CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 BACKGROUND

National surveys have continued to reveal that a proportion of women aged 15-49 (reproductive age) in developing countries have an unmet need for contraception. The concept of unmet need for contraception is used to refer to fecund women's non-use of contraceptives, despite being sexually active and having an expressed desire not to want any more children or want to delay the birth of the next child (Sonfield 2006; Westoff 2006). Those who want to stop having more children are said to have unmet need for limiting while those who want to wait for at least two years before having the next child are said to have unmet need for spacing (Westoff 1988a). In addition, all pregnant or postpartum amenorrheic women are classified as having unmet need for contraception if their pregnancy or current birth was unwanted or mistimed (UN, Department of Economic and Social Affairs, Population Division 2011).The concept dates back to the 1960s, when findings from the Knowledge, Attitude, and Practice (KAP) surveys revealed that a substantial number of women in developing countries expressed a desire to stop child bearing, but were not using any contraceptive method (Bongaarts & Bruce 1995; Ngom 1997; Casterline 2003; Sonfield 2006). Thus it "arose out of concern with family planning needs in developing countries" (Klijzing 2007:74).

Useful critiques, better methods of collecting data and different thinking have led to the revision of the concept of unmet need for contraception (Ravindran & Mishra 2001; Shah, Shah, Chowdhurya & Menon 2004). The original definition focusing on unmet need for limiting was later broadened to include women's unmet need for spacing (Westoff 1978; Weston & Pebley 1981). Nortman (1982) advocated for the inclusion of pregnant, breastfeeding or amenorrheic women in the definition of unmet need for contraception as such women would immediately need to use contraceptives again. Further refinements have seen the inclusion of unmarried women, men (married and unmarried), young people and those whose current method is inappropriate and inadequate (Dixion-Mueller & Germain 1995; Sinding & Fathalla 1995; Westoff &Bankole 1995; De Graff &de Silva 1996; Becker 1999; Ross & Winfrey 2002). The reason for this expansion is that sexually active unmarried women and female young people are also vulnerable to becoming pregnant. Sexually active males (both adults and young people) can also be classified as having unmet need if "their partners are fecund and not pregnant, and they do not want their partners to become pregnant, but neither they nor their partners use contraception" (Robey, Ross & Bhushan 1996:3-4). Women who use inappropriate and inadequate methods are considered to have unmet need for contraception because either they risk getting pregnant or their reproductive health is compromised.

Unmet need for contraception was included to the Millennium Development Goal number 5 (MDG 5) in 2006 as a way of tracking improvement on maternal health (Ferdousi et al. 2010; Ko et al. 2010; UNFPA & Program for Appropriate Technology in Health {PATH} 2008). The fifth MDG has two targets: lowering maternal mortality ratio by three-quarters and attaining universal access to reproductive health by 2015. The former has two indicators while the latter has four indicators and the fourth one (Unmet need for family planning) is the focus of this study. By adding unmet need for contraception to MDG 5, global leaders affirmed that family planning is the key to achieving MDGs. Moreover, some studies have made a case for family planning by showing how each MDG is linked to family planning (Bernstein 2006; Singh et al. 2004). They contended that achieving MDGs is dependent on satisfying unmet need for contraception, in that family planning can, among other things, aid in ensuring that all children go to school, curb the AIDS pandemic, reduce infant mortality and promote gender equality.

Family planning helps families to have fewer children who they can afford to educate, unlike when they have more children (Cohen 2004). The use of the condom offers a twofold shield from pregnancy and Sexually Transmitted Infections (STIs) including HIV/AIDS (Smith et al. 2009). Furthermore, Reynolds et al. (2006) suggested that investing in a family planning project was more effective than investing in an anti-retroviral drugs project aimed at preventing mother-to-child-transmission. They noted that expenditure on the former prevents about 29% more births of babies infected with the HIV virus than an equal amount spent on the latter. Women who use contraceptives are more likely to space their births for at least 36 months apart (UNFPA & PATH 2008). This helps the mother to breastfeed the infant for a longer period. Moreover, the mother will have more time to take care of the infant than when another one comes too soon. This reduces chances of the infant being affected by diseases which may lead to early deaths. Family planning emancipates women. Women who do not use contraceptives risk having unintended pregnancies which can hinder their progress in education and employment (Cates Jr. 2010). Research has established that contraceptive users are more likely to be employed compared to non-users (Riyami et al. 2004; MacPhail et al. 2007; Seutlwadi 2012). Similarly, Bernstein (2006:72) asserted that “investing in a career …would be inconceivable for a woman with no control over the timing and spacing of her pregnancies”.

1.1. STATEMENT OF THE PROBLEM

Despite the concept undergoing some considerable revision and refinement, research has continued emphasizing currently married women’s unmet need for contraception, largely ignoring unmarried women, men and adolescents. This creates a problem in that a section of the population (unmarried women, men and adolescents) is left out. This section of the population also has unmet need for contraception. Leaving it out means that its needs are not being attended to and this can result in negative reproductive health outcomes. In addition, this results in not having a true picture of the situation. Zambia is no exception to this in that the disseminated figure of 27% is based on currently married women only. Though it is traditionally expected that married people are the ones who are sexually active, reality has revealed that the unmarried (both adults and young people) are also sexually active with the attendant consequences. This being the case, they also ought to be included when measuring unmet need for contraception.

One of the reasons for challenging the traditional definition of unmet need for contraception is that teenage pregnancy is one of the major problems today’s world is experiencing. The United Nations {UN} (2001) reveals that 15 million babies are delivered by teenage mothers annually with a large proportion of this figure coming from African countries, including Zambia. Actually, a former United Nations Population Fund (UNFPA) Country Representative, Dr. Deji Popoola, is reported to have “described teenage pregnancy in Zambia as a crisis” and asked the government to take young people’s reproductive health needs seriously (Eastday 2006:1; Gold 2010). More than a quarter (28%) of adolescent females aged 15-19 have either had a child or are having their first pregnancy (Central Statistical Office (CSO), Ministry of Health (MOH), Tropical Disease Research Center (TDRC), University of Zambia (UNZA) & Macro International Inc. 2009).

Haque (2010) indicated that unmet need for contraception was highest among the age group 10–19 (adolescents). This suggests the need to prioritise addressing adolescents' reproductive health needs. Similarly, Bayer (2002) pointed out the significance of meeting young people's (which includes adolescents) reproductive health issues by arguing that "if today's young women … delay childbearing by two and a half years beyond the current average age at first birth, population in 2100 would be ten percent lower". In addition, Barosso (2010) gave a rationale for prioritising the needs of young people. Among the reasons given for the need to prioritise young women's needs are that it has not been easy to fulfil their needs and that these women have been denied their sexual rights. The latter is said to have been the cause of unintended pregnancies.

Most (85%) of the teenage pregnancies are unintended in that they are either unwanted or mistimed (German Foundation for World Population 2008; Santelli 2003). Unmet need for contraception is associated with unintended pregnancies. Existing studies have established that unintended pregnancies increase the risk of morbidly, mortality and unsafe abortions (Barosso 2010; Haque 2010). Moreover, MacDonald (2010); WHO (2007a) contended that though the risk applies to all women in the reproductive ages, it is higher among young women. Specifically, it is more probable that teenage pregnancy will result into pregnancy and birth associated complications which include anaemia, obstructed labour and excessive bleeding or/and maternal mortality (Singh 1998; Neema, Musisi & Kibombo 2004; Liche 2010). Smith, Ashford, Gribble and Clifton (2009) concluded that the odds of dying of pregnancy related complications are 2-5 times higher among adolescents compared to women, aged 20 and above. Furthermore, Bearinger et al. (2007); Barosso (2010) reported that 2.5 million teenagers in developing countries undergo unsafe abortions annually. At the continental level, Shah and Ahman (2004); World Health Organisation {WHO} (2007b) noted that young women accounted for more than half (60%) of unsafe abortions cases.

Pregnancy and childbearing is associated with health risks for the infant. The risks of low birth weight and being premature, injury at birth or stillbirth are higher for babies born to adolescent mothers (Dailard 2000; Gubhaju 2002). Studies have revealed that age of the mother is inversely associated with infant and child mortality, that is, infants and children born to teenage mothers have increased odds of dying, compared to those born to mothers between twenty and thirty years of age (Hobcraft, McDonald and Rutstein1985; Mustafa & Odimegwu 2008; Kaldewei & Pitterle 2011).

Other reproductive health concerns in Zambia include maternal mortality, induced abortion and fertility. Maternal Mortality Rate stands at 591 deaths per 100,000 live births. Induced abortion is ranked among the top five causes of maternal death, thus contributing close to one third (30%) of maternal deaths (Simms 1996; Chiwama 2009). Koster-Oyekan (1998) argued that induced abortion accounted for approximately 120 deaths per 100,000 live births in four of the districts in Western Province between 1994 and 1995 with more than 50% of the victims being school girls. This suggests that teenagers tend to fall for induced abortion as a solution to unintended pregnancy.

Zambia has Total Fertility Rate (TFR) of 6.2. WHO (2006) observed that TFR could be used as a good proxy measure for either the success or failure of family planning services and a measure of physical reproductive health. Moreover, available evidence indicates that there is a high correlation between TFR and CPR. In addition, women with high parity (>4 births) have increased risks of maternal morbidity and mortality compared to those with low parity. This means that most women in Zambia have a high probability of experiencing maternal morbidity and mortality.

As earlier mentioned, previous research has paid more attention to women's unmet need compared to men's. This is despite Ngom (1997) observing that it is unacceptable to ignore men's unmet need considering that reducing unmet need translates into lowering fertility. Addressing men's unmet need is crucial in sub-Sahara Africa where previous research suggests that reproductive decisions are to a greater extent influenced by male rather than female preferences (Mbizyo & Adamchak 1991; Ezeh 1993; Dodoo et al 1997; Dodoo 1998). Furthermore, some studies strongly suggest that including men in family planning programmes and research cannot be overlooked if challenges related to reproductive health are to be effectively addressed (Wolf et al. 2000, Dudgeon & Inkhorn 2004; Dudze & Muhammed 2006).

The few studies on men's unmet need for contraception have tended to focus on its measurement without examining the correlates. For instance, Ngom's (1997) study which introduced the concept of men's unmet need used the Ghana and Kenya Demographic and Health Surveys to determine the magnitude and trends of unmet need for contraception among men and couples in the two countries. The study's findings revealed that though men's unmet need for contraception was slightly lower than that for women, it was high and comparable to the women's.

Using data from a 1998 survey of urban households in Nigeria, Odumosu et al. (2003) went a step further by examining the determinants of unmet need for limiting childbearing among currently married men. The results indicated a high percentage of unmet need for limiting. Furthermore, the results showed that proximity to a family planning clinic was a major determinant of unmet need for limiting childbearing. Though these results are not from a nationally representative survey, they do confirm the existence of a substantial unmet need for contraception among men in Nigeria.

Yaday, Singh and Goswami (2009) study used semi-structured interviews to collect data from couples in Dayalpur Village, Haryana, India. The results of this study whose first objective was to establish the level of unmet need for contraception among husbands and wives, revealed that men's unmet need was significantly lower than that for women. Like findings of Odumosu et al. (2003), these findings may not be generalised to a wider population because the sample was not nationally representative. All three studies estimated the level of unmet need for contraception among men, but only one of them examined its correlates.

Bhushan (1997) noted that from the 1960s to 1997, scholars had concentrated on matters pertaining to definitions and measurements of unmet need among currently married women with only a few of them seeking to examine the factors underlying it. The situation is no longer the same as a number of studies such as Stash (1999), Lutalo et al. (2000); Chaudhury (2001); Pasha, Fikree & Vermund (2001); Ikamari (2002); Korra (2002), Ahmadi & Iranmahboob (2005); Bhandari et al. (2006); Igwegbe, Igboaja, & Monago (2009); Anand (2010) have examined the correlates of unmet need for contraception. Though this is the case, these studies have tended to focus on factors operating at the individual level. Thus, the potential influence of community factors on unmet need has largely been ignored and yet these are considered to be more effective policy informing instruments than the individual and household ones (Degraff et al. 1999; Stephenson &Tsui 2002). Similarly, Babalola and Fatusi (2009) observed that overlooking these factors results in a gap in research and program implementation. Since individuals are nested in communities, it is important that the analysis of factors influencing unmet need for contraception go beyond the individual level factors.

Furthermore, building on Claeson et al.'s (2001) work, Shaikh (2010) argued that similar to the analysis of any other health outcomes, analysis of factors underlying unmet need for contraception ought to incorporate individual, household and community variables. This is because individuals are influenced by households in making decisions related to seeking reproductive health care. Additionally, individuals' responses to health programmes will be influenced by the kind of community they live in (Stephenson et al 2006).

Existing studies on contraceptive use have established that community factors significantly influenced geographical differentials in contraceptive use (Stephenson & Tsui 2002; Stephenson, et al. 2007). This being the case, community factors such as community women's education, mass media saturation, ethnic diversity and the prevalence of a large family norm are likely to influence unmet need for contraception. Additionally, Ononokpono et al. (2013) observed that community factors had a moderating effect on the influence of individual factors on antenatal care visits. This implies that community beliefs and norms in a way do affect an individual's perception and utilization of reproductive health services of which family planning is part.

Though previous studies, Mushinge and Kurz (1998); Ikamari and Lwaanga (2000), have provided useful information on correlates of unmet need for contraception among married women in Zambia, the present study recognizes the multidimensional nature of unmet need by incorporating household, community and programme access factors. This study thus sought to organise these factors in order to find out which of them to a large extent determines unmet need in Zambia. None of the previous studies has systematically examined the relationship between selected reproductive health problems and unmet need for contraception. Therefore, the present study provides useful insights on this relationship.

1.2 LITERATURE REVIEW

This section presents the review of relevant literature. The section aims at providing an overview of the studies on unmet need at three levels: global, sub-Saharan Africa region and Zambia. In addition the section will discuss the underlying factors of unmet need as well as the consequences of unmet need.Various search engines and databases, such as Google, Google Scholar, JSTOR and Pub Med, were used to collect the relevant literature.

There are substantial publications on unmet need for contraception dating back to more than forty years (Ravindran & Mishra 2001). Studies and enquiries on unmet need for contraception fall under three categories, that is, those which focus on the definition and measurement, those which explore causes and determinants, and those which examine the consequences of unmet need for contraception (Ahmadi & Iranmahboob 2005). Of the three categories, the first one has received more attention than the others. This study covers all the three categories.

1.2.1 Unmet need for Contraception: A Global Issue

Though the 1990s saw a drop of 2% in the percentage of currently married women with unmet need for contraception (19% to 17%), the actual size of women with unmet need for contraception has not changed much due to population growth (Ashford 2003; Ross & Winfrey 2002). Bayer (2002:2) argues that “although contraceptive use has increased, the number of people who want family planning is growing faster than the population of reproductive age, contributing to a high level of unmet need.” About 200 million women of childbearing age (17%) in developing countries were estimated to have an unmet need for contraception in 2008 (Barot 2008; Singh et al. 2009; Singh & Darroch 2012). There are variations in the levels of unmet need for contraception across the regions of the developing countries. Middle East and North Africa have the lowest level (11%) whereas Sub-Saharan Africa’s level of 26% is the highest among the various regions (World Bank 2010). Differences also exist in the components of unmet need for contraception. While unmet need for spacing is higher than that for limiting among all the other regions, the opposite is the case with sub-Saharan Africa.

Moreover, there are variations in the levels of unmet need for contraception within the regions. In Asia, Pakistan has the highest level (33%) whereas Vietnam has the lowest level (5%). Unmet need for contraception ranges from 6% (Turkey) to 38.6% (Yemen) in the Middle East/North Africa region. It is worth noting that Yemen is the only country with a level that is higher than 11% as the levels for the other countries in the region range from 6% to 11%. This could be because Yemen’s survey was conducted in 1997 whereas the rest of the countries’ surveys were conducted between 2000 and 2005. There is also a possibility that culture plays a role in this.

According to the 2014 Global Gender Gap Report, Yemen is ranked as the least gender equal out of 142 countries. This is vividly reflected by the high gender gap in education. The literacy rate for males aged 15 and above stood at 81.2% in 2010 compared to 46.8% for females (UNESCO Institute for Statistics, 2012). In addition, fewer girls than boys are enrolled in secondary schools with the female to male ratio being 49% in 2011 (UNICEF 2011). This being the case, it is most likely that there are fewer females than males joining the workforce. This explains why more than half (51%) of females aged 20-24 were reported to have married by their twentieth birthday (Madsen 2010). Furthermore, the lack of strong government support for family planning has resulted in its having a low CPR of 27.7% (World Bank 2011). As for Latin America/Caribbean, some countries like Brazil, Colombia, the Dominican Republic and Peru have low levels whereas others such as Bolivia, Guatemala and Haiti have high levels. Columbia has the lowest level (5.8%) and Haiti has the highest (39.8%). In sub-Saharan Africa, the levels range from Zimbabwe's 12% to Uganda's 41% (Westoff 2006; Khan et al. 2008; Magure et al. 2010).

There are various factors determining unmet need for contraception and their significance varies according to different areas. Bongaarts and Bruce (1995)'s study on causes of unmet need for contraception in selected developing countries revealed that currently married women considered lack of knowledge of contraception, health concerns and spouse (or partner's) objection to be the top three causes of unmet need for contraception. They came up with a combined knowledge index which consists of automatically mentioning one or more methods, knowing the source and giving an opinion on the potential side effects. This method helps researchers to come up with a more encompassing assessment of an individual's knowledge of contraceptives. In addition, findings indicated that lack of knowledge of contraception accounted for more than 50% of the women with unmet need for contraception in Peru and in nearly all of the sub-Saharan countries included in the study. Therefore, more women in sub-Saharan Africa compared to those in the rest of the regions lacked knowledge of contraception. It therefore follows that fewer women in sub-Saharan Africa used contraception as one can only use something if she knows about it and how to use it. The knowledge of contraceptives is somehow linked to their availability. The fact that most of the women in sub-Saharan Africa lacked knowledge, implies that contraceptives were not readily available for use.

Another study also ranked health concerns and side effects second. According to Robey et al. (1996), health concerns and side effects account for high unmet need for contraception in most developing countries. Some of the women who had unmet need for contraception had never used any contraceptive and just based their concerns on others people's experiences, be it real or rumours, while others had actually experienced the health problems and side effects associated with contraception. An example of the former is reflected in Stash's (1999) study. Most women in one village cited an incidence of a woman who died from sepsis as the reason for not using contraceptives. This was notwithstanding the fact that a majority of these women never knew the deceased as she lived in a village that was far from theirs.

Spousal disapproval is another reason for unmet need for contraception. Bongaarts and Bruce (1995) say that a considerable number of the women cited spousal disapproval of contraceptives as the reason for their non-use of contraceptives, despite the desire to avoid pregnancy. It is amazing to observe that most of the women (68%) who cited this reason had never talked about contraception to their spouses. A woman's failure to discuss contraception with the spouse implies that the former has a lower status compared to the latter. Thus the latter dominates in making decisions as reflected in Casterline et al.'s (1997) study in the Philippines. Culture may also play a role in that some cultures do not encourage the discussion of sex and sex related issues. There are different reasons for men's disapproval of contraception. These include husbands being pronatalists, being afraid that the wives might be promiscuous once protected from the risk of pregnancy and their concern about health and side effects (Bhushan 1997; Casterline et al 1997; Robey et al.1996).

Opposition from families, particularly mothers-in-law, also hinders contraceptive use among women. Pasha et al. (2001) reveal that mother-in-law was a crucial factor underlying unmet need in Pakistan. Mothers-in-law seem to have an upper hand in household decision making. Implications for this could include high fertility among the couples as there is a high likelihood of the mothers-in-law being pronatalists.

Though a number of studies on unmet need for contraception, such as Westoff (1978); Casterline and Sinding (2000); Ross and Winfrey (2002); Bhandari et al. 2006) have been undertaken in Nepal, Stash's (1999) exploration of reasons of unmet need for contraception in Chitwan is significant. He identified two factors that are typically left out in estimates of unmet need. These are spousal absence which was associated with women's perceived lower risk of pregnancy and women's wanting to wait for a more preferable time and circumstances to undergo the sterilization procedure. The indirect cost associated with illness and loss of work rather than the direct cost of purchasing or accessing operations in this case served as a major explanation of unmet need for contraception.

The major reason for unmet need among women in Kuwait is perceived low risk for pregnancy (Shah et al. 2003; 2004). Bhushan (1997) also cites perceived low risk for pregnancy as one of the causes for unmet need for contraception. Furthermore, these studies mention reasons for women perceiving themselves as having low risk for pregnancy. These include occasional sexual activity, perceived low fertility and having deficient knowledge about how conception occurs. Older women, especially those nearing menopause, and teenagers are more likely to think that they are not at risk and thus feel there is no need for them to use contraceptives.

Various demographic and socioeconomic factors account for the variation in levels of unmet need for contraception. The most outstanding ones are age, education, number of children and place of residence (Robey et al. 1996; Chaudhury 2001). Moreover, the influence of age on unmet need for contraception is clear when the latter is divided into its two constituents: limiting and spacing. Younger women have increased odds of having unmet need for spacing whereas the older ones have higher odds of having unmet need for limiting. This is because the former still want more children while the latter would like to stop childbearing (Kaushik 1999).

Most studies show a similar relationship between education and unmet need for contraception. Women with secondary or higher education tend to have lower unmet need compared to those with little or no education (Klijzing 1999; Siddiqua & Kabir 2004; Ahmadi & Iranmahboob 2005). This is because the former are better informed and usually more articulate. Educated women also tend to communicate more with their husbands/partners, to be more involved in family decisions and more able, in other words, to plan what happens in their lives, therefore, they have a high motivation for fertility control ((Kaushik 1999; United Nations Population Fund 1990). However Robey et al. (1996) states that this is not the case in sub-Saharan Africa, particularly in Ghana, where there are no differences in the levels of unmet need for contraception between the two categories. Cultural factors could account for this.

There exists a positive correlation between number of children and unmet need for contraception. Women with more children have higher unmet need for contraception (Shah et al. 2004). Unmet need for spacing is likely to be more prominent among low parity women whereas those with high parity will have high unmet need for limiting. Actually, Bhandari et al (2006) reveal that Nepalese women begin thinking about spacing or limiting at parity four or above.

In addition, the number of living sons is considered to be an important predictor of unmet need for contraception (Sengputa & Das 2012; Pal et al 2014). This is more notable in Asian and African countries where high socioeconomic value is attached to sons. In some societies, for example among the Hindus, sons are also valued for religious purposes. Malthus (1872:116) as cited by Weeks (2001:239) stated that, "By a son a man obtains victory over all people; by a son's son he enjoys immortality; and afterwards by the son of that grandson he reaches the solar abode."

Existing studies have established that women who reside in rural areas generally have higher unmet need for contraception than their urban counterparts (Devi et al. 1996; Wafula & Ikamari 2007; Ansary & Anisujjaman 2012; Luon, Pan & Mao 2013). This urban-rural disparity could be attributed to the fact that women in urban areas have, among other things, more access and higher availability to contraceptives and that those in rural areas desire to have more children (Assefa & Haddis 2011). However, in sub-Saharan Africa there are countries where unmet need for contraception among urban women is higher than that for rural ones, whereas elsewhere the distribution in urban and rural areas is almost the same (Sedgh et al 2007). Woldermicael (2011) argued that instances where unmet for contraception among urban women is higher than that among the rural ones suggests women's increasing desire to control fertility amidst a lack of access to family planning services.

Moreover, previous research found a significant correlation between religious affiliation and contraceptive use (Knodel 1999; Moulasa & Rao 1999; McQuillan 2004; Hirsch 2008). Kaushik (2000:11) argues that "if a religious community strictly prohibits the artificial interference to the natural process of child bearing, a woman who does not want to have more children or wants to delay child bearing might not use contraception because of religious opposition resulting in unmet need."

Work status is also considered as an important predictor of unmet need. A working woman is accorded a higher status in society compared to her non-working counterpart. A working woman is economically independent and is thus more likely to talk about family planning and reproductive matters with her spouse than one who is not working. Her interaction with the 'outside world' enables her to gather information about contraception (Sathar et al. 1988; Kaushik 2000).

Though all of the above studies focused on unmet need for contraception among currently married women, Khatun's (2006) is unique in that it examined factors determining unmet need for contraception among men in Bangladesh by merging the males and females records of the DHS data. The study used multilevel modeling to establish the degree to which the individual and household level factors influenced unmet need for contraception among men in Bangladesh.

