat10 residence region Religion education wealth Marital
> Duration LastSex UnmetNeed LastChildWanted fertpref knowsSource VisitedByProv
> ider HeardFP CoupleDiscussion
```

	method~e	agecat10	reside~e	region	Religion	educat~n	wealth
methodtype	1.0000						
agecat10	0.0494	1.0000					
residence	-0.0137	-0.0099	1.0000				
region	-0.0472	-0.0198	0.0177	1.0000			
Religion	0.0094	-0.0362	-0.0248	0.0781	1.0000		
education	0.0407	-0.1683	-0.3119	-0.1220	-0.0922	1.0000	
wealth	0.0268	0.1626	-0.4014	-0.1339	-0.0315	0.3337	1.0000
MaritalDur~n	0.0373	0.8169	0.0522	-0.0001	-0.0188	-0.2815	0.0978
LastSex	0.0044	0.0527	0.0174	0.0661	0.0353	-0.0273	-0.0189
UnmetNeed	0.0196	0.5816	-0.0281	0.0228	-0.0309	-0.1439	0.1012
LastChildW~d	0.0335	0.5157	-0.0633	-0.0081	-0.0603	-0.0591	0.1635
fertpref	-0.0074	0.6367	-0.0279	-0.0122	-0.0447	-0.1563	0.1191
knowsSource	0.9616	0.0538	-0.0080	-0.0494	0.0091	0.0277	0.0226
VisitedByP~r	0.0278	-0.0391	0.0484	-0.2271	-0.0249	0.0371	0.0135
HeardFP	0.0072	0.0270	-0.1536	-0.1175	-0.0369	0.2331	0.2796
CoupleDisc~n	0.0018	0.0736	0.0214	0.0241	0.0429	-0.0658	-0.0443

	Marita~n	LastSex	UnmetN~d	LastCh~d	fertpref	knowsS~e	Visite~r
MaritalDur~n	1.0000						
LastSex	0.0479	1.0000					
UnmetNeed	0.5682	0.0628	1.0000				
LastChildW~d	0.5241	0.0255	0.3620	1.0000			
fertpref	0.6244	0.0550	0.0447	0.4443	1.0000		
knowsSource	0.0430	-0.0012	0.0199	0.0387	-0.0048	1.0000	
VisitedByP~r	-0.0274	-0.0210	-0.0364	-0.0631	-0.0474	0.0349	1.0000
HeardFP	-0.0163	-0.0459	-0.0032	0.0507	0.0059	0.0012	0.0829
CoupleDisc~n	0.0733	0.0735	0.0707	0.0642	0.0782	-0.0004	0.0032

	HeardFP	Couple~n
HeardFP	1.0000	
CoupleDisc~n	-0.0700	1.0000

Annex III: Results of the test for specification error (Linktest)

```
. linktest
(running logit on estimation sample)

Survey: Logistic regression

Number of strata   =        56                  Number of obs      =      9,396
Number of PSUs     =       850                  Population size    =  7,680.887
                                                Design df          =        794
                                                F(   2,    793)    =      52.23
                                                Prob > F           =     0.0000
```

methodtype	Coef.	Linearized Std. Err.	t	P>|t|	[95% Conf.	Interval]
_hat	.5337412	.5010382	1.07	0.287	-.4497748	1.517257
_hatsq	-.0747247	.0812509	-0.92	0.358	-.2342168	.0847673
_cons	-.6566259	.7376528	-0.89	0.374	-2.104606	.7913543

Annex IV: Stata code for data analysis

```
clear
set maxvar 20000
use "C:\Users\Pierre\Documents\MA (Health Demography, 2018)\SOSS Research Report\ ///
Datasets\Malawi 2015-16 DHS Datasets\Individual Recode (Womens file IR) ///
\MWIR7HFL.DTA", clear

* CREATING THE OUTCOME VARIABLE(methodtype)
recode v312 (1/7 = 0) (11 = 0) (14/17 = 0 "Modern methods") (8/10 = 1)(12/13 = 1)///
(18 = 1 "Traditional Methods"), gen (methodtype)
tab methodtype

* EXCLUDING OBSERVATIONS
drop if v312==0 //removing non-users of fp
keep if v501==1 | v501==2 //keeping "married & living together"
drop if v602==5 //declared infecund
tab methodtype

* APPLYING SURVEY WEIGHTS (Weights only used in regression)
gen weight = v005/1000000
svyset [pweight=weight], psu(v021) strata(v023)