The study, among others, established that power relations in the household influenced unmet need for contraception. The odds of having unmet need for contraception was higher among men whose spouses did not have power in the household. In addition, age gap between spouses was positively correlated with unmet need for limiting. This suggests that women who lack power in the household may not have a say over reproductive issues which in turn may result in men dominating. In such a case women are not likely to use contraceptives which may in turn affect the unmet need status of the men. On the contrary, educational attainment was inversely related to unmet need for spacing and limiting. Furthermore, men whose fertility preferences were not the same as their spouses had lowered odds of having unmet need for spacing but increased odds of having unmet need for limiting. This is indicative of a lack of communication between the spouses which may result in failure to discuss family planning and as such, lead to unmet need for contraception.

Other studies have pointed to consequences of unmet need for contraception. These include teenage pregnancies, induced abortion, closely spaced births and child bearing late in women's reproductive life and maternal death (Dailard 2000; Gold 2006; Murray et al. 2006; Barman 2013).

Teenage pregnancy and childbearing increase the probability of having negative child and maternal health outcomes. Teenage mothers have increased odds of giving birth to babies with low birth weight and birth injuries over those above twenty. Their babies also have a higher probability of being premature, stillborn or dying (McDevitt 1996; Florez & Nunez 2001; Nanda 2002). McDevitt (1996:75) further pointed out that "Infant mortality rates for teenage births are as much as 80 percent higher than those for women in the age group 20 to 29." Chen et al. (2007:1) revealed that "teenage pregnancy increases the risks of congenital anomalies in central nervous, gastrointestinal and musculoskeletal/integumental systems".

Though the health risks related to pregnancy and childbearing which teenagers face are the same risks which older ones face, they are more pronounced among the former than among the latter. Reasons for this are that teenagers are physiologically immature and lack information and access to services (Singh 1998; Ashford 2001; Dejong et al. 2005). Obstructed labour is one of the common birth related complications among teenagers. McCauley and Salter (1995) argue that obstructed labour is due to cephalopelvic disproportion (having a pelvic opening that is too small for the baby's head to pass through). In most cases, such obstructed labour results in obstetric fistula (Treffers et al. 2001). Though fistula is preventable and repairable, it affects approximately 2 million females in developing countries with a high annual incidence of 100,000 cases (UNFPA 2010). Fistula is more prominent in teenagers and it often results in lifelong disability and maternal deaths.

Bongaarts and Bruce (1995) bring out an important issue related to unmet need for contraception by noting that studies on unmet need tend to pay little attention to the unmarried, especially the young. They cited two reasons for this omission: having no comprehensive research designs and indisposition to interviewing adolescents and the unmarried concerning their sexual and contraceptive behaviour. Bongaarts and Bruce (1995:71) further argue that "the needs of young people are evident from high rates of premarital conception, from mortality and morbidity that are the results of unsafe abortions and from the fact that half of the people carrying the human immunodeficiency virus are younger than 25". About 2.5 million (14%) unsafe abortions are performed on teenagers in developing countries (Bearinger et al. 2007). Abortion tends to be the only alternative to carrying the pregnancy to full term for most adolescents, especially for those who are still in school.

Ravindran and Mishra (2001) used the Modified ‘Helping Individuals Achieve their Reproductive Intention’ (HARI) Index approach to determine the degree to which Indian women have been able to attain their reproductive intentions. The findings, among other things, revealed that a significant proportion of the women did not achieve their preferred birth interval between the last two consecutive births. In addition, women with unmet need for spacing resorted to induced abortion in order to prevent unwanted births. This can result in negative health outcomes. In fact, the study revealed that complications of unsafe abortions accounted for 11% to 14% of maternal mortality in rural India between 1990 and 1994, while more than half (60%) of all abortions in 1994 were in young women between 15-24 years of age (Ravindran & Mishra 2001).

Teenage pregnancy does not only have health consequences, but also has social consequences. Stigmatisation is one of the social consequences of teenage pregnancy and it is more prominent among females. Unmarried pregnant teenagers are looked down on by society as they are considered to be “loose” (Ilika & Igwegbe 2004). This can be quite stressful for a young person who finds herself in such a situation. Stigimitisation can result in the pregnant teenager failing to seek antenatal care and thus end up having complications associated with pregnancy and child bearing.

Hettiarachchy and Schensul (2001)’s study of single young women in the Free Trade Zone Communities of Sri Lanka indicated that those who became pregnant were abandoned by their partners. The abandonment made some of them resort to unsafe abortions. Those who did not abort were stigmitised for being single mothers.

Though these studies provide useful information on unmet need, situations vary from one region to another. Prevailing socio-cultural systems tend to have an influence on the factors and reasons associated with unmet need. Therefore, there is need to also refer to studies conducted in Africa in order to have a clear understanding of the factors underlying unmet need for contraception.

1.2.2 Unmet need for Contraception: A challenge for sub-Saharan Africa

As mentioned earlier, sub-Saharan Africa has the highest level of unmet need for contraception, with most countries having levels higher than 20% (Ashford 2003; Westoff 2006; World Bank

2010). The reason for the sub-Saharan's level being the highest is that it has not undergone the reproductive revolution (Bayer 2002). Of all the countries in this region, most studies of unmet need for contraception come from data in Kenya and Ethiopia (e.g. Ikamari 2000; Ahmed 2002; Omwago & Khasakhala 2006; Wafula & Ikamari 2007; Assefa & Haddis 2011).

The 1990s saw a number of scholars in sub-Sahara Africa calling for the incorporation of men in studies dealing with reproductive decision making (Bankole 1995; Bankole & Singh 1998; Becker 1996; Dodoo 1998; Ezeh 1993). The reason given for this call was that males play a dominant role in reproductive decision making, thus their involvement is crucial to contraceptive use and effectiveness (Dodoo et al. 1997; Dodoo et al. 1998; Mbizvo and Adamchak 1991). Ezeh (1993) revealed that in Ghana, husbands dominated the reproductive decision making process in that a husband's attitudes and characteristics significantly influenced the wife's contraceptive attitudes. The opposite was not applicable. Though Bankole's (1995) study on couple preferences and subsequent fertility among the Yoruba of Nigeria revealed that fertility behaviour is affected by fertility preferences of husbands and wives, it did not indicate that only the husband made decisions on reproductive matters. On the other hand, the study suggested that estimates of unmet need for contraception could be unreliable if derived from data collected using the traditional approach (currently married women only). Thus Bankole (1995) agrees with Dodoo (1993), who questioned the reliability of the traditional measure of unmet need for contraception.

Ngom (1997) noted that the traditional approach does not give a true picture of unmet need for contraception and advocated for measuring men's unmet need for contraception as well. Ngom (1997:193) further argues that "total ignorance of men's unmet need for family planning is hard to tolerate if the concept is to continue to be linked to fertility decision-making in sub-Saharan Africa." This was not only a view for the 1990s. Studies conducted in the 21st century also show the need for doing away with the traditional approach if challenges related to reproductive health are to be effectively addressed (Dudgeon & Inhorn 2004; Duze & Mohammed 2006; Wolff, Blanc & Ssekamatte-Ssebuliba 2000). Indeed, this should be the way forward for studies conducted in the 21st century and beyond.

Omwago and Khasakhala's (2006) used the couple approach to estimate the level of unmet need in Kenya. The results revealed that couples' unmet need for contraception (16.5%) was lower than that for individuals. Women's unmet need was 24 while that for men was 23 percent. The results thus proved the fact that the woman based approach tends to overstate estimates as argued by Bankole (1995). The study also revealed that region of residence was among the important factors associated with unmet need. The finding is consistent with Ikamari's (2000) findings. Nyanza, Western and Coast had higher levels of unmet need compared to Nairobi, Central and Eastern. The reason given for the differences in levels of unmet need in the two sets of regions was that traditional reproductive practices were more prevalent in the former compared to the latter. Thus people in the latter had increased odds of using contraceptives compared to those in the former. Traditional reproductive practices also entail that the man dominates reproductive decision making. This is reflected in Wolff et al.'s (2000) study of two districts in Uganda. Focus group discussions among women revealed that the woman leaves the man to be the sole decision maker. The man thus decides on the number of children to produce and can deter a woman from using contraceptives.

Ikamari et al. (2007) identified husband's approval as an important predictor of unmet need for contraception in Kenya. Igwegbe, Ugboaja and Monago (2009) also observed that the husband's disapproval of contraception was the major factor underlying unmet need in Nnewi, Nigeria. On the other hand, Korra's (2002) study revealed that perceived low risk for pregnancy was a major cause of unmet need for contraception in Ethiopia. This was particularly the case for breast feeding and postpartum amenorrheic women. Lack of knowledge was ranked as the second most important cause of unmet need for contraception. Short and Kiros (2002), in contrast to Korra (2002), observed that lack of knowledge was the main reason for unmet need in Ethiopia. Though the ranking for lack of knowledge is not the same in the two studies, the findings suggest the need to increase the accessibility and availability of contraceptives. Lack of knowledge of contraceptives also indicates the low educational attainment and socioeconomic status Ethiopian women have compared to their male counterparts (Ahmed & Mengistu 2002; Beekle & McCabe 2006; Gordon, Sebates, Bond & Wubshet 2011).

Though lack of knowledge was observed to be an important cause of unmet need for contraception in Ethiopia, it was not so in Egypt and Ghana. Health concerns and side effects was the most important cause of unmet need for contraception in the two countries (USAID 2005; Sultan et al. 2010; World Bank 2010).

The discussion would be incomplete if factors associated with unmet need for contraception in the two sub-Saharan countries with the lowest and highest levels are left out. Zimbabwe as earlier mentioned has the lowest level of unmet need for contraception (12.8%). In addition, it is one of the countries that have high contraceptive prevalence rates in sub-Saharan Africa. According to Zimbabwe National Statistics Agency (ZIMSTAT) and ICF International, (2012), Zimbabwe's Contraceptive Prevalence Rate rose from 42.2% in 1994 to 58.5 in 2010/2011. On the other hand, Uganda's level has the highest level of unmet need for contraception (41%) and the contraceptive prevalence rate is 30%.

Magure et al. (2010) established that age, educational attainment and wealth were important determinants of unmet need for contraception in Zimbabwe. While age was negatively associated with unmet need for spacing, it was positively related to unmet need for limiting. Having a higher educational attainment and belonging to a wealthy household was negatively associated with unmet need for spacing and limiting. Additionally, women with exposure to family planning messages on mass media were less likely to have unmet need for limiting than those with no exposure. With regard to Uganda, age and number of living children were the important factors related to unmet need for contraception. As was the case in Zimbabwe, age was negatively related to unmet need for spacing, but positively related to unmet need for limiting. In addition, women with 3 or more children were more likely to have unmet need for spacing and limiting compared to those with 0-2 children. Moreover, women who were exposed to family planning messages in mass media had reduced risks of having unmet need for spacing (Khan et al 2008). Besides, fear of side effects was cited to be the main reason for unmet need for contraception in Uganda. This was in conformity with what was established in Egypt and Ghana, as earlier mentioned.

Some studies have established that ethnicity was among the important correlates of unmet need for contraception. Korra (2002) indicated that ethnicity was significantly associated with unmet need for spacing in Ethiopia. Women from the other four ethnic groups had increased risks of having unmet need for spacing than those belonging to the Amharas ethnic group. Omwago and Khassakhala (2006) revealed that ethnicity was an important explanatory factor of total unmet need among couples in Kenya. Furthermore, Wafula and Ikamari (2007) found that ethnicity was an important predictor of unmet need for limiting in Kenya. Women belonging to the Kamba, Luhya and Luo ethnic groups had lower odds of having unmet need for limiting than their Kikuyu counterparts.

This shows that major reasons for unmet need for contraception are not the same in the various African countries. The variations may be explained by the differences in the prevailing socioeconomic situations of these countries.

An earlier study conducted by Mbizvo et al. (1997) examined factors underlying unintended pregnancies in Zimbabwe. This was a follow up to their 1994 study on community based maternal mortality which indicated that there could still be a high unmet need for contraception associated with risky pregnancies. They indicated that unplanned pregnancy was an important factor in a series of events whose end result was either abortion or maternal mortality. In addition, they observed that sub-Saharan African women often treat poor pregnancy outcome as a medical event while ignoring factors associated with unplanned pregnancy.

Some of the findings of the study were as follows. About two fifths (41%) of the deliveries in the main Harare Hospital were unplanned. Adolescents and adult women aged 35 and above had higher odds of having an unplanned pregnancy than those aged between 20 and 34. Moreover, women of parity zero and those of five or more were at significantly increased risk of unplanned pregnancy than those of parity one to four. Therefore, early and late childbearing (below19 and above 35 years) and high parity (five and above) are risk factors for certain adverse pregnancy outcomes. Ilika and Igwegbe (2004); Neema et al. (2004) further support that early childbearing has negative health outcomes. The following are some of the examples of risks associated with early childbearing: excessive bleeding, prolonged labour, stillbirth and death.

Since one third of the teenage pregnancies in sub Saharan Africa are unplanned, unsafe abortion tends to be a viable alternative. About 10% of pregnant teenagers aged between 15 and 19 resort to unsafe abortion which accounted for nearly 12% of maternal mortality in Africa (Biddlecom et al. 2007). Results of an earlier study in the Jos and Ife Local Government Areas of Nigeria revealed that about 20% of the women had experienced an unwanted pregnancy. More than half of them (about 58%) resolved the unwanted pregnancies with induced abortions (Okonofua et al. 1999). To further confirm this, Sedgh et al (2006) conducted a community based cross sectional survey of 2978 women aged 15-49 which revealed that one quarter of Nigerian women have had unwanted pregnancy and half of them sought abortion.

Unsafe abortion is also an important public health problem in Uganda. A national survey conducted in 313 health facilities showed that approximately 297,000 induced abortions are conducted annually. This places the abortion rate at 54 per 1,000 women. About 85,000 of the women who have induced abortion end up being treated for complications (Singh et al. 2005).
According to Mbizvo et al. (1997:941), "behind the medical diagnostic categories directly contributing to maternal mortality lie a number of factors, often a chain of events leading women to suffer pregnancy-related deaths." For example teenage mothers below age 19 have a high probability of receiving inadequate maternal care because of failure to begin antenatal care at the right time. The tendency to hide the unplanned pregnancy leads to complications which could have been dealt with if they sought antenatal care at an early stage (Biddlecom et al. 2007; Mbizvo et al. 1997).

Though the above studies have provided useful insights on unmet need for contraception, situations vary from one country to another. There is need to also look at studies undertaken in Zambia in order to fully appreciate the Zambian situation.

1.2.3 Unmet need for Contraception in Zambia

There are a few studies on unmet need for contraception in Zambia. Mushingeh and Kurz's (1998) study aimed at investigating the nature, extent and major determinants of unmet need for family planning in Zambia. To do this, they chose two high density residential areas in Lusaka and two residential areas in Mansa. This study went beyond the traditional approach by including unmarried women, adolescent females aged 14 and above and a few men (partners of some of the 70 women who were considered in the in-depth interviews).

The study's figures of unmet need for contraception (37% for married women and 50% for unmarried women) were higher than that for the 1992 DHS (33%). The reason that was given for this higher level of unmet need for contraception was that the quantitative methodology used by DHS did not have enough analytical tools to effectively assess some of the factors underlying unmet need for contraception. Though they give this reason, it is worth noting that their study was not nationally representative as the sample just included men and women from two towns.

Mushingeh and Kurz (1998) also noted that the major reason for unmet need was fear of side effects. The fear of side effects was either actual or perceived. Notable among the side effects mentioned are loss or gain of weight, heart palpitations, excessive bleeding and irregular periods.

Using the 1996 ZDHS, Ikamari and Lwaanga (2000) conducted a study aimed at estimating the level of unmet need for contraception and identifying factors that affect it in Zambia. This study took the traditional approach of studying unmet need for contraception (focused on currently married women). The results of the study revealed that the level of total unmet need was 27% (19% for spacing and 8% for limiting). Moreover, total unmet need was significantly related to the age of the woman, region of residence, number of living children and woman's approval of contraception. Woman's age was the most important predictor of unmet need for contraception. It was inversely related to unmet need for contraception. Thus younger women were more likely to have total unmet need compared to older ones. On the other hand, there was a positive association between number of living children and unmet need for contraception. Thus unmet need increased with the increase in the number of living children. Another important predictor of unmet need for contraception was woman's approval of contraception. The study revealed that women who approved contraception had increased risks of having unmet need for contraception relative to those who disapproved of it. This is contrary to findings elsewhere. For example Kekovole (1999); Korra (2002) showed that women who disapprove of contraception have higher odds of having unmet need for contraception compared to those who approve of it. This, of course, could be due to the fact that a woman who approves of contraception is more likely to use contraceptives in order to prevent pregnancy.

As earlier mentioned, not only adults have unmet need for contraception. Young people also have unmet need for contraception and this is reflected, inter alia, in the presence of teenage pregnancies. Teenage pregnancy is one of the major societal challenges being experienced in Zambia (Liche 2010). Since most of these teenage pregnancies are unwanted, more than half (67%) of them end in unsafe abortion (Webb 2000). Pregnant teenagers have varied reasons for resorting to abortion. These include abandonment by the man responsible for the pregnancy, fear of parents' reaction to the pregnancy and wanting to continue with education (Likwa, Biddlecom & Ball 2009). It is not uncommon for men to deny responsibility for the pregnancy. When this happens the girl or young lady opts for abortion as a way of avoiding the burden of taking care of a child without the support from the man. The fear of being rebuked by parents or being chased from home also influences teenagers to opt for abortion. Teenagers who fall pregnant while at school opt to abort so that they cannot be sent away from school. Unsafe abortion can either result in abortion-related complications or maternal mortality.

Though the existing studies on unmet need for contraception in Zambia have provided valuable information on the topic, there are still some gaps that need to be filled in. For example, Mushingeh and Kurz (1998) included female adolescents and a few men in their study, but did not show the dimension of unmet need among adolescents and men. The study did not also include the consequences of unmet need for contraception. Ikamari and Lwaanga (2000) used the traditional approach to identify determinants of unmet need for contraception in Zambia. The analysis was restricted to the individual level thus leaving out the community level.

1.2.4 Summary

The review of the relevant literature indicates that explaining the factors determining unmet need for contraception is an intricate task. A number of factors influencing unmet need for contraception have been identified. These include age, number of living children, ethnicity, educational attainment, employment status, household wealth, place and region of residence, exposure to family planning messages through media and fertility preference. Some factors have had a significant association with unmet need for contraception in one area, but have not been significant in other areas. Other factors seem to be significant predictors of unmet need for contraception in various areas. In some cases, the direction of the association has not been the same in different areas. For instance, while Ikamari and Lwaanga (2000) found a positive relationship between approval of contraception and unmet need for contraception, Kekovole (1999); Korra (2002) established the contrary. It is possible that in the case of the latter, other factors may have confounded the negative influence of self-approval of contraception on unmet need for contraception. In conclusion, though the reviewed literature have contributed to the debate on unmet need for contraception some gaps still exist, especially in the Zambia situation.

1.3 DEFICIENCIES IN EXISTING LITERATURE

Despite existing studies on unmet need for contraception having provided valuable information on unmet need for contraception, they have some deficiencies. Most of the studies concentrated on unmet need among currently married women and some sections of the population in their estimation of unmet need for contraception. Moreover, apart from Khatun's (2006) study on unmet need for contraception which used multilevel modeling to consider the variations in factors influencing unmet need for contraception among men at the individual and household levels, studies have tended to focus on the individual level only. In addition, though Barman (2013) undertook a study on socioeconomic and demographic determinants of unmet need for contraception in India and its consequences, the study only showed the distribution of Total Fertility Rates (TFRs) and Maternal Mortality by level of unmet need for contraception. The study did not clearly show the direction of the relationship of TFR and unmet need for contraception on one hand and MMR and unmet need for contraception on the other hand. As noted earlier, studies on unmet need for contraception in Zambia are lacking. The two existing studies have restricted their analysis to the individual level and have not included the consequences of unmet need for contraception. While Mushingeh and Kurz's (1998) study included female adolescents and a few men, it did not show the dimension of unmet need among adolescents and men. Besides, the study was not based on a nationally representative sample which may pose challenges when making generalisations.

Therefore, building on the foundation of findings of the reviewed studies, the study seeks to fill the gaps by focusing not only on currently married women, but the unmarried ones including men and adolescents. In addition, it will not only consider the correlates of unmet need for contraception, but the consequences as well. It also examines the factors of unmet need for contraception among women using multilevel modeling. Thus it is hoped that unmet need for contraception in Zambia will be put into its correct perspective.

1.4 THE PURPOSE STATEMENT

The purpose of this study was to determine the levels of unmet need for contraception among adolescents and adults (males and females) in Zambia and examine its determinants and consequences.

1.5 RESEARCH QUESTIONS

The study answered the following questions:

a. What is the true level of unmet need for contraception in Zambia?
b. What are the individual, family and community factors responsible for unmet need for contraception among the adolescents and adults (married and unmarried) in Zambia?
c. Is there any association between unmet need for contraception and selected reproductive health problems (termination of pregnancy, short birth interval, infant and child mortality and high parity) in Zambia?
d. Would satisfying unmet need for contraception in Zambia help to reduce fertility?

1.6 RESEARCH OBJECTIVES

1.6.1 General

The aim of the study was to measure the level of unmet need for contraception, examine the factors underlying it and its consequences in Zambia.

1.6.2 Specific

The following specific objectives were addressed.

a. To determine the measure of unmet need for contraception among the adolescents and adults (married and unmarried) in Zambia.
b. To identify individual, household, community and programme access factors underlying unmet need for contraception among the females and males in Zambia.
c. To examine the association between unmet need for contraception and selected reproductive health problems (termination of pregnancy, short birth interval, infant and child mortality and high parity) in Zambia.
d. To determine the potential demographic impact of satisfying unmet need for contraception in Zambia.

1.7 DEFINITIONS

Concept: The term is defined as an abstract idea. In other words, it is an idea or mental image which corresponds to some distinct entity or class of entities, or to its essential features, or determines the application of a term (especially a predicate), and thus plays a part in the use of reason or language (Oxford Dictionary).

Correlates: The term correlate refers to either of two or more related or complementary variables (Merriam-Webster dictionary). The correlates of unmet need for contraception are in this case those variables whose presence implies unmet need for contraception.

Consequences: A consequence is something that follows as a result. In this case consequences of unmet need for contraception are things that follow as a result of an individual's having an unmet need.

Unmet need for contraception: This study uses the concept unmet need for contraception to refer to fecund females who do not desire pregnancy, want to stop bearing children (unmet need for limiting) or want to wait for the next birth for two or more years (unmet need for spacing), but are not using contraception. Also included are pregnant or postpartum amenorrheic females whose pregnancy or current births are unwanted or mistimed. In the case of males, it is defined as the non-use of contraception by either the males or their partners and yet the former reported not wanting any more children or wanting to postpone the birth of the next child for at least two years (Robey et al. 1996; UN, Department of Economic and Social Affairs, Population Division 2011).

1.8 RATIONALE

The significance of this study cannot be debated. For example, considering the refinement which the concept of unmet need for contraception has undergone, ignoring men in such a study would be retarding the progress that has been made ever since the concept was coined. Ngom (1997) argued that unmet need for contraception is a multidimensional phenomenon that cannot be fully understood if individuals are treated in isolation, especially that social and extra individual factors greatly determine both the desire for and timing of additional children. Studies elsewhere point to the fact that in sub-Saharan Africa, reproductive decisions are to a greater extent influenced by male rather than female preferences (Dodoo, Luo & Panayotova 1997; Ngom 1997). Addressing men's unmet need is thus crucial to government's effective policies.

There is a paucity of studies on unmet need for contraception in Zambia. To my knowledge, there are only two studies on unmet need for contraception in Zambia (Mushinge & Kurz 1998; Ikamari & Lwaanga 2000). The latter focused on the correlates of unmet need for contraception among married women without considering the other groups which also have unmet need for contraception. Though the former included unmarried women and teens (13 years and above), they did not examine the consequences of unmet need for contraception. This study's inclusion of not only the adolescents, men and unmarried women, but the consequences as well makes it unique. It is thus hoped that it will add value to the available literature on unmet need for contraception which shall be useful to policy makers and scholars.

The inclusion of the part of population that is often neglected in the studies on unmet need for contraception helps us know the factors affecting various sections of the population. Knowing how other groups, apart from married women, are affected will help to come up with strategies that specifically target those groups. Leaving out other groups could have contributed to the figure for unmet for contraception being persistently at 27% as well as having inefficient strategies designed to address the issue.

Another contribution which the study has made, is that it analysed the factors underlying unmet need for contraception at the individual and community levels. Most studies have tended to focus on individual factors leaving out those at the community level. Including community level factors helps to have a clearer picture of the factors underlying unmet need for contraception.

Combating unmet need for contraception has a number of health and socioeconomic benefits for individuals, families and society as a whole (Gold 2009). The use of contraceptives reduces health risks associated with unplanned pregnancies. One of such risks is unsafe abortion. Cohen (2010); Coeytaux, Bingham, and Langer (2011) state that the annual incidence of unsafe abortions in the developing world is 20 million. This contributes to high rates of death and injury. Unsafe abortions account for one in eight maternal deaths, indicating that effective use of contraceptives can result in the reduction of maternal mortality by between 13-15% (Tsui, McDonald-Mosley & Burke 2010). At the individual level, contraception reduces the likelihood of terminating an unwanted pregnancy by approximately 85% (Deschner & Cohen 2003).
Satisfying unmet need for contraception can help to reduce poverty and speed up socio-economic development. UNFPA and PATH (2008:5) argue that "with fewer, healthier children, families are less likely to become poor." Having moresuch families can result in economic growth at the national level. This is because the government will spend less on providing services such as education and health for the young ones. As more of these healthier children grow up and enter

the labour force, the dependency ratio goes down, resulting in more resources available for investing in socioeconomic development (Lee & Mason 2006; UNFPA and PATH 2008).

1.9 ORGANISATION OF THE THESIS

The thesis is organized into eleven chapters. Chapter 1 presents the background of the study, statement of the problem, objectives of the study and the rationale of the study. It also provides a review of the relevant literature on unmet need for contraception at the global, regional and country levels. The literature explains the concept of unmet need for contraception, its determinants and consequences. The literature informs the conceptual framework that guides the methodology of the study and analysis of its objectives and hypothesis.

Chapter 2 addresses the theoretical frameworks and the conceptual framework as well as the research hypotheses. The background of the study area, the survey design, sample design, instruments, variable measurement, quality issues in data and data analysis of the study are discussed in chapter 3.

Chapter 4 puts the study into context by presenting the background characteristics of the study population. Chapter 5 presents the levels of unmet need for contraception among the adolescents and adults (married and unmarried) in Zambia. Chapter 6 presents the individual, household, community and programme access factors underlying unmet need for contraception among the adolescents and adults (married and unmarried) based on the binary and multinomial regression analysis. Chapter 7 presents the individual, household, community and programme access factors determining unmet need for contraception among females based on multilevel modeling and the testing of hypotheses. The association between unmet need for contraception and selected reproductive health problems (termination of pregnancy, short birth interval, infant and child mortality and high parity) in Zambia is examined in chapter 8.

Chapter 9 explores how satisfying unmet need for contraception can help reduce Zambia's Total Fertility Rate (TFR) whereas chapter 10 is the discussion of the key findings of the study. The final chapter (11) provides the summary and conclusion of the study as well as the policy and programme and the direction of future research.

CHAPTER TWO

THEORIES AND CONCEPTUAL MODELS

2.0 INTRODUCTION

This chapter aims at providing four theoretical frameworks related to the topic and their conceptualization.

2.1 THEORETICAL FRAMEWORKS

The study adapted four theoretical frameworks to develop a comprehensive multi-factor conceptual framework that included individual, household, community and programme access factors. The four frameworks are Bhushan's model, Casterline's framework, Kaushik's framework and Shaikh's framework.

2.1.1 Bhushan's Model

Bhushan (1997) modified the conventional microeconomic theory to come up with a more rational microeconomic model for unmet need for contraception. The conventional microeconomic theory applies the economic theory of consumer behavior to decisions on childbearing. The economic theory of consumer behavior originates from Jeremy Bentham's utility theory. Bentham (1907:4) refers to utility as "that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness…to the party" who can be either an individual or community. The utility theory is based on the premise that what is good produces pleasure and what is bad causes pain (Bentham 1907). Moreover, the theory views consumers as rational decision makers (Bray 2008). Therefore, the assumptions of the conventional microeconomic theory are that couples decide to have children so that they can maximise their utility and that they have perfect information about available methods of contraception, and the additional cost and benefits of children and contraception (Bhushan 1997). Since "the conventional theory of consumer behavior views the individual as trying to maximize satisfaction, given a range of goods, their prices, and his own tastes and income" (Easterlin 1975:54), childbearing decision making is considered to be done "directly analogous to the decision to purchase any other consumer durable such as a car" (Kabeer 1996:6).

Bhushan (1997) argued that the conventional microeconomic theory could not account for unmet need for contraception partly due to some of its assumptions being unrealistic. In order to explain the presence of unmet need for contraception, Bhushan (1997:3) modified the conventional model as follows:

i. Decision-making about fertility is a continuous, sequential process, not a static one made to last throughout life.
ii. People decide about fertility regulation on the basis of the *perceived*, rather than *actual*, costs and benefits to them, and on the *perceived* probability of conception. The implicit point here is that they do not have perfect information about contraception or about the probability of conception.
iii. Couples generally make the negative decision *not to conceive* rather than the positive choice *to conceive*.

Moreover, Bhushan's model substituted demand for children to that for contraception. According to the framework, the reasons for unmet need are weak motivation and high perceived contraceptive costs. The former may be the main factor accounting for unmet need in some cases while contraceptive costs may do so for others. Perceived costs of contraception can be classified into three categories: economic, physiological and psychological; and social (Bhushan 1997).

The results of the study revealed that low motivation for fertility control and lack of information about contraceptives were the major reasons for unmet need in countries where the contraceptive prevalence rate is low. On the contrary, fear of side effects and familial opposition to contraception were the most important reasons for unmet need in countries where the contraceptive prevalence rate is high. The findings also suggested that nonmonetary (physiological and social) costs were more important reasons for unmet need compared to monetary ones.

2.1.2 Casterline's Framework

Casterline et al. (1997:175) used the following framework to explain unmet need for contraception in Philippines.

i. Unmet need is an artifact of survey measurement.
ii. Women with unmet need have weak fertility preferences.
iii. Women with unmet need have a perceived low risk of conceiving.
iv. Women with unmet need lack knowledge of contraception.
v. Women with unmet need have a high perceived cost of contraceptives which blocks the implementation of preferences:
    a. Contraception is perceived as being socially and culturally unacceptable.
    b. Women with unmet need are more likely than others to fear the effects of contraceptives on health.
    c. Women with unmet need have less adequate family planning services than do others.
    d. The husband is an obstacle, either due to:
    d1. His fertility preferences.

    d2. His perception of contraceptive costs.

The framework thus consists of two sets of explanations for unmet need. These are the measurement explanation (i) and factors that act as obstacles to contraceptive use (ii to v). The second set is of more importance for this study in that it offers reasons for unmet need. Results of the study showed that unmet need described a discrepancy between fertility goals and contraceptive practices. Therefore, it is not an artifact of survey measurement. The results also revealed that weak fertility preferences were associated with unmet need, a perceived low risk of conceiving significantly accounted for unmet need for contraception and lack of knowledge of contraceptives did not account for unmet need. The fifth hypothesis (cost of using contraception) had five components and the results were as follows: the relationship between social and cultural acceptance of contraception and unmet need were not clear; fear of side effects was an important obstacle to the use of contraceptives; adequacy of services did not account for unmet need; husband’s fertility preferences and their perceived cost of contraception accounted for unmet need (Casterline et al.1997).

2.1.3 Kaushik's Framework

Another framework for analyzing unmet need is Kaushik's (2000). This framework consists of unmet need as the dependent variable and various independent variables falling under four categories (demographic, economic, social and other background). These variables operate through intervening variables, such as contraceptive use and desire to control fertility to influence unmet need. The framework was used to analyse the factors influencing unmet need in four selected states of Northern and Southern India - Punjab, Bihar, Kerala and Karnataka.

Kaushik (2000) classified woman's age, place of residence and the number of living sons under the demographic variables while religion and caste/tribe were classified as social variables. Economic variables comprised work status and the standard of living whereas education of woman and exposure to mass media were classified as other variables. Results of the study revealed that age and education were the two most important independent variables that accounted for unmet need. The association between each of the two variables and unmet need was significant in all the four States. The major reason for unmet need was the husband's disapproval of contraceptive use.

Though both Bhushan and Casterline's frameworks explain the causes of unmet need, Casterline went further by including the measurement explanation for unmet need. Kaushik looked at both the characteristics of women with unmet need and the reasons for unmet need. The frameworks offer useful insights on the characteristics and causes of unmet need but fall short in one area. They do not consider the variables associated with unmet need at different levels.

2.1.4 Shaikh's Framework

Shaikh (2010) used secondary data on health-seeking behaviours and health systems to come up with a framework for analyzing unmet need. He adapted the pathways framework which is normally used in studies on poverty reduction to establish the causes of unmet need. "It views health outcomes … as the result of an interaction between households, communities, health services, other sectors, and government" (Claeson, Griffin & Johnston et al. (2001:4). Thus using the framework, the analysis of factors underlying unmet need can be done at different levels.

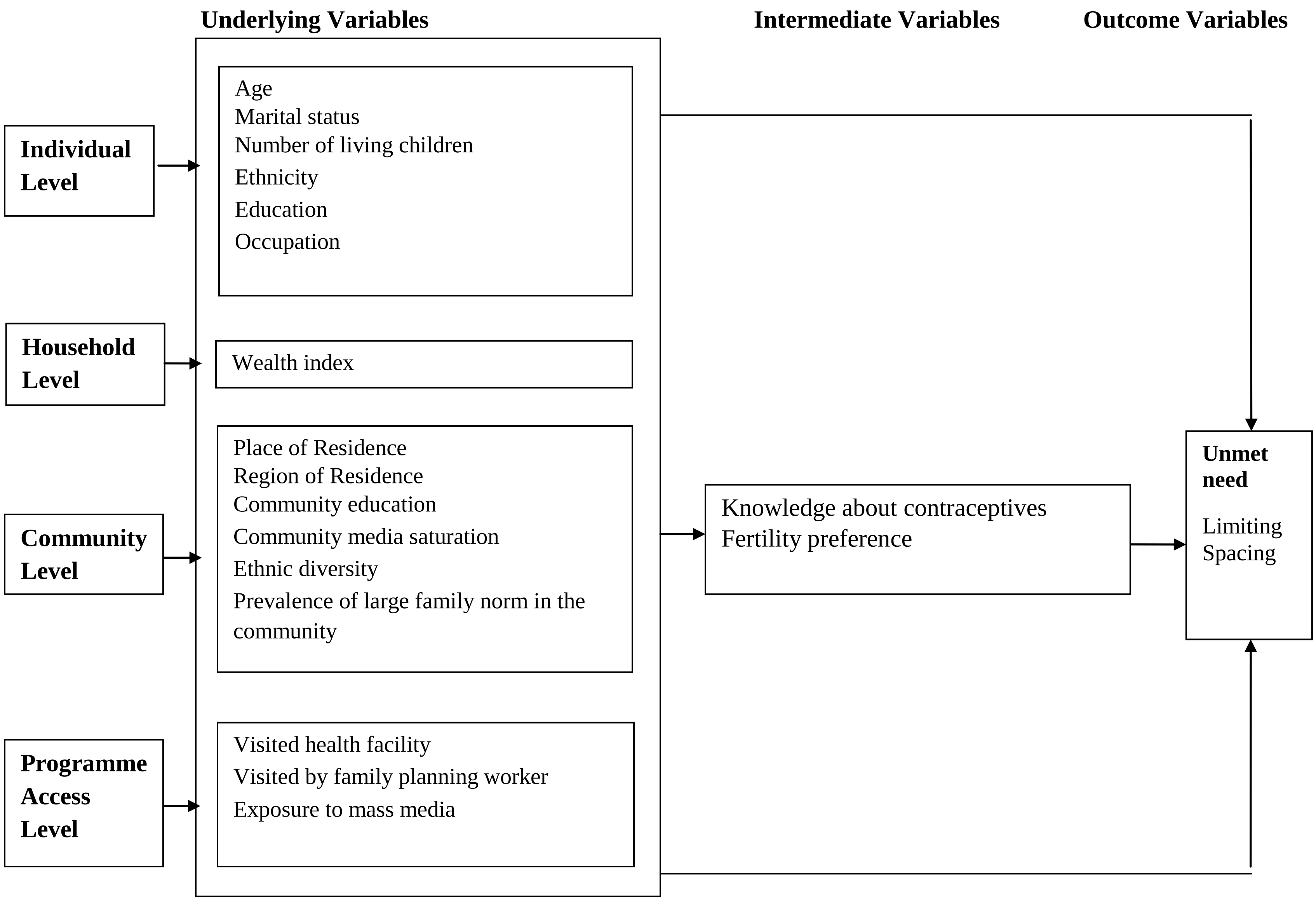
According to the pathways framework, household, community and health services factors can influence health actions, for example, a household can choose either to seek health care or not, in the event of an illness. On the other hand, a community's cultural norms can influence people's responses to health programmes. In addition, services provided by the health system also affect people's health seeking behaviour. Thus, building on Claeson, Griffin and Johnston et al.'s (2001) work, Shaikh (2010) provided a realistic organisation for the analysis of factors influencing unmet need at the individual, household community and health services levels.

It is thus important to address unmet need at various levels in order to determine the extent to which factors at each level affect unmet need. This will help stakeholders to come up with strategies that will effectively address unmet need.

2.2 CONCEPTUAL FRAMEWORK

This study thus adapted the above theoretical frameworks to come up with a conceptual framework that examines unmet need for contraception by taking into account factors at various levels. Figure 2.1 depicts the conceptual framework for this study. The framework identifies several independent variables which influence the dependent one (unmet need for contraception). The former fall under two major categories: underlying and intermediate factors. Underlying factors consist of demographic, cultural and socioeconomic variables while intermediate ones can generally be said to consist of variables which reflect an individual's attitudes and knowledge.

Figure 2.1: Conceptual Framework on the Correlates of Unmet need (adapted from Bhushan 1997, Casterline et al. 1997, Kaushik 1999 and Shaikh (2010)



2.2.1 Relationships among the variables

According to the framework, men and women are found at the individual level. These belong to households that are found in communities. Hence the factors at each level of operation in the hierarchy can affect unmet need for contraception by interacting with other attributes.

The underlying variables may have a direct influence on the outcome (unmet need for contraception) or do so by operating through the intermediate variables. In this case individual characteristics which include age, marital status, number of living children, ethnicity, education and occupation exert an influence on the outcome variable. These variables may also moderate the intermediate variables to influence the outcome variable. In addition, the household characteristic (wealth index) can directly influence the outcome variable or may first influence the intervening variables and in turn influence the outcome variable. Moreover, community variables comprising place of residence, region of residence, community education, community media saturation, ethnic diversity and prevalence of large family norm in the community can affect unmet need for contraception directly or by operating through the intermediate variables. Furthermore, programme access variables not only directly influence unmet need for contraception but also operate through intermediate factors.

The relationship between most of the independent variables and the dependent variable has been discussed in the preceding sections. This section discusses the association between one independent variable from each level and the dependent variable.

The place of residence is expected to have an influence on unmet need for contraception. An individual residing in a rural area is more likely to have unmet need for contraception than one living in the urban area. The place of residence has an effect on knowledge about contraceptives. Men and women residing in rural areas are less likely to have knowledge about contraceptives compared to those living in urban areas. This will result in higher unmet need for contraception for individuals living in rural areas compared to those in urban areas.

The prevalence of large family norm in the community is expected to affect unmet need for contraception. Individuals in such a community will not uphold family planning and thus are more likely to have unmet need for contraception compared to those in communities which uphold family planning.

An individual who has no contact with a family planning worker is more likely to have unmet need for contraception than one who has. Contact with a family planning worker is expected to affect one's knowledge about contraceptives which in turn will influence unmet need for contraception.

Wealth is expected to have influence on unmet need for contraception. Individuals belonging to a poor household are more likely to have unmet need for contraception compared to those belonging to a rich one. The wealth status of a household affects knowledge about contraception which in turn influences unmet need for contraception.

2.3: RESEARCH HYPOTHESES

The hypotheses of this study are as follows:

a. Factors at the community level account for a larger portion of unmet need for contraception in Zambia.
b. Ethnicity is a significant determinant of unmet need for contraception.
c. Visit by a family planning worker is negatively associated with unmet need for contraception.
d. The number of living children one has, significantly influences unmet need for contraception.
e. Satisfying unmet need for contraception has a significant impact on fertility.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methodology of the study. The discussion includes the background of the study area and the rationale for its selection, survey design, sample size, variables and their measurement, data management and analysis, data quality assessment and ethical consideration.

3.1 STUDY SETTING

The territory which came to be known as Northern Rhodesia in 1911 was governed by the British South Africa Company from 1891 until it was taken over by the British Colonial Office in 1924. In December 1953, Northern Rhodesia became part of the Central African Federation of Rhodesia and Nyasaland. Ten years later (1963), the Federation was dissolved and Northern Rhodesia became the republic of Zambia when it gained political independence on 24th October, 1964. Zambia's first president was Dr. Kenneth Kaunda (KK). The other presidents who ruled after KK are: Dr. Fredrick J.T. Chiluba, Dr. Levy P. Mwanawasa, Mr. Rupiah B. Banda and Mr. Michael C. Sata. Zambia was a multi-party state from 1964 to 1972. In 1972, it became a single-party state. Almost 20 years later (1991), the country embraced a multi-party system again.

3.1.1 Geography

Zambia is a landlocked country surrounded by eight countries: Angola, Botswana, Democratic Republic of Congo, Malawi, Mozambique, Namibia and Tanzania. Its area is 752,612 square kilometers (2.5% of Africa). The country had, for a long time, nine provinces, but recently (2011), Muchinga was added as the tenth province. The nine provinces are: Central, Copperbelt, Eastern, Luapula, Lusaka, Northern, North Western, Southern and Western (see figure 3.1). Copperbelt and Lusaka are predominantly urban while the opposite is the case for the rest. Zambia has 72 districts.

Figure 3.1: Map of Zambia showing the nine provinces

Source: Source: http://zambiamining.com/wp-content/uploads/2013/06/province-map.jpg

Zambia lies between latitudes 8 and 18 degrees south and longitudes 20 and 35 degrees east. Its climate is tropical and this is ameliorated by its elevation (Davies 1971). It has three distinct seasons: it is cool and dry from May to August, hot and dry around September and October, and warm and wet between November and April (CSO, MOH, TDRC, UNZA, Macro International Inc. 2009).

3.1.2 Population

The Zambia 2010 census of Population and Housing national analytical report indicates that the country's population stands at 13,092,666 with a growth rate of 2.8% per annum. There are slightly more females (50.7%) than males (49.3%). This was the fifth census conducted since

Zambia became independent. The population increased from 4,056,995 in 1969 to 5,661,801 in 1980. In 1990 it stood at 7,759,161 and increased to 9,885,591 in 2000. The population density has also been increasing from 7.5 in 1980 to 9.8 in 1990 to 13.1 in 2000 and 17.3 persons per square kilometer in 2010. Lusaka province has the highest density (100.1 persons per square kilometer) whereas North-Western has the lowest (5.8 persons per square kilometer). Moreover, Lusaka is the most urbanized province. The 2010 census of Population and Housing national analytical report further indicates that 39.5% of the population resides in urban areas whereas about three fifths (60.5%) reside in rural areas. This shows an increase in the proportion of people residing in urban areas contrary to the steady decline that has been taking place since the 1980s. The 1980, 1990 and 2000 census estimates were 40%, 38% and 35%, respectively.

High fertility has continued to be one of the prominent features of Zambia's population. Total Fertility Rates (TFRs) recorded from the various censuses are as follows: 7.4 in 1969, 7.2 in 1980, 6.7 in 1990, 6.0 in 2000 and 5.9 births per woman in 2010. The four DHSs recorded the following figures 6.5 in 1992, 6.1 in 1996, 5.9 in 2001/02 and 6.2 births per woman in 2007. Though the first three surveys reported a decline in the TFRs, the fourth one reported an increase.

Despite successive censuses recording a decline in infant mortality rates (IMR), figures still remain high. The 1969 census estimated it at 141 deaths per 1,000 live births. This dropped to 99 in 1980, but increased to 123 in 1990. The 2000 census estimates showed a decline to 110 deaths per 1,000 live births. The DHS estimates reveal a further decline to 95 deaths per 1,000 live births in 2001-2002 to 70 deaths in 2007 (CSO, MOH, TDRC, UNZA, Macro International Inc. 2009). According to the 2010 census estimates (76 deaths per 1,000 live births) Zambia has experienced a slight increase in infant mortality since the 2007 survey was conducted.

3.1.3 Economy

Zambia was among the rich countries in Africa when she became independent in October 1964 (Heijden 2001; McCulloch 2000). Copper mining which at that time dominated the economy, still dominates. Actually, the first republican president, Dr. Kenneth Kaunda is reported to have made a well known remark that 'Zambia was born with a copper spoon in her mouth' (Bigsten & Kayizzi-Mugerwa 2000; Mukherjee 2002). The sector accounted for 95 percent of export earnings and contributed to 45 percent of government revenue between 1965 and 1975. However, the strong mining-based economy which Zambia inherited at independence experienced external shocks in the mid-1970s due to the sharp decline in copper prices and a sharp increase in oil prices (Bigsten & Kayizzi-Mugerwa 2000; Saasa & Carlsson 2002). The situation was exacerbated by the United National Independence Party (UNIP) government's failure to come up with policies better suited to address the declining economic situation. Hence, the Zambian economy underwent a recession in the 1980s. Its average annual growth rate during this period was 1.3% (Kayizzi-Mugerwa 1990; Simutanyi 2008). Consequently, Zambia became a low income country instead of a middle one. Though the government recognized the need to diversify the economy and lessen its over-dependency on mining exports, it did not implement any changes. The government decided to embrace the import substitution industrialisation strategy, but failed to achieve the desired results because the strategy was import dependent (Abalu et al. 1996; Saasa 1996; CSO, MOH, TDRC, UNZA, Macro International Inc. 2009; Government of the Republic of Zambia {GRZ} 2002). The result of this was an economic stagnation.

GRZ (2002); CSO, MOH, TDRC, UNZA and Macro International Inc. (2009) further confirm that in the middle of such a stagnating economy, the government embarked on implementing vigorous Structural Adjustment Programmes (SAPs) in the 1980s. However, the implementation of SAPs was short lived because the government had to abandon it in May 1987 due to the people's outcry against SAPs. The year preceding the government's abandonment of the SAPs saw food riots on the Copperbelt and Lusaka (Saasa 1996; Touwen 1998).

A year later (1988), government saw the need to continue with the SAPs in order to effectively address the prevailing economic situation. With support from IMF and the World Bank, government put in place measures to gradually liberalise the economy. The UNIP government could not fully implement these measures because there was a change of government in 1991. The new government, Movement for Multi party Democracy (MMD), was under the leadership of Dr. Fredrick Chiluba (Abalu et al. 1996).

The MMD government accelerated the pace of reform which included privatisation of parastatals, removal of food subsidies, trade liberalisation and payments and lowering of government expenditure (GRZ 2002; Rakner et al. 2001; Touwen 1998; White1997). Saasa (1996) observes that added political will and policy commitment were vital elements of the MMD government's pledge to adopt the structural adjustment programme. This implementation of the structural adjustment programme continued until Michael Chilufya Sata's Patriotic Front (PF) party took over the reins of power after the September 2011 elections. So far the PF led government has not diverted from this.

GRZ (2002) asserts that despite government having embraced the structural adjustment programme, Zambia's economic structure did not change much during the 1990s as it had the least average annual growth rate (1%) in the Southern African Development Community (SADC). However, Zambia's economic performance considerably improved in the 2000s. The economic growth rate has been around 6% per year (Smith-Honn 2009; Zambia Economy 2013). This is attributed to the rise in copper prices at the world market as well as the increase in copper production. Despite this achievement, poverty still remains a significant problem with the 2010 census estimating the levels at 60.5%.

3.1.4 The population policy

It was not until the 1980s that the Zambian government recognised that demographic dynamics, particularly rapid population growth, had adverse effects on socio-economic development. This resulted in the government including a national population policy in the Fourth National Development Plan (1989-1993). The population policy was adopted in May 1989 (Osei-Hwedie 1992; CSO, MOH, TDRC, UNZA, Macro International Inc. 2009; GRZ 2010).