* CREATING/RENAMING INDEPENDENT VARIABLES

//Age (10-year groups)
recode v012 (15/24 = 1 "15-24 Years") (25/34 = 2 "25-34 Years") ///
(35/44 = 3 "35-44 Years") (45/max = 4 "45+ Years"), gen (agecat10)

//Place of residence
rename v025 residence

//Region
rename v024 region

//Religion
recode v130 (1 = 1 "Catholic") (2/5 = 2 "Other Christian") (6 = 3 "Muslim")///
(7/max = 4 "No religion/Other"), gen (Religion)
```

```
//Type of marriage
recode v505 (0 = 0 "Monogamy")(2/19 = 1 "Polygamy") (98 = 3 "Wife unsure"),///
 gen (MarriageType)

//Highest level of Education
rename v106 education

//Employment status
rename v714 employment

//Wealth status
recode v190 (1/2 = 1 "Poor") (3 = 2 "Middle") (4/5 = 3 "Rich"), gen (wealth)

//Fertility preference
rename v602 fertpref

//Children ever born
recode v201 (0/4 = 1 "Four children at most") (5/max = 2 "More than 4 children"), ///
gen (CEB)

//Marital duration
recode v513 (1/2 = 1 "0-9 Years") (3/4 = 2 "10-19 Years") (5/6 = 3 "20-29 Years") ///
(7/max = 4 "30+ Years"), gen (MaritalDuration)

//Time since last sex
recode v528 (0/7 = 0 "Within the past week") (8/31 = 2 "Over a week ago"),///
 gen (LastSex)

// Susceptibility to pregnancy
rename v623 susceptibility

//Need for contraception
rename v624 UnmetNeed

//Last child wanted
rename v367 LastChildWanted
replace LastChildWanted = 9 if LastChildWanted==.
```

```
label define LastChildWanted 9 "Not applicable", modify

//Knows source for any method
recode v380 (1/7=0 "Yes") (8=1 "No"), gen (knowsSource)

//First source of current method
recode v3a07 (11/12 = 1 "Government health facility") ///
(13/17 = 2 "Government outreach/community worker")(20/21 = 3) ///
(23/25 = 3 "Private health facility/delivery") (22 = 4)(31/33 = 4 "Pharmarcy/shop/friend") ///
(26/29 = 5 "CHAM Mission facilities") (34/36 = 6 "Marie Stopes/Other NGO")(96 = 7 "Other"), ///
 gen(FirstSource)
recode FirstSource (1 = 1 "Government facility") (2 = 2 "Government outreach") ///
(3/4 = 3 "Private facility/phamarcy") (5/7 = 4 "CHAM, NGOs & other") (5 = 5 "Don't know"), ///
 gen (firstsource2)

 //Visited by FP worker
rename v393 VisitedByProvider

//Visited health facility
rename v394 VisitedFacility

//Told about side effects
rename v3a02 ToldSideEffects

//Heard of family planning on radio
rename v384a HeardFP

//Couple discusses contraception use
recode v632 (3=0 "Yes") (1/2=1) (6=1 "No"), gen (CoupleDiscussion)

* CROSSTABS

//Frequencies
tab agecat10 methodtype
tab residence methodtype
tab region methodtype
tab Religion methodtype
```

```
tab Religion methodtype
tab education methodtype
tab wealth methodtype
tab MaritalDuration methodtype
tab LastSex methodtype
tab UnmetNeed methodtype
tab LastChildWanted methodtype
tab fertpref methodtype
tab knowsSource methodtype
tab VisitedFacility methodtype
tab VisitedByProvider methodtype
tab HeardFP methodtype
tab CoupleDiscussion methodtype

//Percentages (Computed separately for easy merging in Microsoft Office Excel)
tab agecat10 methodtype, col nof chi
tab residence methodtype, col nof chi
tab region methodtype, col nof chi
tab Religion methodtype, col nof chi
tab education methodtype, col nof chi
tab wealth methodtype, col nof chi
tab fertpref methodtype, col nof chi
tab MaritalDuration methodtype, col nof chi
tab LastSex methodtype, col nof chi
tab UnmetNeed methodtype, col nof chi
tab LastChildWanted methodtyp, col nof chi
tab fertpref methodtype, col nof chi
tab knowsSource methodtype, col nof chi
tab VisitedFacility methodtype, col nof chi
tab VisitedByProvider methodtype, col nof chi
tab HeardFP methodtype, col nof chi
tab CoupleDiscussion methodtype, col nof chi