Some of the objectives of this "comprehensive population policy" are to: initiate, improve and sustain measures aimed at slowing down the high population growth rate; extend the coverage of family planning services to all adults; work towards the reduction of the total fertility rate from 7.2 to 4; reduce the infant mortality rate from the present 97 per 1 000 live births to 75 per 1 000 live births per year during the plan period; and improve the health of the mother and child (GRZ 1989). This policy was revised in 2007 to incorporate issues adopted by the 1994 Cairo International Conference on Population and Development (ICPD). Some of the objectives are to: reduce the high level of fertility, particularly adolescent fertility; improve sexual and reproductive health (including family planning) in order to encourage a manageable family size;

and reduce the incidence of morbidity and mortality, particularly maternal, infant and child mortality (MOFNP, 2007). It is worth noting that Zambia is yet to achieve most of these objectives. Though the objective on the reduction of the infant mortality rate from 97 per 1 000 live births to 75 per 1 000 live births per year was attained at some point, it happened many years after the plan period.

3.1.4 Rationale for selection of study area

The rationale for selecting Zambia as the study area is varied. Firstly, Zambia's level of unmet need (27%) is high. This is slightly higher than the average for sub-Saharan Africa (26%). Secondly, the reduction of unmet need for contraception in Zambia has stalled since 1996 (CSO, MOHH, TDRC, UNZA & Macro International Inc. 2009). Thirdly, Zambia still faces several reproductive health challenges. These include a high total fertility rate (6.2 births per woman), high maternal mortality of 591 deaths per 100,000 live births, high teenage pregnancy (28% of adolescent females aged 15-19 have either had a child or are having their first pregnancy) and high population growth rate (2.8% per annum).

3.2 SURVEY DESIGN

This cross-sectional study made use of quantitative data drawn from the 2007 Zambia DHS. The Zambia DHS is a nationally representative sample survey of women and men of reproductive age. Its main objective is to provide information on levels and trends in fertility and use of family planning methods among other things.

3.3 SAMPLE DESIGN

The sample was designed to provide estimates of population and health indicators at the national and provincial levels. The sampling frame was adopted from the Census of Population and Housing of the Republic of Zambia (CPH) conducted in 2000 which was provided by the CSO. The frame consisted of 16,757 standard enumeration areas (SEAs) created for the 2000 CPH. A SEA is a convenient geographical area with an average size of 130 households or 600 people. It contains information about its location, the type of residence, the number of households and the number of males and females in the population.

A representative sample of 8,000 households was drawn. It was a stratified sample selected in two stages from the 2000 CPH frame. Stratification was achieved by separating every province into urban and rural areas. Therefore, the nine provinces were stratified into 18 sampling strata. Samples were selected independently in every stratum by a two-stage selection. Implicit stratifications and proportional allocation was achieved at each of the lower geographical/administrative levels by sorting the sampling frame according to the geographical/administrative order and by using a probability proportional to size selection at the first stage sampling.

In the first stage, 320 SEAs were selected with probability proportional to the SEA size.

The lists of households served as the sampling frame for the selection of households in the second stage. Selected SEAs with more than 300 households were segmented, with only one segment selected for the survey with probability proportional to the segment size. Household listing was conducted only in the selected segment. Therefore, a cluster is either an SEA or a segment of an SEA (CSO, MOHH, TDRC, UNZA & Macro International Inc. 2009).

In the second stage selection, an average number of 25 households were selected in every cluster, by equal probability systematic sampling. All private households were listed. All women age 15-49 and all men age 15-59 that were either permanent residents of the households in the sample or visitors present in the household on the night before the survey were eligible to be interviewed.

3.4 STUDY POPULATION AND SAMPLE SIZE

The DHS covered 8,000 households where 7,146 women aged 15-49 and 6,500 men aged 15-59 were interviewed. Though the author intended to analyse the data for all the men and women, it was not possible to do that for all men. Only that for 3,146 currently married men whose partners were also interviewed was analysed. This is because the estimation for unmet need for contraception among men requires that information about the partners' contraceptive use is also available. Therefore, the sample for this study was 7,146 women and 3,146 currently married men. The individual and couple recodes were thus employed, respectively.

3.5 INSTRUMENTS

Three questionnaires were used, i.e., the Household Questionnaire, the Women's Questionnaire, and the Men's Questionnaire. These questionnaires were based on questions developed for the MEASURE DHS programme and were adapted to reflect the population and health issues relevant to Zambia. In addition to English, the questionnaires were translated into seven major local languages, Nyanja, Bemba, Kaonde, Lunda, Lozi, Tonga, and Luvale.

The Household Questionnaire was used to list all the usual members and visitors of selected households. This collected some basic information on the characteristics of each person listed, including age, sex, education, and relationship to the head of the household inter alia.

The Women's Questionnaire was used to collect information from all women age 15-49. These women were asked questions on topics such as: background characteristics (education, residential history, etc.), knowledge and use of family planning methods, fertility preferences, marriage and sexual activity, women's work and husband's background characteristics.

The Men's Questionnaire was administered to all men age 15-59 in each household. The Men's Questionnaire was shorter than the Women's because it did not contain a detailed reproductive history or questions on maternal and child health.

3.5.1 Data Processing

Data processing took place at the CSO office in Lusaka. This involved office editing, coding of open-ended questions, data entry and editing computer identified errors. The personnel who processed the data consisted of 11 data entry clerks, 4 data editors, 4 data entry supervisors and 1 administrator. Data entry and editing was done using the CSPro software.

3.6 VARIABLE IDENTIFICATION

The dependent and independent variables that were used in this study are presented in Table 3.1.

Table 3.1: Variables and their measurement

Variable	Measurement
Individual level variables	
Age	15-19 (1); 20-34 (2); 35-49/59 (3)
Children Ever Born	0 (0); 1-2 (1); 3-4 (2); 5 and above (3)
Number of living children	0 (0); 1-2 (1); 3-4 (2); 5 and above (3)
Highest educational attainment	No education (0); Primary (1); Secondary/High (3)
Marital status	Never married (0); Currently married (1); Formerly married (2)
Ethnicity	Bemba (1); Tonga (2); North Western (3); Barotse (4); Nyanja/Eastern (5); Mambwe/Tumbuka (6); Other
Occupation	Not working (0); Professional/clerical (1); Sales/Service (2); Agriculture (3); Manual (4)
Religion	Catholic (1), Protestant (2), Others (3)
Household level variables	
Wealth Index	Poor (0); Middle (1); Rich (2)
Programme variables	
Visited a health facility	No (0); Yes (1)
Visited by family planning worker	No (0); Yes (1)
Heard about family planning on media	No (0); Yes (1)
Ever use of contraceptives	No (0); Yes (1)
Community level variables	
Place of residence	Rural (1); urban (2)
Region of residence	Luapula (1); Copperbelt (2); Eastern (3); Central (4); Lusaka (5); Northern (6); North Western (7); Southern

	(8); Western (9)
Community level education	Low (1); medium (2); high (3)
Community media saturation	Low (1); medium (2); high (3)
Prevalence of large family norm in the community	Low (1); medium (2); high (3)
Ethnic diversity	Low (1); medium (2); high (3)
Intermediate variables	
Knowledge of any contraceptive	No (0); Yes (1)
Fertility preference	Don't want (0); Want another (1); Undecided (2)
Dependent Variable	met need (1); unmet need for spacing (2);unmet need for limiting (3)

3.6.1 Dependent Variable

The dependent variable was unmet need for contraception. Its measurement among females was based on a DHS-constructed variable. Thus, unmet need for contraception refers to the condition of a fecund currently married and sexually active unmarried woman who reported not wanting any more children or wanting to wait for at least 2 years before having the next child, but not using any contraceptives. A pregnant woman whose pregnancy was mistimed or unwanted due to non-use of contraceptives at the time she became pregnant is also considered to have an unmet need for contraception. The same applies to an amenorrhoeic woman whose last birth was mistimed or unwanted. Regarding males, one was considered to have unmet need for contraception if he or his partner was not using any contraceptives, but wanted no more children or wanted to wait for at least 2 years before having the next child. Unmet need for contraception is expressed as a percentage based on the total number of men or women aged 15 – 59 and 15 – 49, respectively.

Questions asked in the 2007 ZDHS included: "are you currently doing something or using any method to delay or avoid getting pregnant? (Responses were: yes/no), 'which method are you using?’ (Responses were: female sterilisation/ male sterilization/ pill/ IUD/ injectables/ implants/ male condom/ female condom/ diaphragm/ foam or jelly/ lactational method/ rhythm method/ withdrawal/ other), ‘would you like to have a/another child or would you prefer not to have any/more children?’ (Responses were: have a/another child, no more/none, can’t/partner can’t get pregnant, undecided, unsure). Other questions that are female specific included: ‘are you pregnant now?’ (Responses were: no/yes/unsure), ‘when you got pregnant, did you want to get pregnant at that time? (Responses were: yes/no). Responses to these questions helped to determine the type of contraceptive method used (modern or traditional method) as well as their unmet need for contraception status (spacing or limiting). The dependent variable is both dichotomous and polychotomous and it was categorized as unmet need for contraception (met need, total unmet need) and unmet need for contraception (met need, unmet need for spacing, unmet need for limiting).

3.6.2 Independent Variables

The independent variables consisted of selected characteristics which were categorized as individual, household, community and programme access factors. The selection of these variables was informed by the theoretical framework and the literature review.

3.6.2.1 Individual level variables

The selected variables include age, marital status, number of living children, educational attainment, ethnicity and occupation. To get the age of the respondent, the Zambia DHS asked two questions: ‘In what month and year were you born?’, ‘How old were you at your last birthday?’ An individual’s marital status was established by their responses to the following three questions: ‘Are you currently married or living together with a man/woman as if married?’, Have you ever been married or lived together with a man/woman as if married?’, and ‘What is your marital status now: are you widowed, divorced, or separated?’ The number of living children men and women had was ascertained by their responses to the following questions: ‘Have you ever given birth/ fathered any children with any woman?’, ‘Do you have any sons or daughters to whom you have given birth/fathered who are now living with you?’, Do you have any sons or daughters to whom you have given birth/fathered who are alive but do not live with you?', 'How many sons/daughters live with you?', and 'How many sons/daughters are alive but do not live with you?'

Information on a respondent's educational attainment was obtained by considering their responses to three questions: 'Have you ever attended school?', 'What is the highest level of school you attended: primary, secondary, or higher?', and 'What is the highest grade you completed at that level?' Information on their ethnicity was obtained through their response to the question 'What tribe do you belong to?' Finally, to obtain the occupation of the respondent, the Zambia DHS asked the following questions: 'Have you done any work in the last 12 months?' and 'What is your occupation, that is, what kind of work do you mainly do?'

3.6.2.2 Household-level variable

Only one variable (wealth index) was included at this level. The DHS uses the wealth index to ascertain the standard of living in households. Information on indicator variables such as type of flooring, water supply, sanitation facilities, electricity, radio, refrigerator, television and telephone was collected. Principal Component Analysis (PCA) was employed to assign weight to each indicator. Factor analysis was used to achieve standardized scores and factor coefficient scores (FCS). Thereafter the household index value was generated by summing the products of indicator values and FCS or factor loadings. This sum was a standardized score with a mean of zero and a standardized deviation of one. Quintiles were then created to act as break points in the wealth index (Rutstein & Johnson, 2004). Thus each individual received a quintile of the household they belonged to.

3.6.2.3 Community-level variables

These included place of residence, region of residence, community education, community media exposure, ethnic diversity and prevalence of a large family norm in the community. The 2007 Zambia DHS categorized region of residence according to the nine provinces in existence at the time. These were Central, Copperbelt, Eastern, Luapula, Lusaka, Northern, North Western, Southern and Western. The place of residence was categorized as urban and rural. The variables community education (proportion of individuals with secondary and higher education in the community), community media saturation (proportion of individuals exposed to mass media in the community), ethnic diversity (the extent of diversity in the community where respondents live based on the composition of ethnic groups) and prevalence of a large family norm in the community (proportion of individuals living in communities where individuals have four or more children) were created by aggregating individual level variables at the primary sampling unit.

Therefore, community education was constructed by aggregating men's and women's responses to questions on their individual educational attainment whereas community media saturation was constructed by aggregating individuals' responses to questions on their exposure to mass media. Respondents were asked whether they read newspapers, listened to radio and watched television, every day, at least once a week, or less than once a week. Moreover, to create the variable ethnic diversity, which is the degree of diversity in the community where respondents reside in terms of ethnic composition, individual responses to the question asking them the ethnic group they belonged to were aggregated. Finally, the variable prevalence of a large family norm in the community was generated by aggregating individual responses to questions pertaining to the number of children. Each of the measures obtained after aggregating individual responses was divided into three quantiles: low, medium and high.

Previous studies have established significant associations between reproductive health indicators and the four constructed variables. For instance, higher community education was found to lower levels of fertility in sub-Saharan Africa (Kravdal 2002), increase interest in limiting child bearing and contraceptive use (Benefo 2006; Stephenson et al 2007), lower risks of dying in infancy and childhood (Adedini 2013) and increase odds of having antenatal care visits (Ononokpono et al 2013). Therefore, the variable was selected in that if it influences the stated reproductive health indicators, it is most likely that it does influence unmet need for contraception. The association between community education and contraceptive use is particularly crucial when considering the relationship between community education and unmet need for contraception. The social interaction among individuals in the community may influence their use of contraceptives. Individuals with higher education may help the uneducated or less educated to be well informed about contraceptive methods and hence the latter will be in a position to adopt contraceptive use (Montgomery & Casterline 1996).

Moreover, higher community media saturation has been found to increase the odds of having antenatal care visits (Ononokpono et al 2013). Since media not only informs, but educates individuals (Kwankye & Augustt 2007), it is most likely that an individual with exposure to it is more likely to gain knowledge on reproductive health issues than one who has no media exposure. Hence, it was assumed that individuals in communities with higher media saturation were more likely to have knowledge about contraceptives and were more likely to use them to space and limit child births. Consequently, individuals in communities with higher media saturation were expected to have lower unmet need for contraception.

Existing studies also indicate that high ethnic diversity influences risky sexual behavior (premarital and non-spousal sex) as well as infant and child mortality (Uthman 2010; Adedini 2013). This being the case, it was assumed that ethnic diversity could have an influence on unmet need for contraception. Furthermore, Kaggwa et al. (2008) indicated that community norms regarding family size ceased being significantly associated with women's use of modern contraceptives after controlling for individual factors. However, Babalola and Fatusi (2009) found ethnic diversity to be significantly associated with two of the three outcomes under consideration. Their findings reveal an increase in use of skilled assistance and antenatal care in communities with a high prevalence of small family norm whereas the relationship was not significant in the case of postnatal care though the direction was the same as for the other two. This motivated the selection of the variable on community norms regarding family size in order to determine its effect on unmet need for contraception.

3.6.2.4 Programme access variables

The programme access factors were as follows: exposure to family planning messages on media, visited by a family planning worker and visited health facility. To obtain information on respondents' exposure to family planning messages on media, the Zambia DHS asked the following question: In the last few months have you heard about family planning: a) on the radio?, b) on the television?, and c) in a newspaper or magazine? Information on visits by a fieldworker or to a health facility was obtained by their responses to the following questions: In the last 12 months, were you visited by a fieldworker who talked to you about family planning? In the last 12 months, have you visited a health facility for care for yourself (or your children)?

3.6.3 Intermediate variables

Two intermediate variables were included. These were knowledge of any contraceptive and fertility preference. Information on the two variables was obtained by the respondents' responses to the following questions: a) which methods of contraception have you heard about? b) would you like to have a/another child or would you prefer not to have any/more children?

3.7 STEPS IN DATA ANALYSIS

After registering for data set access, the data set was downloaded from the Measure DHS website. Thereafter the DHS recode manual was downloaded to help the researcher in familiarising herself with the variables in the data set. In addition, the data was checked to see if it was as expected. After that, the required variables were kept and those that were not needed were dropped. In some cases, new variables were generated. Do files were created to make the analysis process easy. One advantage of having do files is that they allow for modifying and re-running commands. Stata 12 and Microsoft Office Excel 2007 were used in the management and analysis of the data set. DHS sampling weights were applied in the analysis in order to control for uneven sampling and non-response.

3.8 QUALITY ISSUES IN DATA

Since we are not living in a perfect world, the likelihood of demographic data being flawed is high. Demographic data is considered to be flawed if it is inaccurate, inadequate, incomplete and not up to date (Moultrie 2013). Seeing that demographic data are widely used by policy makers, planners and researchers (as is the case with this study), there is need to ensure that the data are of high quality. Hence, evaluation and assessment of data is crucial in that it helps to ascertain the reliability of a given data set. Tests of the age statistics were conducted in order to establish the quality of the 2007 Zambia DHS data. Doing so is significant, considering that apart from such data being of great importance in population estimates and demographic analysis, errors in these statistics also indicate inadequacies in the head count of the population or records of the numbers of vital events (UN 1955). Moreover, taking into account the fact that age is a key variable in demographic analysis, it is important to ensure that no error or bias in the age data is allowed to distort the results (Phillips 1999).

It has been established that age misreporting is a common phenomenon in demographic studies (Shryock 1976; Bello 2012). Besides, heaping is the most common phenomenon among the irregularities associated with age data (Pardeshi 2010). This is due to, among other things, the tendency of reporting ages in figures ending in certain digits (e.g. 0, 2, 5 and 8), enumerator or respondent's carelessness in reporting and/or recording age, the respondent's ignorance about certain personal details and wilful misrepresentations (UN 2007; Bello 2012). The evaluation and assessment of the age data in the 2007 Zambia DHS included: graphical representation of the age data, age ratios, Myer's index and Whipple's index.

3.8.1 Graphical representation of the age data

The first assessment of the age data was done by a graphical representation of the single-year age data of the men and women in the study population. The graphical representation of single-year age data is a quick and visual way of assessing whether there are deficiencies and digit preferences in the age data. To achieve this, a line graph is plotted with single years on the x-axis and the number of persons reporting various ages on the y-axis. If the study population has not experienced sharp swings in fertility or mortality or remarkable levels of migration, its distribution by single years is expected to follow a smooth linear graph (Ibisomi 2007). Therefore, any remarkable fluctuations in the graph suggest the existence of error in the enumeration or other distorting factors. However, if there are spikes at 0, 5 and even digits such as 2 and 8, it indicates the presence of digit preference (US Bureau of the Census, 1985).
Figure 3.2 shows the distribution of males and females by single years of age. The graph shows that to some extent there was a preference for ages ending with digits such as 0, 2, 4, 5 and 8. The spikes seem to be more pronounced among the females. Despite the spikes, the graph shows a downward trend along the ages of both males and females.

The age data was also assessed by the graphical representation of the five-year age distribution. This is presented in figure 3.3. The graph shows a pronounced peak at the 25-29 age cohort among the females whereas there is a slight peak at the 30-34 age cohort among the males. As expected, there is a downward trend along the age cohorts.

Figure 3.2: Single-year age distributions (Males &Females), ZDHS 2007

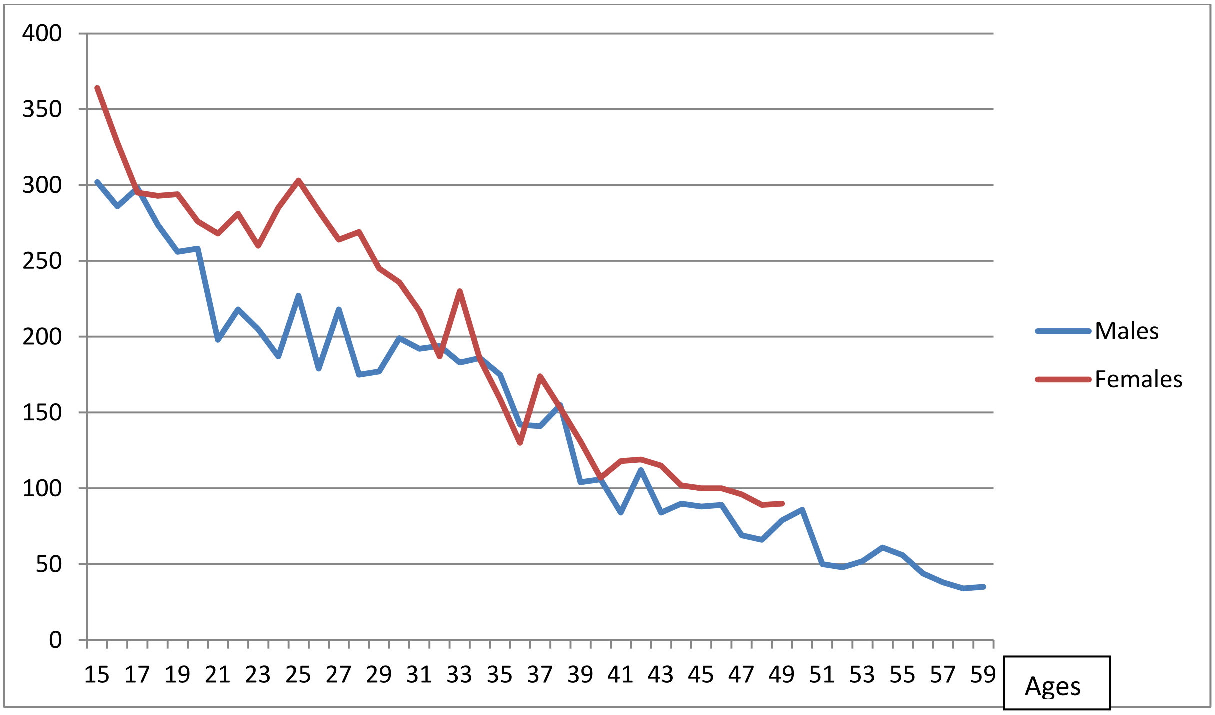
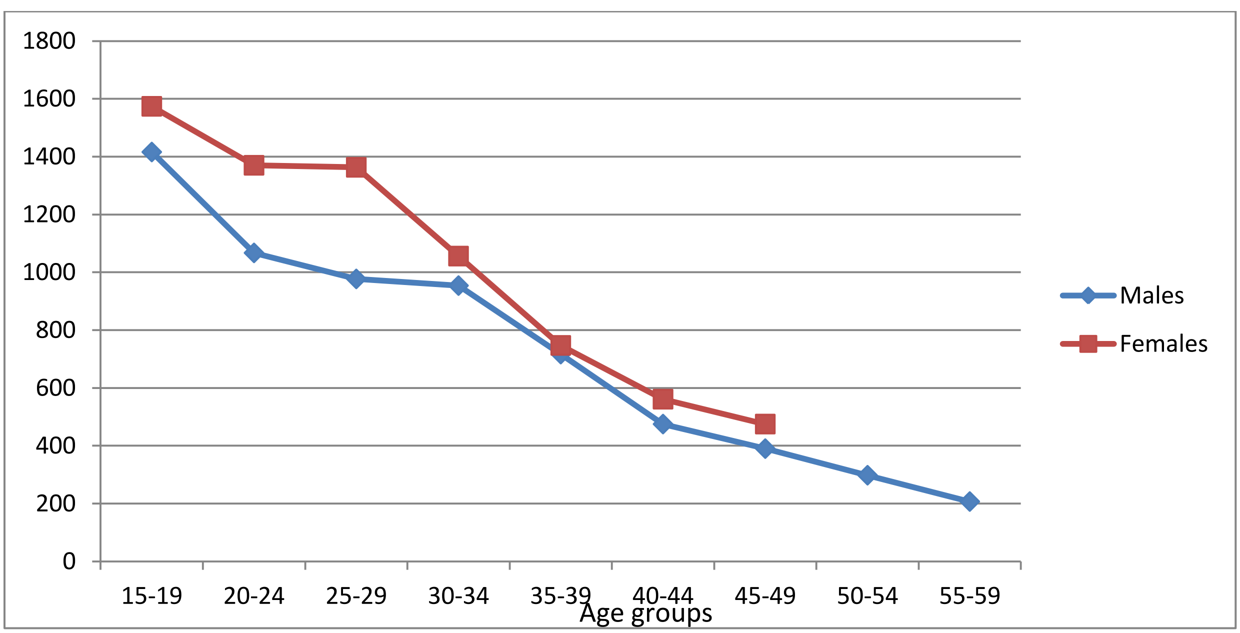


Figure 3.3: Five-year age distributions (Males &Females), ZDHS 2007



Though the graphical representation of both the single-year and five year age distributions shows the presence of age heaping, it does not provide insights into patterns of error in the age data. Moreover it is not possible to tell if there were undercounts and displacements between cohorts. Therefore, age ratios which are a more quantitative approach were used to further assess the quality of the age data.

3.8.2 Age Ratios

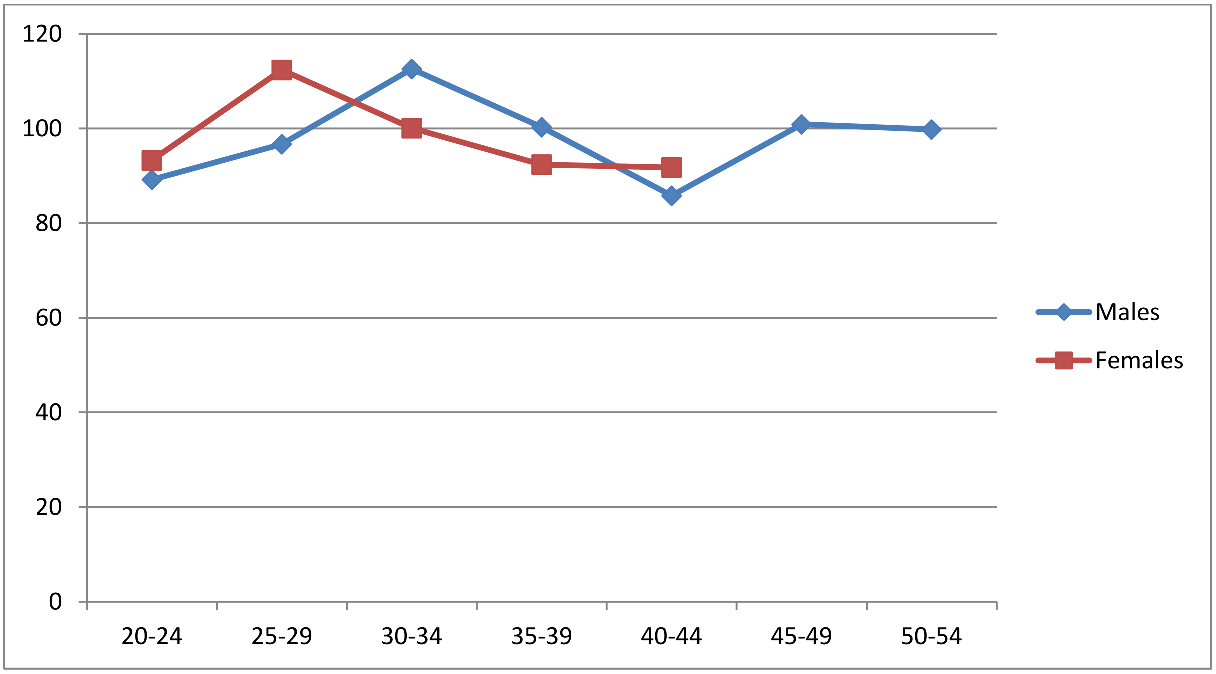
Age ratios are used to measure the smoothness of the age distribution. If the study population has not experienced sharp swings in fertility or mortality or remarkable levels of migration, the enumerated size of a specific cohort should be almost equal to the average size of the immediately preceding and subsequent cohorts. That is, the ratio of the census count for a specific cohort to the average of the adjacent cohorts is almost equal to 1.0. Therefore, any remarkable deviations from 1.0 (100) suggest the existence of error in the enumeration or other distorting factors (US Bureau of the Census, 1985; UN Statistics Division 2009). Hence, if the deviation from 1.0 (100) is large, the error is large as well. The formula for age ratio is:

$$_5AR_x = \frac{_5P_x}{1/2\ (_5P_{x-5} + {}_5P_{x+5})}$$

Where: $_5AR_x$ = age ratio for ages x to x+4, $_5P_x$ = population at ages x to x+4, $_5P_{x-5}$ = enumerated age population in the adjacent lower age category and $_5P_{x+5}$ = enumerated age population in the adjacent higher age category.

Figure 3.4 presents the age ratios for five year age groups by sex. The lines representing the age groups for both males and females are not smooth. Specifically, the graph reveals that there were positive deviations in age group 25-29 and 30-34 among females and males, respectively. In addition, there were negative deviations among ages 20-24 and 25-29 with a sharp dip in the age group 40-44 among males. Age groups 20-24, 35-39 and 40-44 among women also had negative deviations. The calculated age ratio for males (6.1) was lower than that for females (7.0). Details of the calculations are in Table 3.2. To determine the extent of preference for each of the ten digits (0-9), Myer's index was used.

Figure 3.4: Age ratios for five-year age groups by sex, ZDHS 2007



3.8.3 Myers' Blended Index

This method of assessing the quality of age data was developed by Myers in 1940. The Myers index assesses single-year age data. This measure of the extent of preference for each of the ten digits (0-9) can be used to report errors for all ages (10 and above). It is based on the assumption that if there are no systematic irregularities in the reporting of age, the aggregate population of each age ending in one of the ten digits should be almost 10% of the total blended population.

A sum of more than 10% of the total blended population at any given digit, suggests the presence of over selection or preference of ages ending in that digit. Contrary, a negative deviation suggests avoidance of ages ending in that digit. The theoretical range of Myers index is 0-90 with 0 indicating non existence of age heaping and 90 indicating that all recorded ages end in a single digit (US Bureau of the Census, 1985; Bello 2012; Zohry 2012).

The procedure involved in calculating the Myers index is as follows:

1. Sum the populations ending in each digit over the whole range, start with the lower limit of the range (e.g., 10, 20, 30…; 11, 21, 31...).
2. Ascertain the sum excluding the first population combined in step 1(e.g., 20, 30, 40…; 21, 31, 41…).

3. Weight the sums in steps 1 and 2 and add the results to obtain a blended population (weights 1 and 9 for the 0 digit; … weights 10 and 0 for the 9 digit).
4. Convert the distribution in step 3 into percentages.
5. Take the deviation of each percentage in step 4 from 10.0, the expected value of each percentage.
6. A summary index of preference for all terminal digits is derived as one half of the sum of the deviations from 10.0%, each without regard to signs.

The deviation of each percentage of the blended population from 10.0 along each of the terminal digits is presented in figure 3.5. The most preferred terminal digits among males were 5, 0 and 2 in the order of preference whereas they were 7, 8 and 3 in the case of females. Moreover, the most avoided terminal digits among males were 1, 9 and 6 whereas 2, 6 and 0 were the most avoided among females. Tables 3.2 and 3.3 present the computation of Myers index for males and females, respectively. The most selected terminal digit among males was 5 (10.9%) whereas 7 (10.7%) was the most selected among females. In addition, 1 was the least selected terminal digit among males whereas 2 was the least among females. However the difference between the most selected and least selected terminal digits for each sex was not large. This suggests that age heaping was not significant.

The calculated index indicates that 2.3% of the males and 2.1% of the females reported ages with incorrect final digits. Only ages 20-49 and 20-59 were used for females and males, respectively. The limitation of Myers index is that it does not have a sound theoretical basis and does not capture other forms of age bias.

Figure 3.5: Deviation of each percentage of blended population from 10 by sex, ZDHS 2007

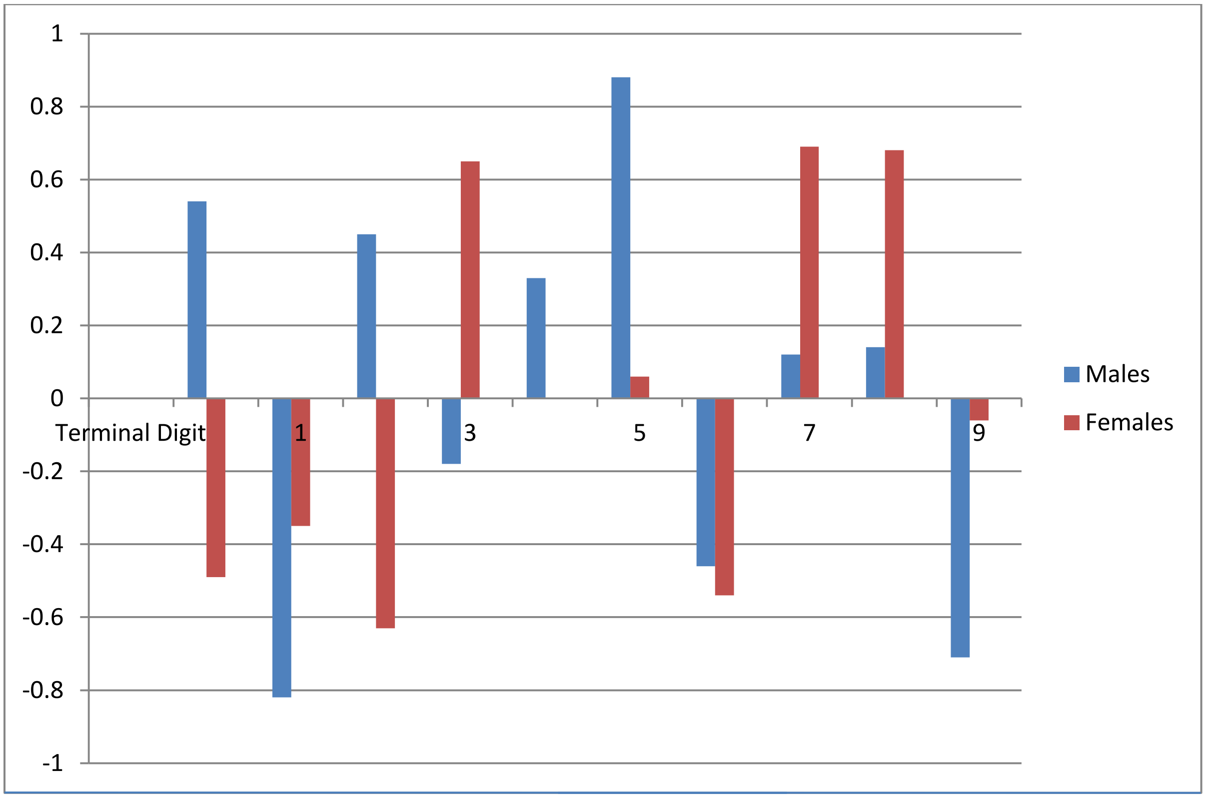


Table 3.2: Age Ratios of Males and Females in Zambia, ZDHS 2007

Age	Males	Age Ratio	Deviation from 100	Absolute Deviation	Females	Age Ratio	Deviation from 100	Absolute Deviation
15-19	1416				1574			
20-24	1067	89.18	10.82	10.12	1370	93.29	6.71	6.71
25-29	977	96.68	3.31	3.31	1363	112.37	-12.37	12.37
30-34	954	112.63	-12.63	1263	1056	100.09	-0.09	0.09
35-39	717	100.35	-0.35	0.35	747	92.39	7.61	7.61
40-44	475	85.82	14.18	14.18	561	91.82	8.18	8.18

45-49	390	100.90	-0.91	0.91	475			
50-54	298	99.83	0.17	0.17				
55-59	207							
Total	**6500**			**42.37**	**7146**			**34.96**
Mean				**6.05**				**6.99**

Table 3.3: Myers' blended index for males in Zambia, ZDHS 2007

Terminal Digits	Sum of ages 20-59	Weight	Ages 20-59 Weight Product	Sum of ages 30-59	Weight	Ages 30-59 Weight product	Blended Population	% Distribution	Deviation from 10	Absolute Deviation
0	563	1	563	391	9	3519	4082	10.54	0.54	0.54
1	474	2	948	326	8	2608	3556	9.18	-0.82	0.82
2	524	3	1572	354	7	2478	4050	10.45	0.45	0.45
3	472	4	1888	319	6	1914	3802	9.81	-0.19	0.19
4	463	5	2315	337	5	1685	4000	10.32	0.33	0.33
5	490	6	2940	319	4	1276	4216	10.88	0.88	0.88
6	410	7	2870	275	3	825	3695	9.54	-0.46	0.46
7	428	8	3424	248	2	496	3920	10.12	0.12	0.12
8	396	9	3564	255	1	255	3819	9.86	-0.14	0.14
9	360	10	3600	218	0	0	3600	9.29	-0.71	0.71

Sum	**4580**			**3042**			**38740**	**1.00**		**4.64**
Index										**2.32**

Table 3.4: Myers' blended index for females in Zambia, ZDHS 2007

Terminal Digits	Sum of ages 20-59	Weight	Ages 20-49 Weight Product	Sum of ages 30-59	Weight	Ages 30-49 Weight product	Blended Population	% Distribution	Deviation from 10	Absolute Deviation
0	512	1	512	343	9	3087	3599	9.51	-0.49	0.49
1	485	2	970	335	8	2680	3650	9.65	-0.35	0.35
2	468	3	1408	306	7	2142	3546	9.37	-0.63	0.63
3	490	4	1960	345	6	2070	4030	10.65	0.65	0.65

4	470	5	2350	287	5	1435	3785	10.00	0.00	0.00
5	462	6	2772	259	4	1036	3808	10.06	0.06	0.06
6	413	7	2891	230	3	690	3581	9.46	-0.54	0.54
7	438	8	3508	270	2	540	4044	10.69	0.69	0.69
8	422	9	3798	242	1	242	4040	10.68	0.68	0.68
9	376	10	3760	221	0	0	3760	9.93	-0.06	0.06
Sum	**4536**			**2838**			**37843**	**100.00**		**4.15**
Index										**2.07**

3.8.4 Whipple's Index

The Whipple's index is an evaluation technique which was developed by the American demographer George C. Whipple to reflect preferences for terminal digits '0' and '5'. This is measured on a scale ranging from 0 to 500 with 0 indicating total avoidance, 100 indicating uniform distribution across ages ending in each of the ten digits (no age heaping) and 500 indicating that all recorded ages end in either 0 or 5 (US Census Bureau 1985). The scale used to estimate the accuracy of the age data is presented in Table 3.4. The Whipple's index applies to single years of age returns between ages 23 and 62 inclusive. The younger and older ages are excluded because their likelihood of being affected by other types of error reporting is higher compared to that of preference for particular terminal digits (Denic, Khatib & Saadi 2004; UN Statistics Division 2013). The underlying assumption is that of rectangularity or linearity (equal decrements from age to age) in 5 or 10 year range. The computation for measuring preferences for both 0 and 5 is as follows:

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

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

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

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

Though the upper limit of the ages for men and women in the study sample were 49 and 59, respectively, the Whipple's index was calculated for the sake of comparing its results with those of Myers' index. This is necessary considering that the choice of the ages included in the technique (23-62) is arbitrary. As such, the fact that there were no men and women aged 60-62 and 50-62, respectively, does not adversely affect the results obtained.

Therefore, the computation for measuring preferences for both 0 and 5 among males in this study is as follows:

$$W_{0,5} = \sum(p_{25} + p_{30} + p_{35} + p_{40} \ldots + p_{50}) \,/\, \tfrac{1}{5}\sum(p_{23}, p_{24}, p_{25} + \ldots + p_{58} + p_{59}) * 100$$

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

$$W_0 = \sum(p_{30} + p_{40} + p_{50}) \,/\, \tfrac{1}{10}\sum(p_{23}, p_{24}, p_{25} + \ldots p_{57} + p_{58} + p_{59}) * 100$$

$W_5 = \sum(p_{25} + p_{30} + p_{35} + \ p_{45} + p_{50}) \ / \ ^1\!/\ _{10}\sum(p_{23}, p_{24}, p_{25} + \ldots + p_{58} + p_{59}) * 100$

On the other hand, the computation for measuring preferences for both 0 and 5 among females in this study is as follows:

$$W_{0,5} = \sum(p_{25} + p_{30} + p_{35} + p_{40}) \ / \ ^1\!/\ _{5}\sum(p_{23}, p_{24}, p_{25} + \ldots + p_{48} + p_{49}) * 100$$

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

$$W_0 = \sum(p_{30} + p_{40}) \ / \ ^1\!/\ _{10}\sum(p_{23}, p_{24}, p_{25} + \ldots p_{47} + p_{48} + p_{49}) * 100$$

$W_5 = \sum(p_{25} + p_{30} + p_{35} + \ p_{45} + p_{50}) \ / \ ^1\!/\ _{10}\sum(p_{23}, p_{24}, p_{25} + \ldots + p_{48} + p_{49}) * 100$

The results of the computation of the Whipple's index for males and females are presented in Tables 3.5 and 3.6. The Index for heaping at ages ending with 0 and 5 among males is 106.2 whereas that for females is 93.2. Therefore, the index for males indicates that the quality of the data is fairly accurate whereas that for females is highly accurate. Moreover, the index for male age data ending with 0 is 88.7 and that for females is 72.3. Both indexes indicate that the data was highly accurate in quality. There was an improvement in the quality of the data ending with 0 compared to that ending with 0 and 5. The improvement was more with regards to the male data. Furthermore, the index for those reporting age with terminal digit 5 was 123.8 and that for females was 114.2. Both indices suggest that the quality of the data is approximate. Generally, females' age data is of a better quality than that for males.

The limitations of Whipple's index are that unlike Myers', it only measures preference for 0 and 5 and does not consider the decreasing nature of the age distribution as a result of depletion by death. Moreover, the choice of the interval 23 to 62 is arbitrary and as such it is not the entire life span that is considered. Besides, it is only appropriate for single-year data.

Table 3.5: Whipple's Index Scale

Whipple's Index	Quality of data	Deviation from Perfect
<= 105	Highly accurate data	< 5
105 – 109.9	Fairly accurate data	5 – 9.99
110 – 124.9	Approximate data	10 -24.99
125- 174.9	Rough data	25 – 74.99
>= 175	Very rough data	>= 75%

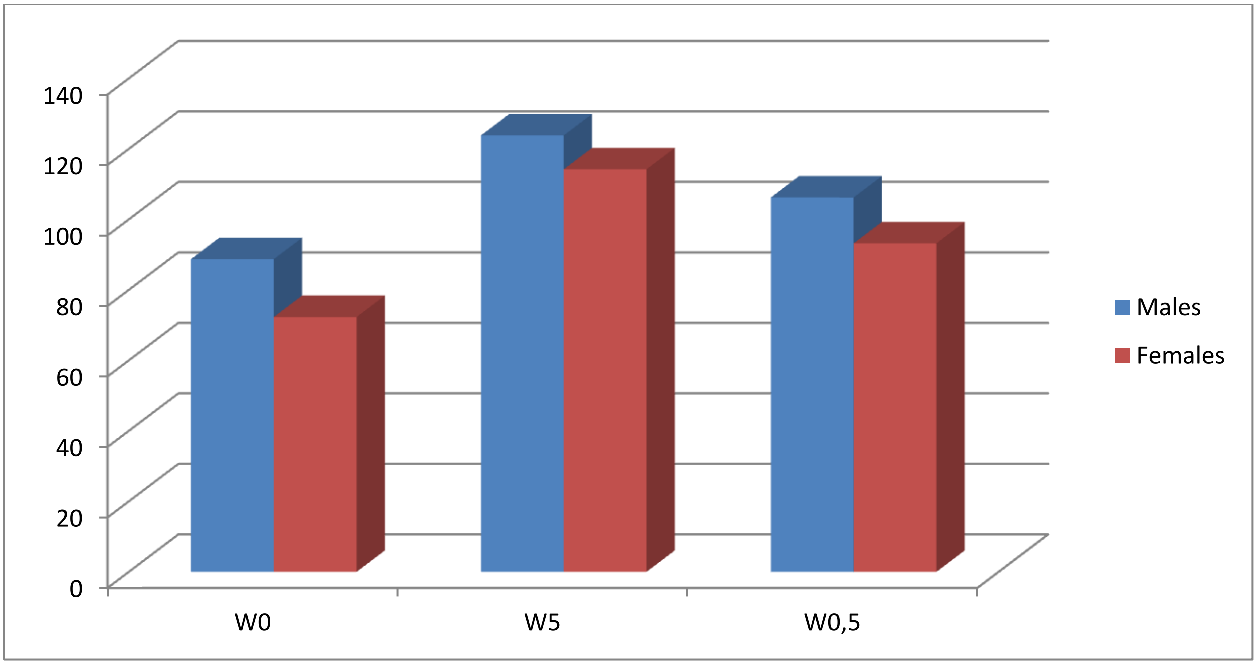
Table 3.6: Whipple's Index for males in Zambia, ZDHS 2007

Age	Frequency	Frequency (0,5)	$W_{0,5}$	Frequency (0)	W_0	Frequency (5)	W_5
23	205	227	**106.2**	199	**88.7**	227	**123.8**
24	187	199		106		175	
25-29	977	175		86		88	
30-34	954	106				56	
35-39	717	88					
40-44	475	86					
45-49	390	56					
50-54	298						
55	56						
56	44						
57	38						
58	34						
59	35						
	4410	**937**		**391**		**546**	

Table 3.7: Whipple's Index for females in Zambia, ZDHS 2007

Age	Frequency	Frequency (0,5)	$W_{0,5}$	Frequency (0)	W_0	Frequency (5)	W_5
23	260	283	**93.2**	236	**72.3**	283	**114.2**
24	285	236		107		159	
25-29	1363	159				100	
30-34	1056	107					
35-39	747	100					
40-44	561						
45	100						
46	100						
47	96						
48	89						
49	90						
	4747	**885**		**343**		**542**	

Figure 3.6: Whipple's Index (W_0; W_5 and $W_{0,5}$) by sex, ZDHS 2007



3.8.5 Summary of the section on quality issues in data

The graphical representation which is the first step of assessing the quality of age data revealed some spikes in the graphs that were plotted. This suggested preference for ages ending with some digits particularly, preference for ages ending with some digits to some extent. This being the case, a further assessment was done using a more quantitative technique (age ratios). The calculated age ratios revealed some age groups 20-24, 25-29 and 40-44 among males and 20-24, 35-39 and 40-44 among females had ratios which were greater than 100. The opposite was the case for age groups 30-34 and 25-29 among males and females, respectively. Age ratios that were greater than 100 suggest that the age groups were selectively under enumerated or a presence of errors due to misclassification of persons in those age groups. The opposite applies for the age groups with ratios less than 100 (Kpedekpo 1882). The age accuracy indices for both males and females were low, 6.1 and 7.0, respectively. This suggests that the 2007 ZDHS age data was of good quality. Since the age ratio does not determine the extent of preference for each of the ten digits, assessment of the quality of the age data in the 2007 ZDHS was further done by using the Myers index. The calculated index indicates that 2.3% of the males and 2.1% of the females reported ages with incorrect final digits. Therefore, the values obtained suggest that the levels of age misreporting among males and females were low. This suggests that age heaping was minimal and as such the age data is of good quality.

Finally, the quality of the age data was assessed by making use of Whipple's index. This technique helped to compare the levels of heaping at 0 and 5 combined and 0 and 5 separately. The index for heaping at ages ending with 5 was the highest among both males and females (123.8 and 114.2, respectively). The lowest index was for ages ending with 0: 88.7 for males and 72.2 for females. The index for heaping at ages ending with 0 and 5 among males was 106.2 whereas that for females was 93.2. According to Whipple's Index Scale, males' age data ending with 0 is highly accurate whereas that ending with 5 is approximate. On the other hand, the age data ending with 0 and 5 is fairly accurate. With regards to females, while both the age data ending with 0 and 5 and 0 only is highly accurate, the one ending with 5 is approximate. Hence, the quality of age data for females is better than that for males. Having assessed the quality of the 2007 ZDHS data using various techniques, it can be concluded that though it has some deficiencies, it is generally of good quality. Therefore, these deficiencies are not so gross that they can have a negative effect on the inferences made.

3.9 STATISTICAL ANALYSIS

Both descriptive and inferential statistics were used to analyse the data. The data was analysed at the univariate, bivariate and multivariate levels. The first level of analysis was conducted to describe the background characteristics of the study population. This is presented in the form of frequencies, percentages and means. Analysis at the bivariate level involved cross tabulation in order to assess the association between unmet need (dependent variable) and the independent variables. The Pearson chi-square test of goodness of fit was used. The third level (multivariate) involved the use of binary and multinomial logistic regressions and binary multilevel modeling to examine the association between unmet need and the various selected independent variables. The objectives were addressed as follows.

For Objective 1: **To determine the measure of unmet need for contraception among the adolescents and adults (married and unmarried) in Zambia,** percentages of individuals with unmet need (married adult females, married adolescent females, unmarried adult females, unmarried adolescent females, married adult males and married adolescent males) were calculated.