* REGRESSION MODELS

//Unadjusted (Model 1)
svy: logit methodtype i.agecat10, or
```

```
svy: logit methodtype i.Religion, or
svy: logit methodtype i.education, or
svy: logit methodtype i.wealth, or
svy: logit methodtype i.MaritalDuration, or
svy: logit methodtype i.LastSex, or
svy: logit methodtype i.UnmetNeed, or
svy: logit methodtype i.LastChildWanted, or
svy: logit methodtype i.VisitedByProvider, or
svy: logit methodtype i.fertpref, or
svy: logit methodtype i.HeardFP, or
svy: logit methodtype i.CoupleDiscussion, or

//Model 2 (Modifying factors)
svy: logit methodtype i.agecat10 i.residence i.region i.Religion i.education ///
i.wealth, or // Marital duration dropped, multicollinearity

//Model 3 (Individual influencers)
svy: logit methodtype i.agecat10 i.residence i.region i.Religion i.education i.wealth ///
 i.LastSex i.UnmetNeed i.LastChildWanted i.VisitedByProvider, or

//Model 4 (Cues to action/Full model)
svy: logit methodtype i.agecat10 i.residence i.region i.Religion i.education i.wealth ///
i.LastSex i.UnmetNeed i.LastChildWanted i.VisitedByProvider i.fertpref i.HeardFP ///
i.CoupleDiscussion, or

*//MODEL DIAGNOSTICS
//Pairwise Correlation
pwcorr agecat10 residence region religion MarriageType education wealth CEB ///
MaritalDuration LastSex susceptibility UnmetNeed LastChildWanted knowsSource ///
VisitedByProvider HeardFP CoupleDiscussion

//Model Specification
svy: logit methodtype i.agecat10 i.residence i.region i.Religion i.education i.wealth ///
i.LastSex i.UnmetNeed i.LastChildWanted i.VisitedByProvider i.fertpref i.HeardFP ///
i.CoupleDiscussion, or

linktest
```

Annex V: Stata code for data analysis (Other model variations tested)

```
* ADDITIONAL MODELS TESTED (STEPWISE)

//Stepwise regression
xi: stepwise, pr(0.05):logit methodtype i.agecat i.residence i.region i.religion ///
i.MarriageType i.education i.employment i.wealth i.CEB i.LastSex i.susceptibility ///
i.UnmetNeed i.LastChildWanted i.VisitedByProvider i.VisitedFacility i.HeardFP ///
i.CoupleDiscussion, or

* ADDITIONAL MODELS TESTED (MODELS WITH A PRIMARY EXPOSURE AT A TIME)

//Model 1 (Influence of cues to action)
svy: logit methodtype i.agecat i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.residence i.HeardFP i.CoupleDiscussion,or
svy: logit methodtype i.region i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.religion i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.MarriageType i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.education i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.employment i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.wealth i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.CEB i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.MaritalDuration i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.LastSex i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.susceptibility i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.UnmetNeed i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.LastChildWanted i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.VisitedFacility i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.VisitedByProvider i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.HeardFP i.HeardFP i.CoupleDiscussion, or
svy: logit methodtype i.CoupleDiscussion i.HeardFP i.CoupleDiscussion, or
```

```
//Model 2 (Influence of individual perceptions)
svy: logit methodtype i.agecat i.LastSex i.susceptibility i.VisitedFacility i.///
VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.residence i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed,or
svy: logit methodtype i.region i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.religion i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.MarriageType i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.education i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.employment i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.wealth i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.CEB i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.MaritalDuration i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.LastSex i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.susceptibility i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.UnmetNeed i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.LastChildWanted i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.VisitedFacility i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.VisitedByProvider i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.HeardFP i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
svy: logit methodtype i.CoupleDiscussion i.LastSex i.susceptibility i.VisitedFacility ///
i.VisitedByProvider i.LastChildWanted i.UnmetNeed, or
```

```
//Model 3 (The influence of modifying factors)
svy: logit methodtype i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.residence i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment,or
svy: logit methodtype i.region i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.religion i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.MarriageType i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.education i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.employment i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.wealth i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.CEB i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.MaritalDuration i.agecat i.wealth i.education i.religion i.region ///
 i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.LastSex i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.susceptibility i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.UnmetNeed i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.LastChildWanted i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.VisitedFacility i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.VisitedByProvider i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.HeardFP i.agecat i.wealth i.education i.religion i.region i.CEB ///
i.residence i.MarriageType i.MaritalDuration i.employment, or
svy: logit methodtype i.CoupleDiscussion i.agecat i.wealth i.education i.religion i.region ///
i.CEB i.residence i.MarriageType i.MaritalDuration i.employment, or
```