The measure for currently married women was obtained as follows. The currently married women were first put into two categories depending on whether they were using any method of contraception (users) or not (nonusers). The nonusers were further divided into two classes: pregnant or amenorrheic and not pregnant or amenorrheic. The pregnant or amenorrheic were further classified according to whether they had had an intended, mistimed or unwanted pregnancy. Those whose pregnancy was mistimed or unwanted were considered to have unmet need for spacing and limiting, respectively. The nonusers in the not pregnant or amenorrheic category were divided into fecund and infecund. The former were further divided according to whether they wanted a child later, no more, soon or wanted a child but not sure of the timing. Those in the want later and want no more categories were considered to have unmet need for spacing and limiting, respectively. Those who wanted a child later but not sure of the timing were also considered to have unmet need for spacing. Those who wanted a child soon and the infecund were not included in the estimate of unmet need.

Considering unmarried women, the nonusers in the not pregnant or amenorrheic category were divided into fecund had sex, fecund never had sex and infecund. The fecund had sex were divided according to whether they were sexually active or not active in the past month. Those who were sexually active in the past month were further divided according to whether they wanted a child later, no more, soon or wanted a child later but not sure of the timing. Those who wanted later and those who wanted later but were not sure of the timing were considered to have unmet need for spacing whereas those who wanted no more were considered to have unmet need for limiting. Those who wanted a child soon, those who were not sexually active in the past month and the infecund were excluded from the estimate of unmet need.

In the case of currently married men, the measure was obtained by dividing the currently married men into two categories depending on whether they or their partners were using any method of contraception (users) or not (nonusers). The nonusers were further divided according to whether they wanted a child later, no more, soon or wanted a child later but not sure of the timing. Those in the want later and want no more categories were considered to have unmet need for spacing and limiting, respectively. Additionally, those who wanted a child later but not sure of the timing were considered to have unmet need for spacing. Those who wanted a child soon and those who wanted a child later but not sure of the timing were not included in the estimate of unmet need.

For Objective 2: **To identify individual, household, community and programme access factors underlying unmet need for contraception among adolescents and adults in Zambia,** binary, multinomial regression and multilevel logistic regression models were employed.

The study used binary and multinomial logistic regressions to examine the factors underlying unmet need for contraception among men and women in Zambia. In addition, it employed binary logistic multilevel modelling to ascertain the determinants of unmet need for contraception among women in Zambia at the individual and community levels. It was not possible to do multilevel modelling for unmet need for contraception among men because most of the models could not converge when doing the analysis using men's data.

Six binary logistic regression models were employed to examine the association between selected characteristics and total unmet need, whereas six multinomial regression models were employed to examine the association between selected characteristics and unmet need for spacing and limiting. The initial model includes only individual factors. The second model contains individual and household factors. The third model includes individual, household, and community factors. The fourth model has individual, household, community and programme access factors. The fifth (full) model consists of individual, household, community, programme access, and intermediate factors. The final model only included the variables that were selected by the forward stepwise regression.

The binary logistic model was employed to distinguish factors related to total unmet need versus met need. The outcome variable in this case has two categories, i.e. total unmet need and no unmet need. The models were thus fitted by classifying the data into two categories met need and total unmet need coded 0 and 1, respectively. The logistic regression equation employed is of the form:

$$Logit(p) = a + b1X1 + b2X2 \ldots bnXn$$

where logit*(p*) is the log *(*to base *e)* of the odds ratio that the outcome variable (unmet need) is 1, *a* is a constant (analogous to the y-intercept of the simple linear regression model); *b1, b2* and *bn* are regression coefficients for each explanatory variable and *X1, X2* and *Xn* represent the values of each variable for a particular woman (Lin et al., 2008).

Multinomial logistic regression was employed to distinguish factors associated with unmet need for spacing from those related to unmet need for limiting. This is because in this case the outcome variable has three categories: spacing, limiting and met need. Therefore, two dichotomies had to be compared (unmet need for limiting to no unmet need and unmet need for spacing to no unmet need) instead of one. The multinomial equation was expressed as:

$$Logit(j/j') = a + b1X1 + b2X2\ /{+}bkXk$$

where *j* is the identified category of unmet need and *j'* is the reference category (no unmet need), *a* is the intercept, *b1, b2* and *bk* are regression coefficients of the explanatory variables and *X1, X2* and *Xk* are the explanatory variables (Moutinho & Hutcheson, 2011).

The multilevel modelling technique was employed to determine the association between unmet need for contraception and the various explanatory variables. A multilevel modeling technique is appropriate for this study in that it is able to account for the hierarchical structure of the DHS data. The individuals (level 1) are nested in communities (level 2) (Goldstein 2011; Guo & Zhao 2000; Sharma 2011). Therefore, individuals from the same community are more likely to have similar behavior, contraceptive inclusive (Leite & Gupta 2007; Merlo et al 2005). Multilevel modeling also allows researchers to study the extent to which factors at each level account for the variation in the outcome variable which is unmet need in this case (Diez-Roux 2000; Kaggwa 2008). Furthermore, Browne et al. (2005); Goldstein (2011); Guo and Zhao (2000); Pallitto and O'campo (2004) asserted that the technique assumes interdependence of observations. Actually, unlike the binary logistic regression, multilevel modelling considers variations in both individual and community levels simultaneously.

Binary logistic multilevel modelling was employed to distinguish factors related to each of the components of unmet need for contraception versus met need. The outcome variable in each case has two categories: unmet need for spacing and no unmet need, unmet need for limiting and no unmet need and total unmet need and no unmet need. The models were thus fitted by classifying the data into two categories met need and unmet need for contraception (spacing, limiting and total), The two- level binary logistic regression model was estimated by first running the empty or null model. This model was run in order to partition the total variance into individual and community components. Hence this model presents variance in unmet need among clusters and tests the significance of the cluster level variance. Furthermore, the empty model allows us to ascertain the presence of a possible contextual dimension for unmet need (Merlo et al. 2005a). The empty model is specified as:

$$Logit(pj) = log\ odds = \log\left(\frac{pj}{1-pj}\right) = \ \gamma + \ Uj$$

Where γ is the overall mean probability (prevalence) expressed on the logistic scale, Uj is the second (community) level residual (they are on the logistic scale and have a normal distribution with mean 0 and constant variance $\tau^2 \tau Uj \sim \ N(0,\ \tau^2)$, τ^2 is the second level residual variance expressed on the logistic scale (that is variance around γ), $\tau = \left(\frac{pj}{1-pj}\right)$ is the individual variance expressed on the probability scale and depending on the predicted probability pj of the outcome (Giusti & Vignoli 2006; Merlo et al. 2005b).

The level 2 model is expressed as:

$$Logit\left\{P\left(Yij = \frac{1}{\gamma}\right)\right\} = \ \beta o + \beta xij + \beta zij + \ \gamma$$

$$\gamma \ \sim N\ (0, \tau^2)$$

Where $P\ (Yij)$ represents log odds of women (i) in cluster (j) having unmet need, xij represents the individual level covariates, zij represents the community factors, γ represents the random intercept, which has a variance τ^2 (Kaggwa 2008).

All in all, eleven models were fitted. The initial model (empty model) contains no explanatory variables. Model 2 includes only individual factors as explanatory variables. This helps us assess the independent effects of individual characteristics on unmet need for contraception. Model 3 contains individual and intermediate factors as the explanatory variables whereas model 4 has individual and programme access factors. Model 5 only has the community factors as the explanatory variables whereas Model 6 added the intermediate factor. Model 7 comprised community and individual factors. This was done in order to find out if individual factors have moderating effects on community ones and vice versa. Model 8 consists only of programme factors as the explanatory variables whereas Model 9 added the intermediate factor to programme access factors. Model 10 comprised programme access and community factors. Model 11 (full) includes all the explanatory variables: individual, household, community and programme factors.

Each model estimates the variance of random intercepts for the cluster as well as the intra class correlation coefficients (ICC) also known as variance partition coefficients (VPC). The former reflects the degree of heterogeneity between clusters whereas the latter reflects the degree of homogeneity within a cluster (Griffiths et al. 2004; Kaggwa et al. 2008). Kaggwa et al. (2008) further concludes that a low ICC denotes that the within-cluster variation accounts for a larger part of the variance. In addition, the significance of the between-cluster variance can be obtained if the random intercept variance is divided by its standard error. A random intercept variance is considered significant if it falls within -2 and +2.

For Objective 3: **To examine the association between unmet need for contraception and selected reproductive health problems (infant and child mortality, short birth interval, termination of pregnancy and high parity) in Zambia,** the Pearson chi-square test of goodness of fit and logistic regressions were used. This involved cross tabulation of unmet need and the selected reproductive health problems. The Pearson chi-square test of goodness of fit helped to determine if there was an association between unmet need and selected reproductive health problems. A chi-square test is used when one wants to find out if there is a relationship between two categorical variables. The logistic regressions models helped to show the direction of the association in that they provided odds ratios.

For Objective 4: **To determine the potential demographic impact of satisfying unmet need for contraception in Zambia,** a simple regression equation (TFR = 6.337 – 0.055 (CPR) + e) was used. The equation was used to help determine if satisfying unmet need would help reduce fertility in Zambia.

The author used TFR and CPR estimates from most recent national surveys for 84 countries as obtained from MEASURE DHS STAT compiler to come up with the regression equation. Therefore, the estimates made were based on current data instead of using equations formulated by using old data. The TFR and CPR for these countries are highly correlated at 0.82. Based on various assumptions as indicated in Westoff and Bankole's (1996) study, three models were used to determine Zambia's TFRs if unmet need among women were to be met. The first model assumed the satisfaction of all unmet need for contraception and thus gives the maximum effect of satisfying unmet need on TFR.

The second model assumed that all women with unmet need for contraception who reported having no intention to use any contraception in future will in fact not use any method. This being the case, the estimate for potential demand for family planning included current users and women with unmet need for contraception who have intentions to use contraceptives in future. Therefore, the model offers the minimum effect of satisfying unmet need on TFR.

The third model assumed that 20% of the women with unmet need for spacing and 10% of women with unmet need for limiting who have intentions to use contraceptives in future will not use any method. In addition, it assumed that women with unmet need for contraception who have no intentions to use contraceptives in future because they consider themselves at low risk of pregnancy will not use any method. Finally, it assumed that 50% of the remaining women with unmet need for contraception, who intend to use contraceptives in future, will not use any method. The model gives conservative estimates which are closer to those for Model 2 and offers the most realistic effect of satisfying unmet need on TFR.

3.10 ETHICAL ISSUES

The study was based on secondary analysis of data from the 2007 Zambia DHS which had no participant identifiers. The study did not need any ethical approval. The author just needed permission to use the data set. This was obtained from MEASURE DHS, ICF International.

3.11 DISSEMINATION OF FINDINGS

Some of the findings of this study have been presented at two international conferences on population: 2013 Population Association of America (PAA) and International Union for the Scientific Study of Population (IUSSP). Details of these and other conferences are presented in Appendix E. In addition, some manuscripts have been written and are to be submitted to various peer reviewed journals as indicated in Appendix F. Furthermore, a policy brief has been prepared to help the Zambian government and other stakeholders use the findings of this study to come up with strategies aimed at addressing the situation (see Appendix A).

CHAPTER 4

SETTING THE CONTEXT: BACKGROUND CHARACTERISTICS OF THE STUDY POPULATION

4.0 INTRODUCTION

It is important to first address the background characteristics of the study population before discussing the findings of the study. This is because background characteristics of the population provide the context for the discussion. Therefore, this chapter presents the distribution of men and women interviewed during the 2007 ZDHS according to contextual, demographic and socio-economic characteristics which could be associated with unmet need for contraception.

Descriptive statistics were used to present the background characteristics. These are classified into four categories based on the level of operation. The four categories are: individual-level, household-level, community-level and programme access-level. Individual-level characteristics are the woman or man specific characteristics whereas household-level characteristics include the attributes of the domestic unit in which the woman or man resides. Community-level characteristics comprise attributes of the community or cluster where the woman or man resides. Finally, the programme access-level characteristics consist of attributes of the family planning services offered to women or men.

4.1 INDIVIDUAL-LEVEL CHARACTERISTICS

This section presents the percent distribution of Individual-level characteristics of the study population. The Individual-level characteristics which were analysed include age, marital status, number of children ever born, number of living children, ethnicity, education and occupation. The theoretical foundation established from the reviewed literature helped to inform the selection of these characteristics.

Table 4.1 presents the distribution of the respondents by individual-level characteristics. Results showed that the highest proportion of female respondents (53.5%) belonged to the age group, 20-34, followed by those aged 35 and above (24.2%) whereas for males it was age group 35 and above followed by age group 30-34 (51.5% and 40.6%, respectively). Adolescents (15-19 years) accounted for about one fifth of the female respondents (22.4%) and only 7.9% 0f the males. The mean ages were 27.9 for women and 30.1 for men. With respect to the marital status, most of the women (61.6%) were currently married whereas those who were formerly married were the least (12.4%). All the men (100%) were currently married because the sample comprised currently married women whose partners were also interviewed.

Results also showed that the highest proportion of women (30.1%) had 1-2 living children whereas for their male counterparts it was those with no living children (41.1%). This was followed by those with no children for women (25.9%) and those with 5 and more children for men (21.4%). Considering the number of children ever born, the highest proportion of female respondents (27.5%) had 5 and more children ever born whereas for male respondents it was those with no child ever born (40.1%).Those with 3-4 children ever born were the least among both female and male respondents (21.5% and 16.1%, respectively). With reference to ethnicity, the Bemba were the majority (34.8% for women and 32.4 for men), followed by the Nyanja (19.1% for women and 21.0% for men), and the others were the minority (2.9% for women and 2.5% for men).

Table 4.1: Percent distribution of respondents by selected characteristics, ZDHS 2007

Selected characteristic	***Females***		***Males***	
	Frequency	***Percentage***	***Frequency***	***Percentage***
Individual factors				
Age				
Below 20	1,598	22.4	250	7.9
20-34	3,821	53.5	1,276	40.6
35& above	1,727	24.2	1,620	51.5
Children ever born				

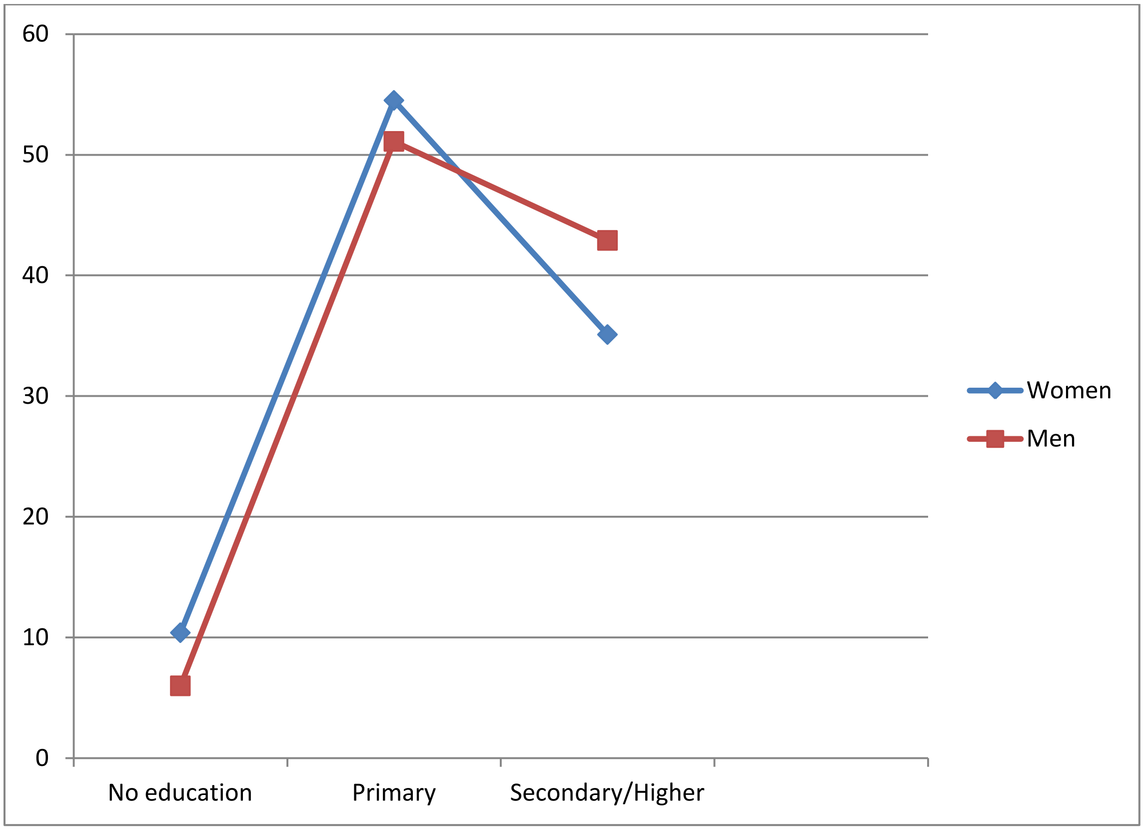
0	1,736	24.2	161	5.1
1-2	1,940	26.8	738	23.5
3-4	1,557	21.5	837	26.6
5 & above	1,910	27.5	1,411	44.8
Number of living children				
0	1,870	25.9	197	6.3
1-2	2,163	30.1	861	27.4
3-4	1,643	23.0	940	29.9
5 & above	1,470	21.0	1,148	36.5
Marital status				
Never	1,941	26.0	-	-
Currently	4,316	61.6		100
Formerly	889	12.4	-	-
Ethnicity				
Bemba	2,261	34.8	1,018	32.4
Tonga	1,033	14.1	447	14.2
Lunda, Luvale and Kaonde	1,039	10.3	311	9.9
Barotse	654	6.5	174	5.5
Nyanja	1,227	19.1	661	21.0
Mambwe and Tumbuka	742	12.2	455	14.5

Others	187	2.9	79	2.5
Religion				
Catholic	1,368	19.2	648	20.6
Protestant	5,652	79.2	2,370	75.5
Other	116	1.7	123	3.9
Community factors				
Community media saturation				
Low	1,562	21.9	579	18.4
Medium	2,321	32.5	1,120	35.6
High	3,263	45.7	1,447	46.0
Community wealth				
Low	1,560	21.8	689	21.9
Medium	2,311	32.3	953	30.3
High	3,275	45.8	1,503	47.8
Prevalence of large family norm in the community				
Low	1,448	20.3	629	20.0
Medium	2,240	31.3	944	30.0
High	3,458	48.4	1,573	50.0
Ethnic diversity				
Low	1,660	23.2	701	22.3

Medium	2,311	32.4	1,029	32.7
High	3,175	44.4	1,416	45.0
Programme access factors				
Exposure to family planning messages through media				
No	4,060	56.3	1,116	35.5
Yes	3,082	43.7	2,030	64.5
Ever use of contraceptives				
No	2,720	38.1	591	18.8
Yes	4,426	61.9	2,555	81.2

According to Figure 4.1, the highest proportion (54.5%) of the females had primary education whereas for their male counterparts it was those with secondary/higher education (51.1%). These were followed by those with secondary/higher education (35.1%) for females and primary (42.9%) for males. Those with no education were the least for both females and males (10.4% and 6.0%, respectively). Considering religion, more than three quarters of the respondents were Protestants (79.2% for women and 75.5% for men). Catholics accounted for about one fifth (19.2% for women and 20.6% for men) of the population. Those belonging to other religions were the least (1.7% for females and 3.9% for men).

Figure 4.1: Percentage distribution of respondents by education attainment



According to figure 4.2, the majority of the women (45.7%) were not working, whereas the majority of the men (52.3%) were involved in agriculture. Slightly over a quarter (26.5%) of the females were engaged in agriculture work, whereas only 18.7% of the males were engaged in manual work. The least of the females were engaged in manual work (3.5%), whereas in the case of their male counterparts, it was those who were not working (2.6%).

4.2 HOUSEHOLD-LEVEL CHARACTERISTIC

This section presents the percent distribution of household-level characteristics of the study population. Wealth was the only selected characteristic at the household level.

Figure 4.2: Percentage distribution of respondents by occupation

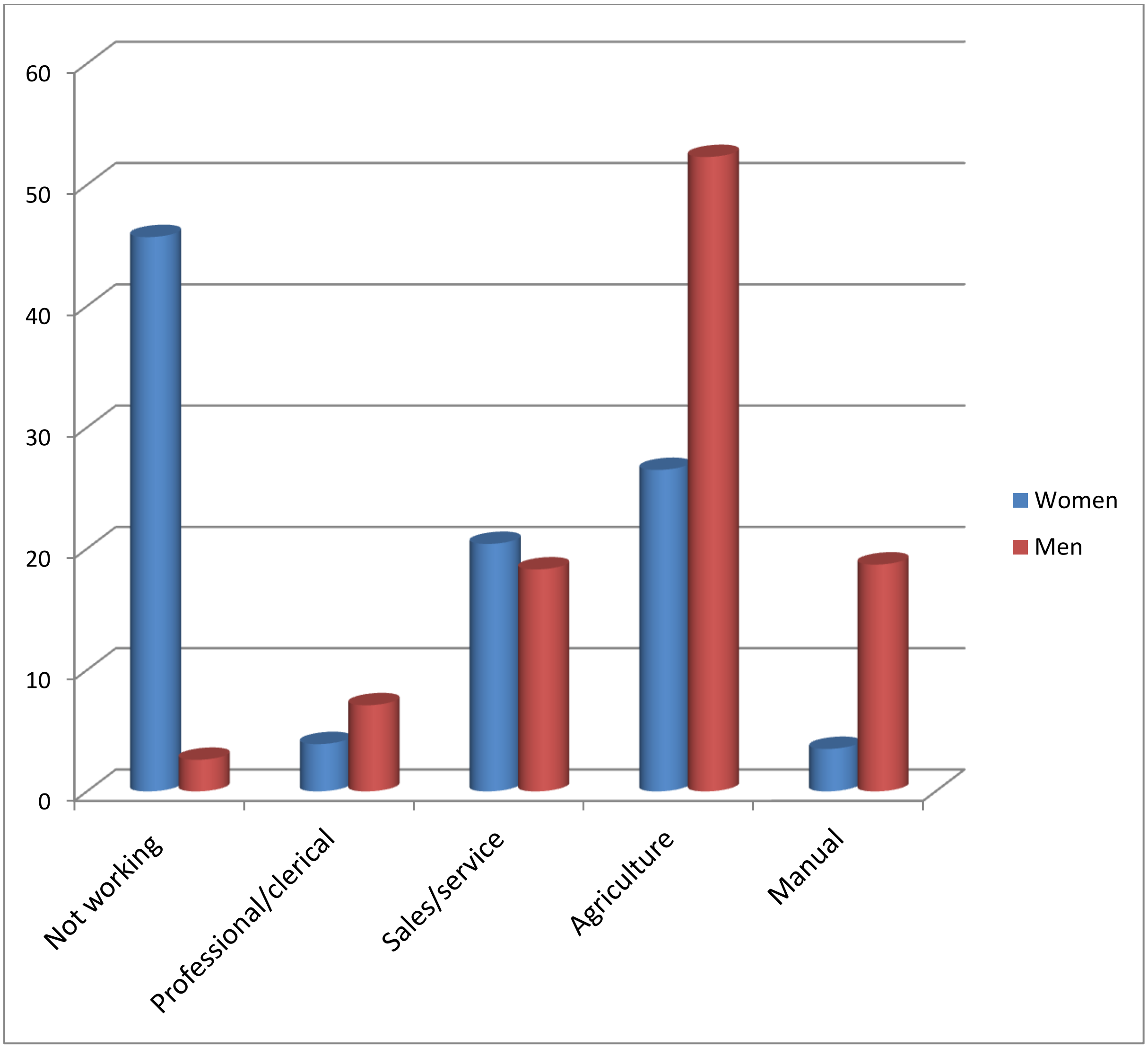
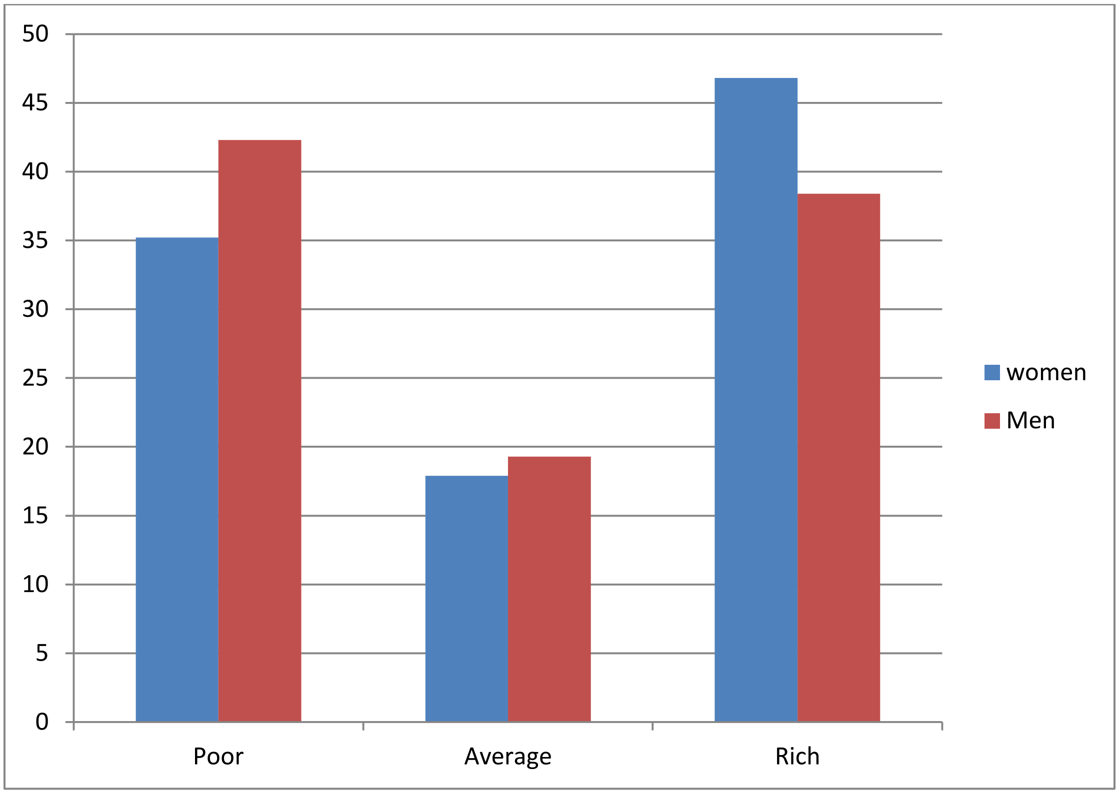


Figure 4.3 presents the percentage distribution of the respondents by household wealth index. The majority of the respondents belonged to rich households (46.8% for women and 42.3% for men, respectively), whereas the least of the respondents came from middle class households (20.2% for women and 19.3% for men, respectively).

Figure 4.3: Percentage distribution of respondents by household wealth index

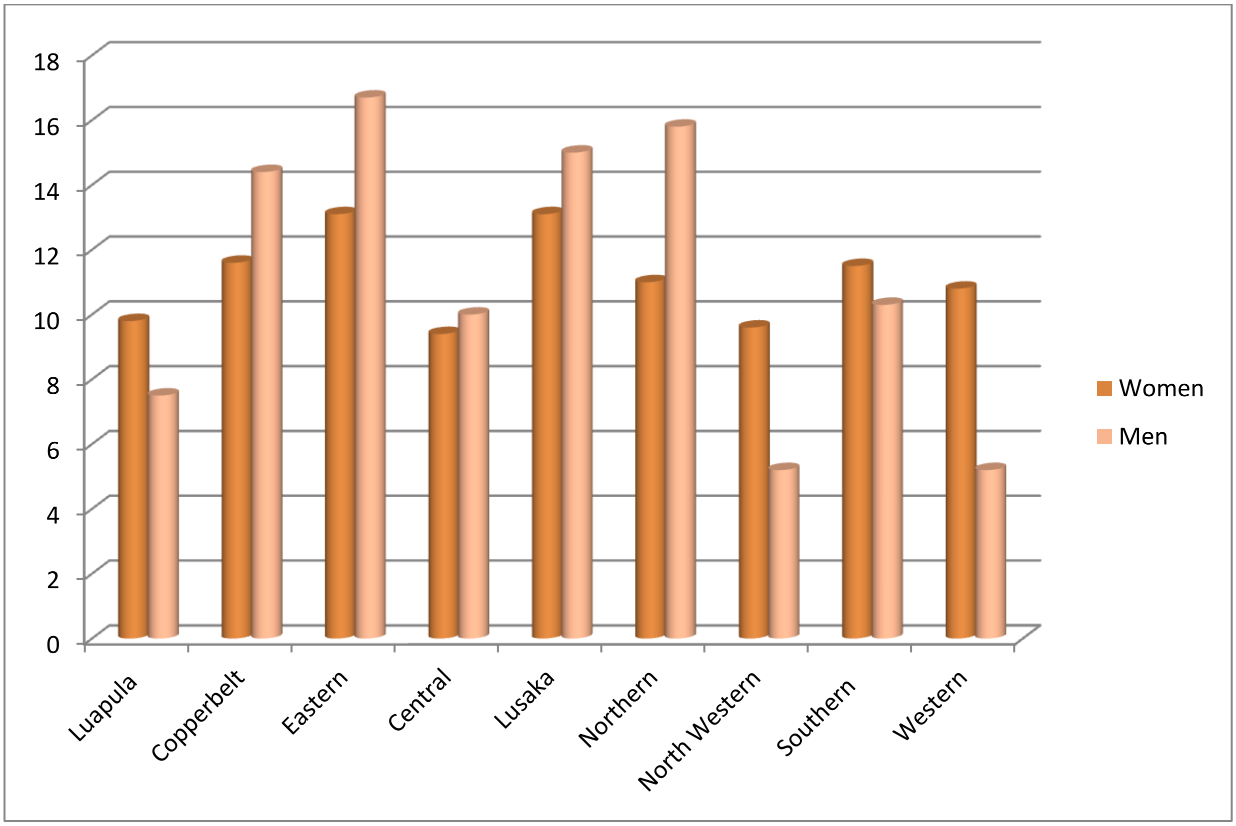


4.3 COMMUNITY-LEVEL CHARACTERISTICS

The community level characteristics of interest were: region of residence, type of place of residence, ethnic diversity, percentage of women/men with secondary/higher education, community media saturation, community neighbourhood povertyand prevalence of large family norm in the community.

The percentage distribution of respondents by community level characteristics is presented in figures 4.4 to 4.6 and Table 4.1. Results reveal that the highest proportion of the women resided in Eastern Region and Lusaka (13.1% each) followed by those who resided in Copperbelt and Southern Region (11.6% and 11.5%, respectively). The least resided in the Central Region. With regard to men the highest proportion lived in Eastern Region (16.7%) followed by those who lived in Northern (15.8%). The least lived in Western Region (5.2%).

Figure 4.4: Percentage distribution of respondents by region of residence



Considering type of place of residence, more than half of the respondents (55.5% of women and 65.7% of men) resided in rural areas compared to urban ones (44.5% of women and 34.3% of men). The results further reveal that about one fifth of the respondents (21.6% of women and 20.1% of men) were residing in communities with low proportions of women or men with secondary or higher education, whereas 45.9% and 49.3% of women and men, respectively were in communities with high proportion of women or men who had secondary or higher level of education.

Figure 4.5: Percentage distribution of respondents by type of place of residence

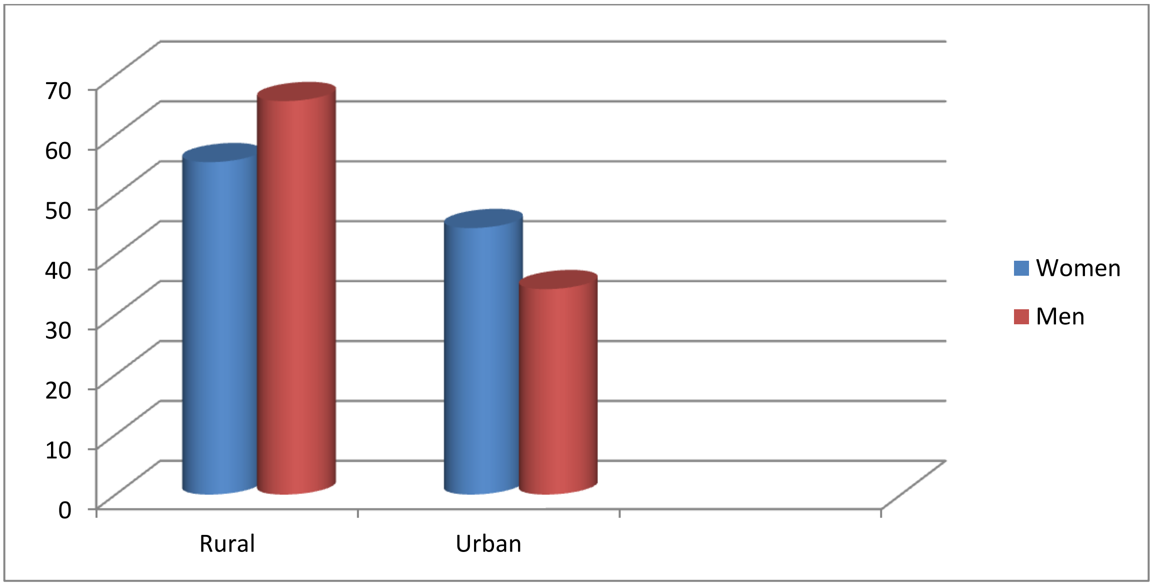
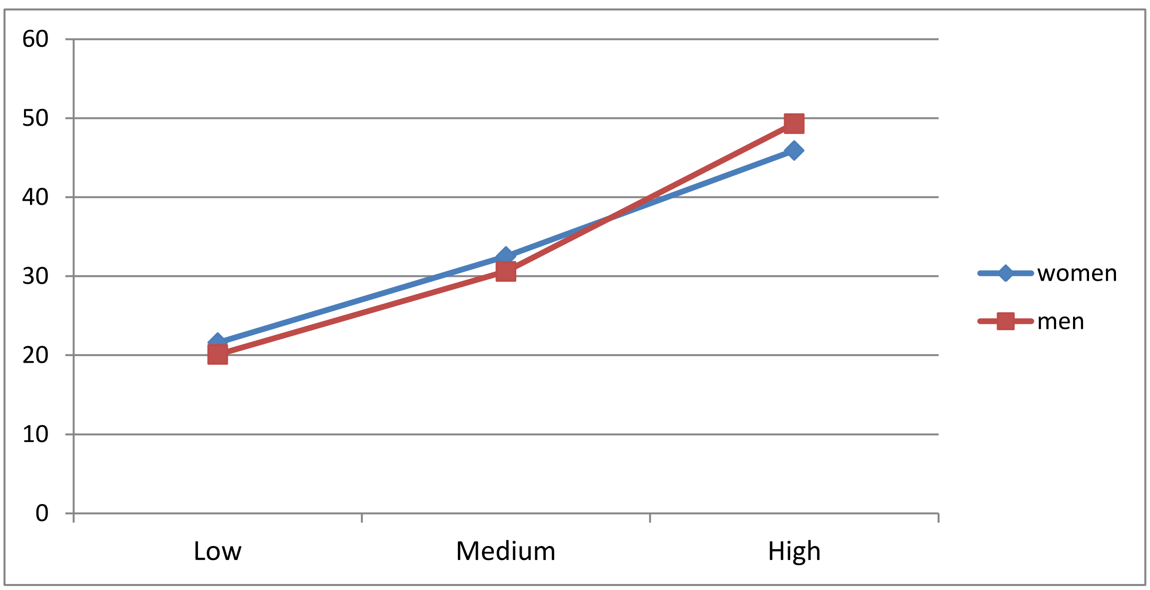


Figure 4.6: Percentage distribution of respondents by community education



Furthermore, results show that nearly one fifth of the women (21.9%) and men (18.4%) resided in communities with low media saturation, whereas more than one third of the women (45.7%) and men (46.0%) resided in communities with high media saturation. Considering community wealth, nearly the same proportion of women (21.8%) and men (21.9%) lived in communities with low concentration of rich households, whereas 45.8% (women) and 47.8% (men) lived in communities with high concentration of rich households. In addition, one fifth of the respondents resided in communities with a low prevalence of a large family norm, whereas 48.4% of the women and half of the men (50%) resided in communities with a high prevalence of a large family norm. Results also show that 23.2% of women and 22.3 % of men resided in communities with a low level of ethnic diversity, whereas almost the same proportion of women (44.4%) and men (45.0%) resided in communities with a high level of ethnic diversity.

4.4 PROGRAMME ACCESS CHARACTERISTICS

The programme access characteristics included exposure to family planning messages through media, ever use of contraceptives, visited by family planning worker, visited health facility and discussed family planning with health worker. Visited by planning worker and visited health facility apply to women only, whereas discussed family planning with health worker apply to men only.

Table 4.1 shows that more than half (56.3%) of the females did not have exposure to family planning messages through media, whereas almost the same proportion (58.8%) of their male counterparts did. Table 4.1 further reveals that more than half of the respondents (61.9% for females and 63.1% for males) had ever used contraceptives. About a third of them (38.1% for females and 36.9% for males) had never used contraceptives.

Figures 4.7 and 4.8 present the distribution of respondents by those programme access characteristics which pertain to either females or males only. Results reveal that more than half of the females (53.6%) did not visit a health facility, whereas 46.4% of them did. Nearly all of the females (93.6%) were not visited by a family planning worker and only 6.4% of them were visited. Most of the males (83.4%) did not discuss family planning with a health worker, whereas only 16.6% of them did so.

Figure 4.7: Percentage distribution of females by visit

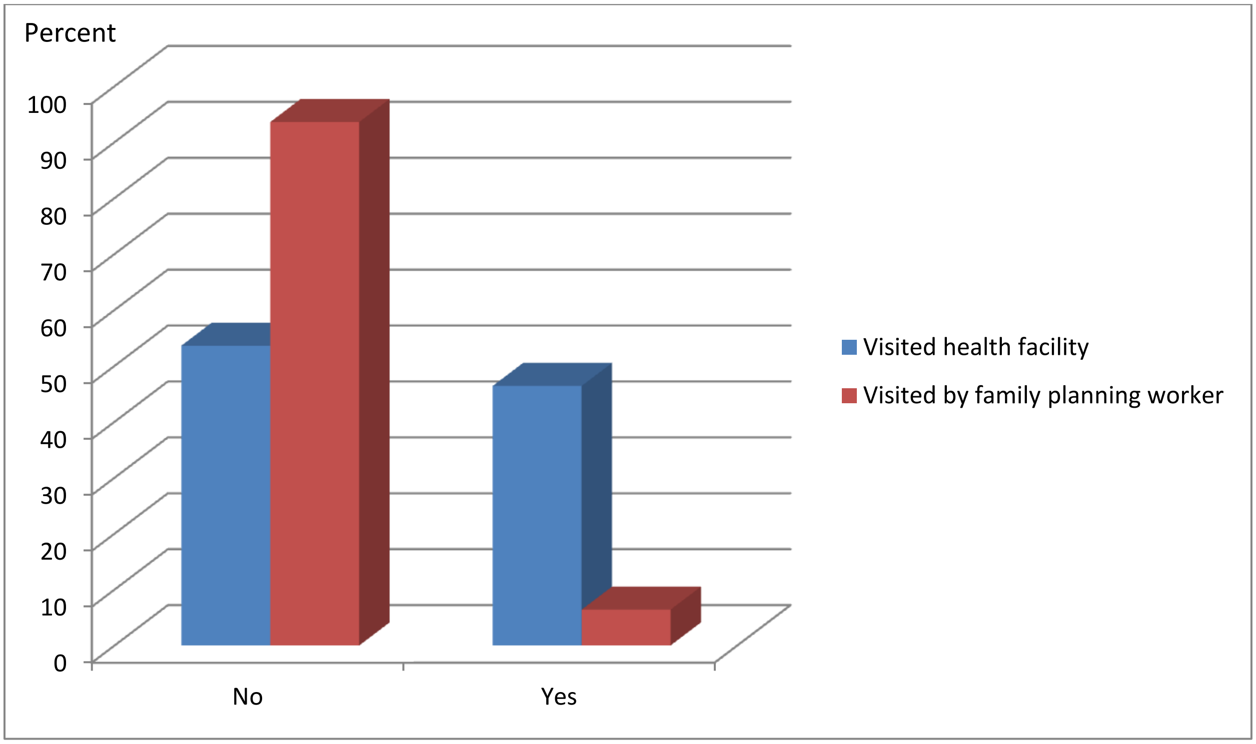
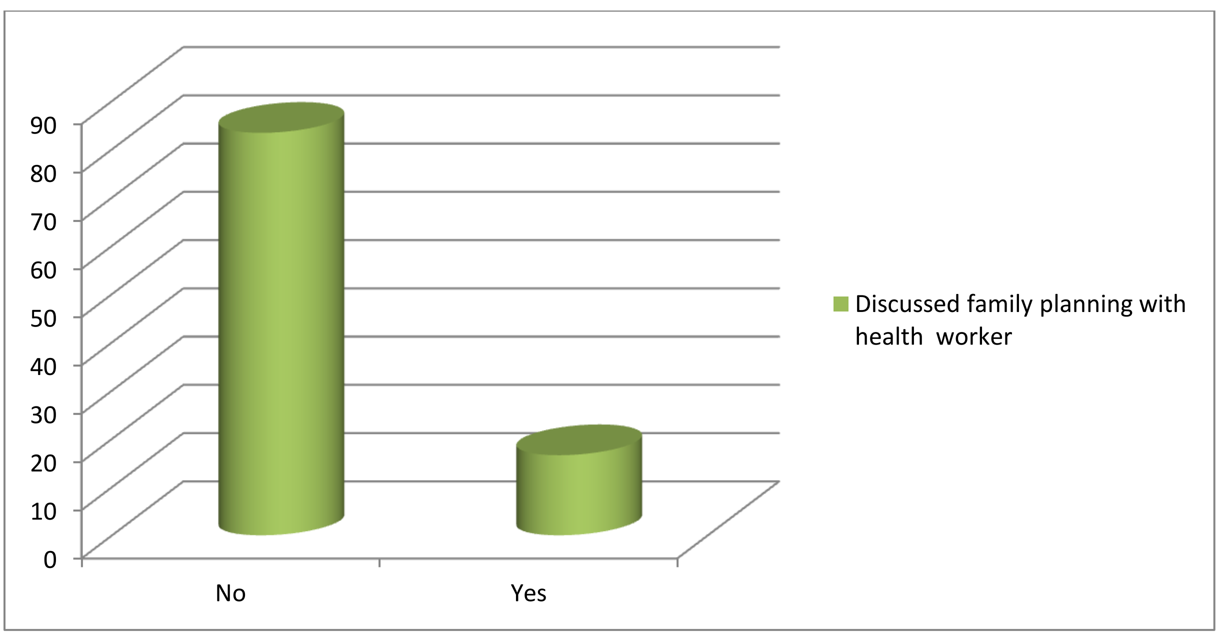


Figure 4.8: Percentage distribution of males by discussed family planning with a health worker



4.5 INTERMEDIATE CHARACTERISTICS

The Intermediate-level characteristics which were analysed were knowledge of any contraceptive and fertility preference. Figures 4.9 and 4.10 show the distribution of the respondents according to these two intermediate-level characteristics.

Results reveal that more than half (61.9%) of the women had some knowledge of any contraceptive whereas nearly all of the males (99.8%) had some knowledge of any contraceptive. A consideration of the respondents' fertility preference reveals that the majority of the women (61.1%) and men (64.4%) wanted another child whereas about one third (30.2% of women and 32.5% of men) did not want any more children.

Figure 4.9: Percentage distribution of respondents by knowledge of any contraceptives

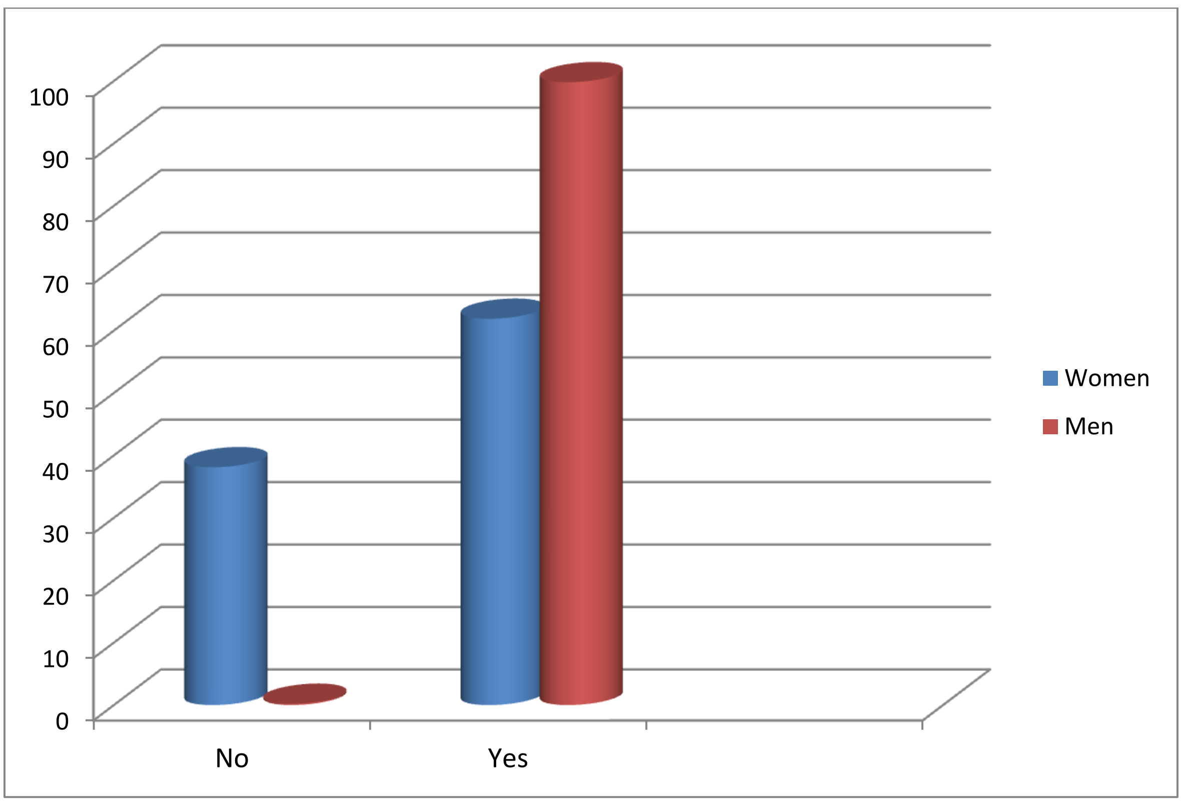
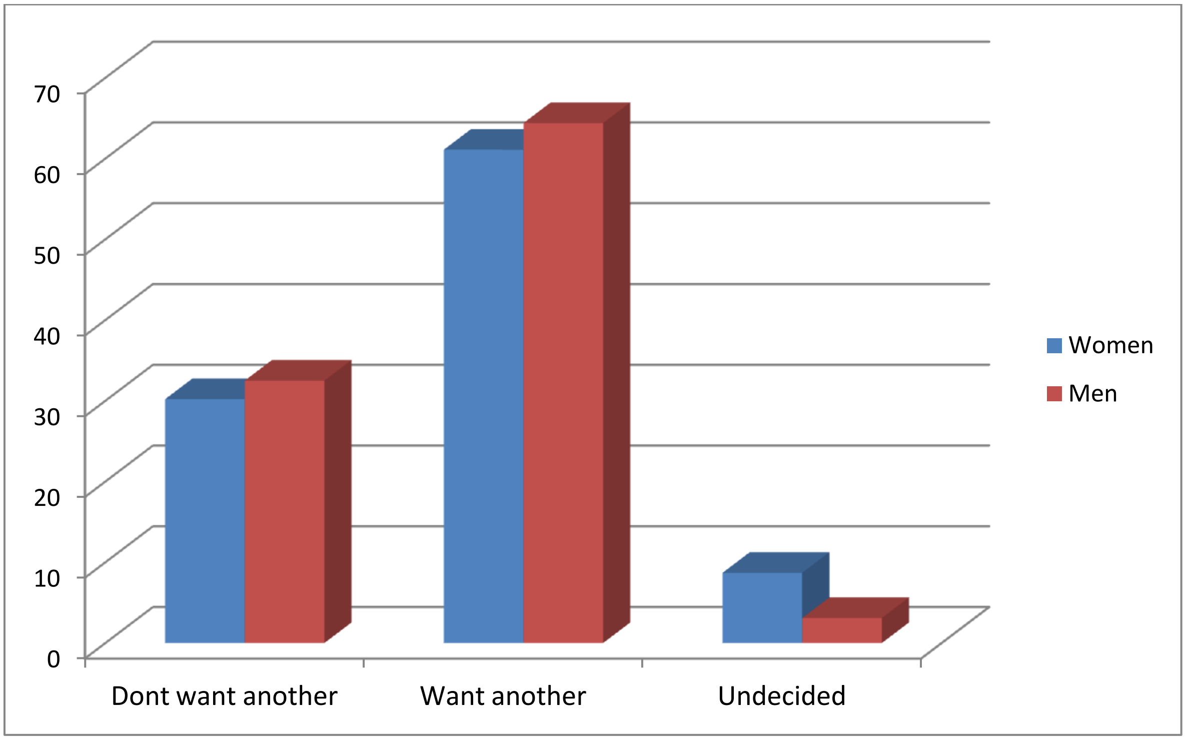


Figure 4.10: Percentage distribution of respondents by fertility preference



4.6 SUMMARY

This chapter has presented the distribution of the background characteristics of the study population. The distribution of the study population according to age showed that the highest proportion of the population was in the age group 20-34 and that of the adolescents was the least. A consideration of children ever born showed that women with 5 and more children were the majority whereas for the males it was those with no child ever born. Furthermore, results revealed about half of the women had primary education compared to their male counterparts with almost the same proportion having secondary/higher education. With regards to occupation, more women than men were not working. Though the least of the men were in the professional/clerical category, they were still more than their female counterparts in this category. Results also showed the percentage of respondents who resided in communities with high proportion of men and women who had secondary or higher education was higher than that of those who resided in communities with low proportion of men and women who had secondary or higher education. Additionally, results showed that there were more men and women residing in communities with high media saturation than those with low media saturation. Results further showed that more females did not have exposure to family planning messages through media than their male counterparts. Results further showed that most of the respondents had some knowledge of any contraceptives. The figure for men was higher than that for women. With respect to fertility preference, results showed that there were more men and women who wanted another child than those did not. The figure for men was slightly higher than that for women.

CHAPTER FIVE

LEVELS AND PATTERNS OF UNMET NEED FOR CONTRACEPTION AMONG ADOLESCENTS AND ADULTS IN ZAMBIA

5.0 INTRODUCTION

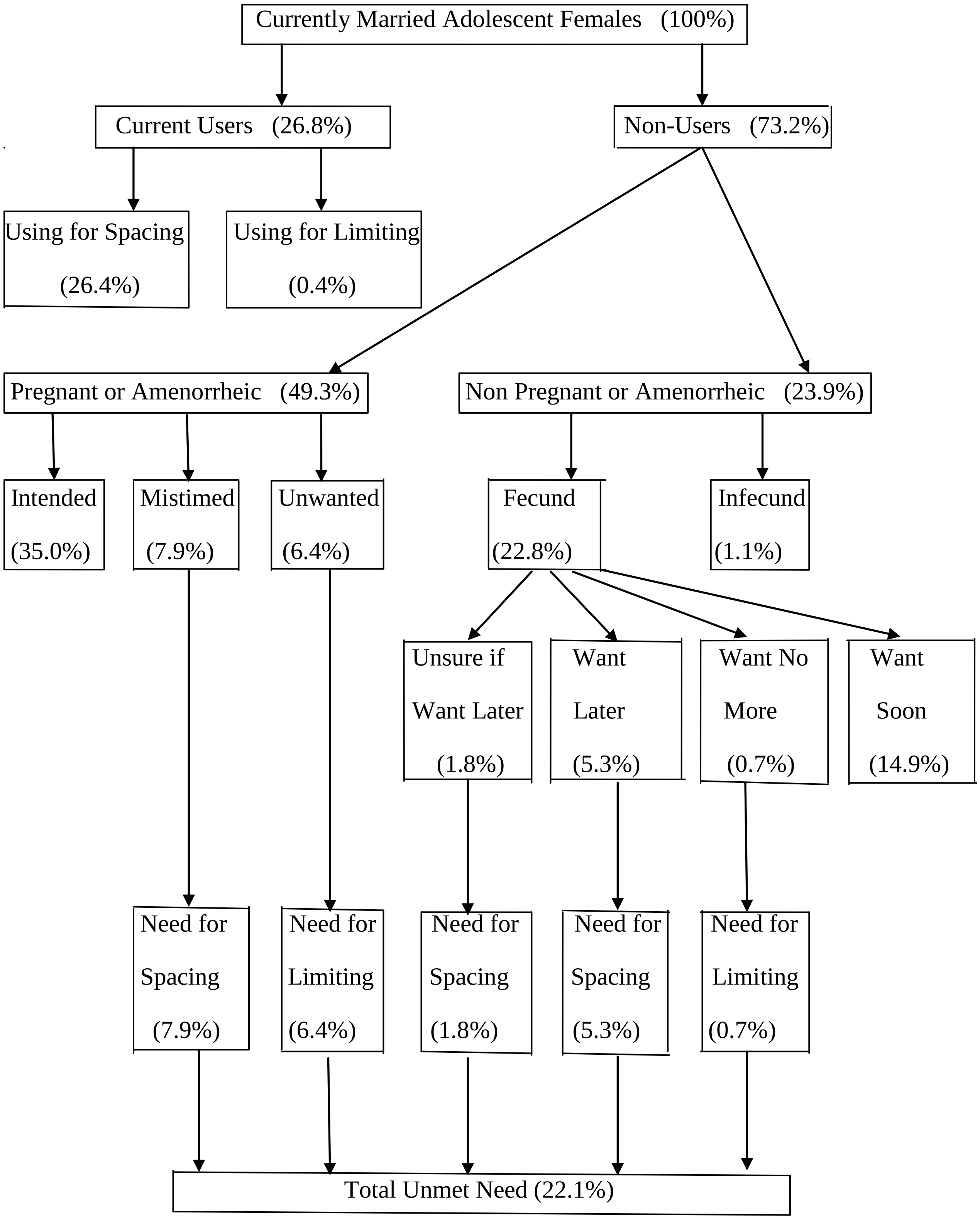
The assessment of unmet need for contraception plays a significant role in informing family planning programmes and population policies of any given country. This is because when the estimate of unmet need is added to the proportion of those who are using contraceptives (Contraceptive Prevalence Rate), we get the total potential demand for family planning. The total potential demand for family planning provides the magnitude and characteristics of the potential market for family planning which are useful for programmes. For policy interests, data on unmet need can be used to determine the effect of meeting unmet need for contraception on fertility (Ashford 2003; Westoff & Bankole 1995).

This chapter provides the estimates of unmet need for contraception among adolescents and adults (females and males) in Zambia. In addition, the estimates for potential demand of family planning among the adolescents and adults are made. First, the estimations are made for females and those for males follow. Estimates for the former include for both currently married and the unmarried whereas those for the latter include only for the currently married whose partners were also interviewed. This was done to take into account the contraceptive behaviour of the currently married males' partners as well.

5.1 LEVEL OF UNMET NEED FOR CONTRACEPTION AMONG FEMALES

When estimating unmet need, married females are assumed to be sexually active whereas for the unmarried a distinction is made between those who are sexually active and those who are not. Only the sexually active are included in the estimation of unmet need for unmarried females, aged 15-19.

Figure 5.1: Unmet need among currently married adolescent females aged 15-19, Zambia DHS 2007



5.1.1 Unmet need among currently married adolescents

Unmet need for spacing among currently married adolescent females was 15.0% and unmet need for limiting was 7.1%. Thus total unmet need among them was 22.1% (see figure 5.1). Levels of met need, unmet need and potential demand for family planning are presented in figure 5.2. Total met need for contraception among currently married adolescent females was 26.8% (26.4% for spacing and 0.4% for limiting). The total potential demand for family planning was 48.9% (41.4% for spacing and 7.5% for limiting). Hence, the level of potential total demand for family planning satisfied was 54.8%.

Figure 5.2: Met need, unmet need and potential demand for family planning among currently married adolescent females aged 15-19, Zambia DHS 2007

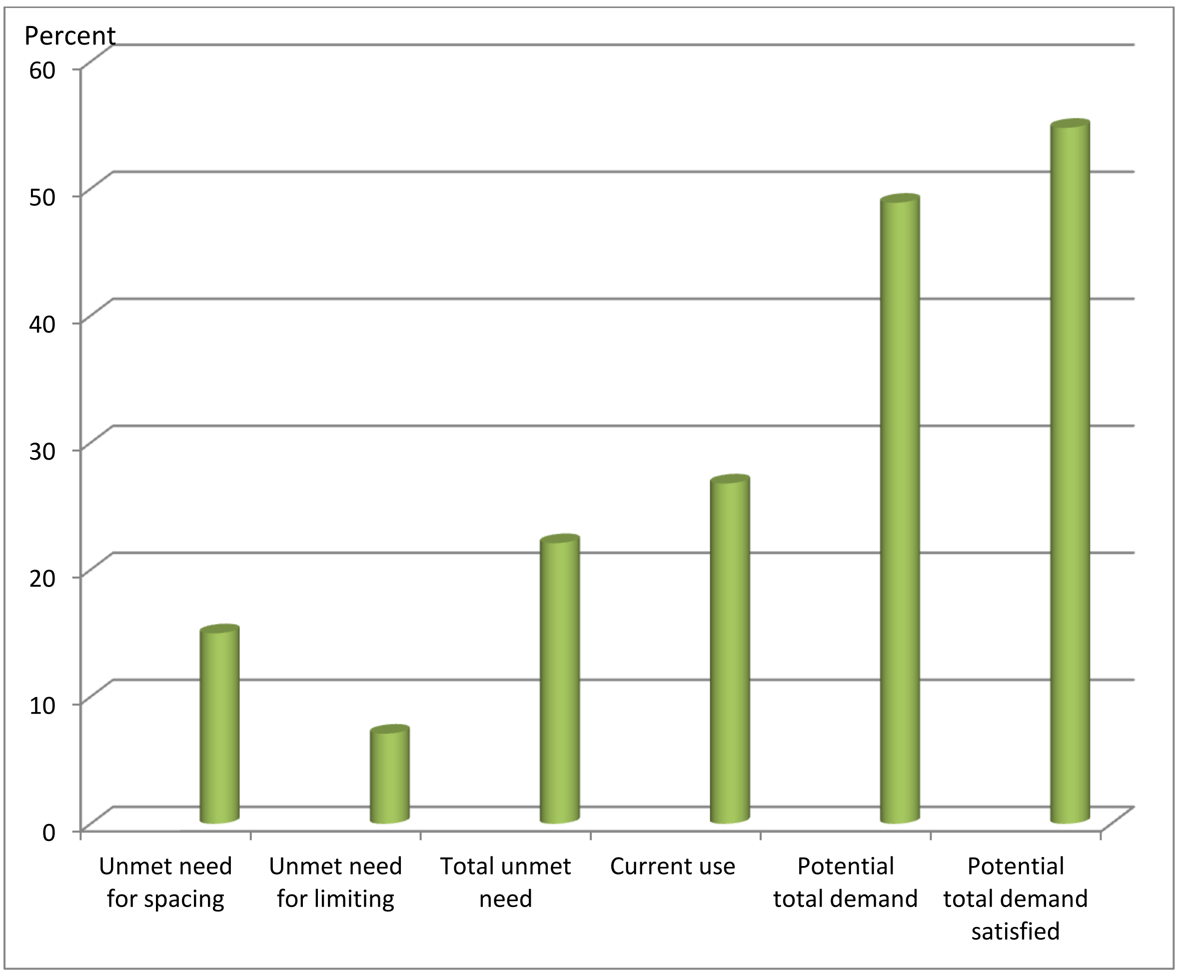
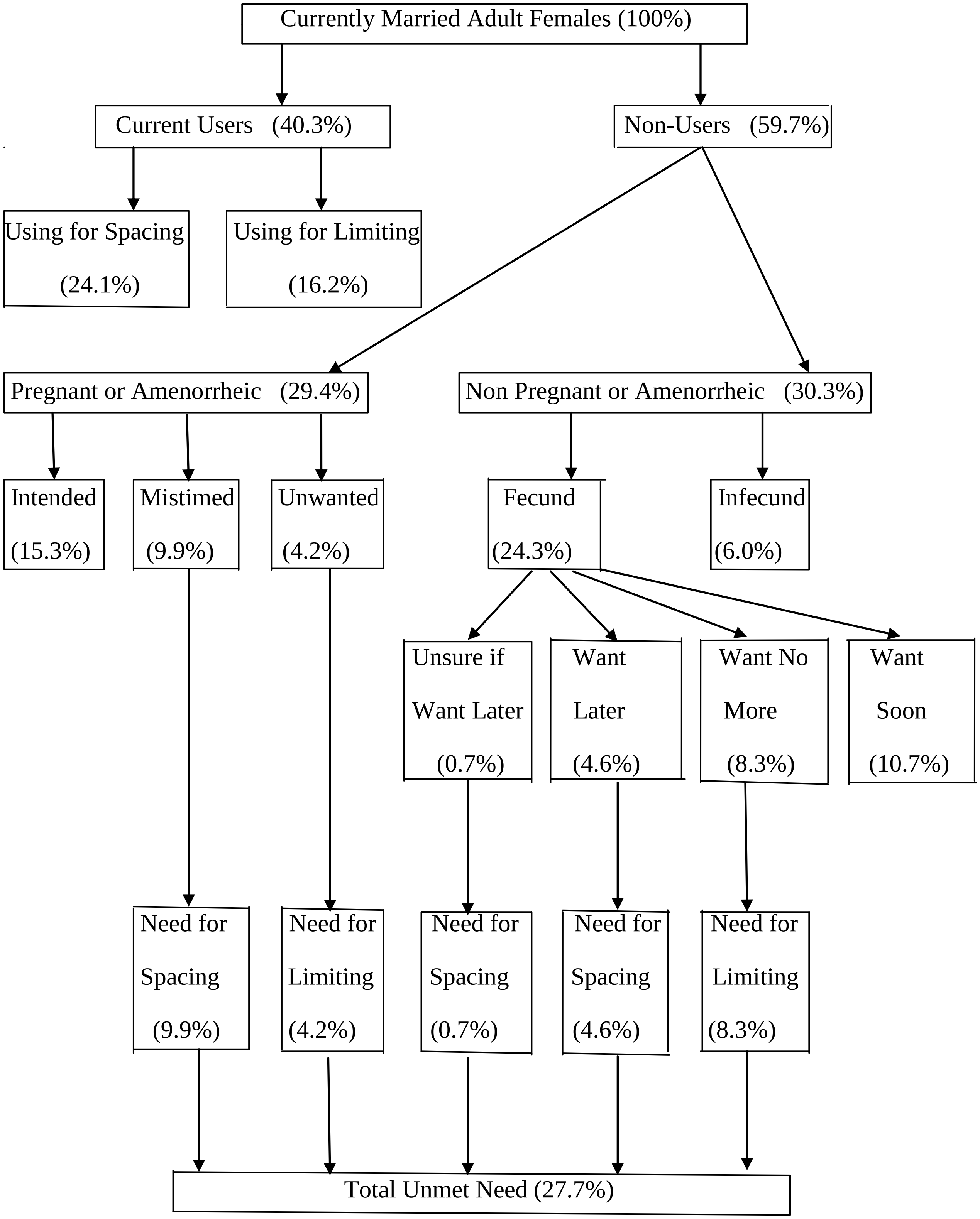


Figure 5.3: Unmet need among currently married adult females aged 20-49, Zambia DHS 2007



5.1.2 Unmet need among currently married adults

The total unmet need among married adult females was 27.7%; 15.2% had unmet need for spacing their children whereas 12.5% wanted to stop childbearing (unmet need for limiting). See figure 5.3. Levels of met need, unmet need and potential demand for family planning are presented in figure 5.4. Total met need for contraception among currently married adult females was 40.3% (24.1% for spacing and 16.2% for limiting). The total potential demand for family planning was 68.0% (39.3% for spacing and 28.7%). Therefore, potential total demand for family planning that was satisfied was 59.3%.

Figure 5.4: Met need, unmet need and potential demand for family planning among currently married adult females aged 20-49, Zambia DHS 2007

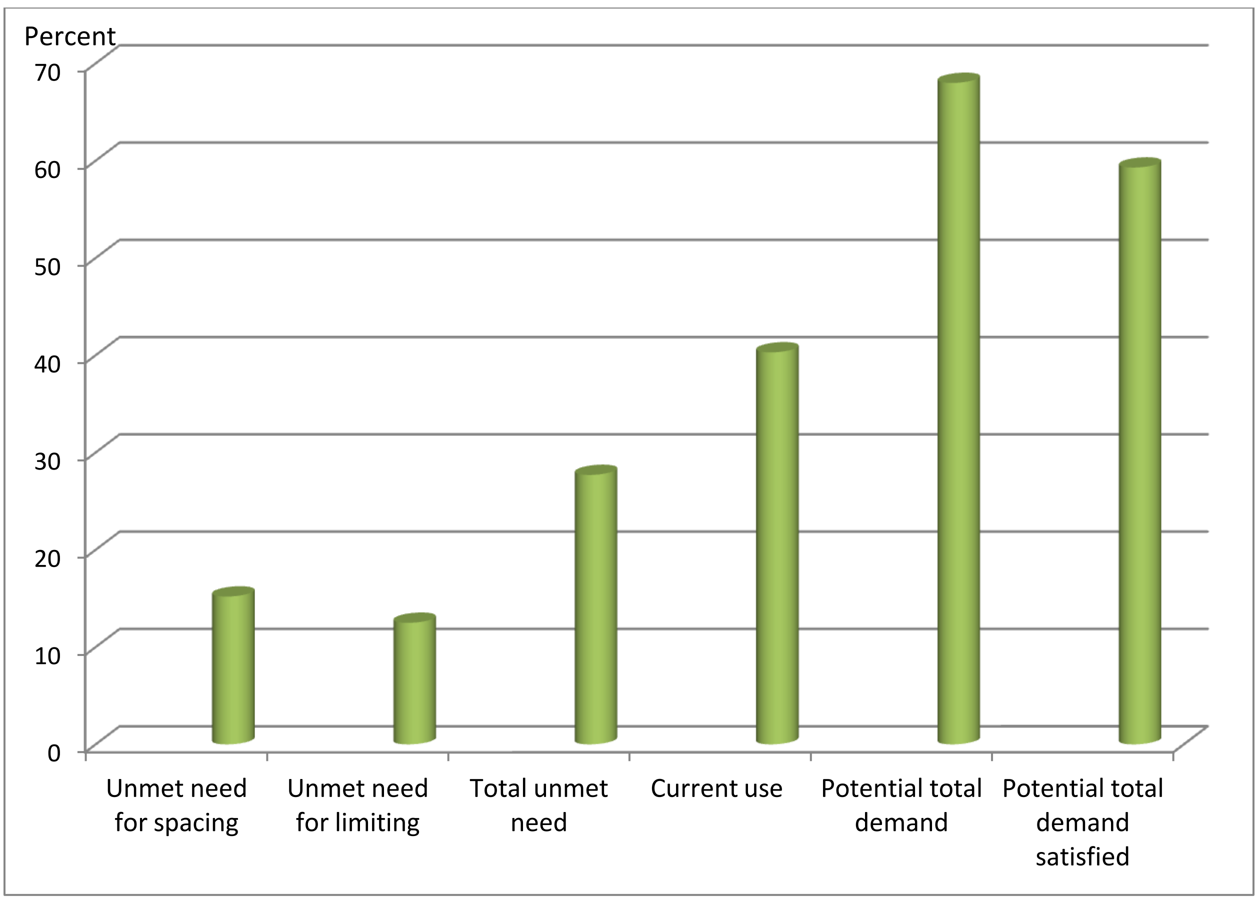
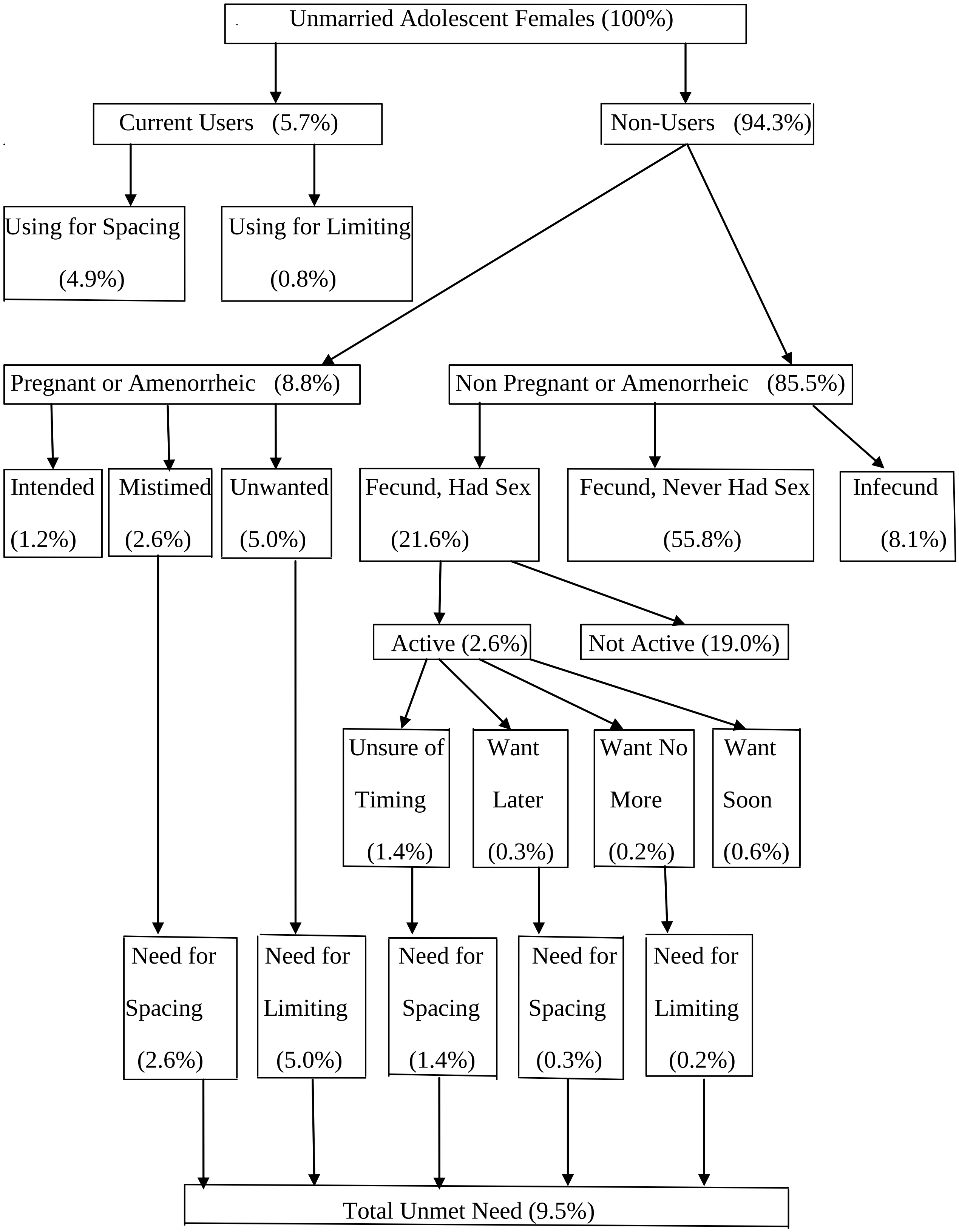


Figure 5.5: Unmet need among unmarried adolescent females aged 15-19, Zambia DHS 2007



5.1.3 Unmet need among unmarried adolescent females

Unmet need for spacing among unmarried adolescent females was 4.3% and unmet need for limiting was 5.2%. Thus total unmet need among unmarried adolescent females was 9.5% (see figure 5.5). Levels of met need, unmet need and potential demand for family planning are presented in figure 5.6. Total met need for contraception among currently unmarried adolescent females was 5.7% (4.9% for spacing and 0.8% for limiting). The total potential demand for family planning was 15.2% (9.2% for spacing and 6.0% for limiting). This resulted in the potential total demand for family planning that was satisfied being 37.5%.

Figure 5.6: Met need, unmet need and demand for family planning among unmarried adolescent females aged 15-19, Zambia DHS 2007

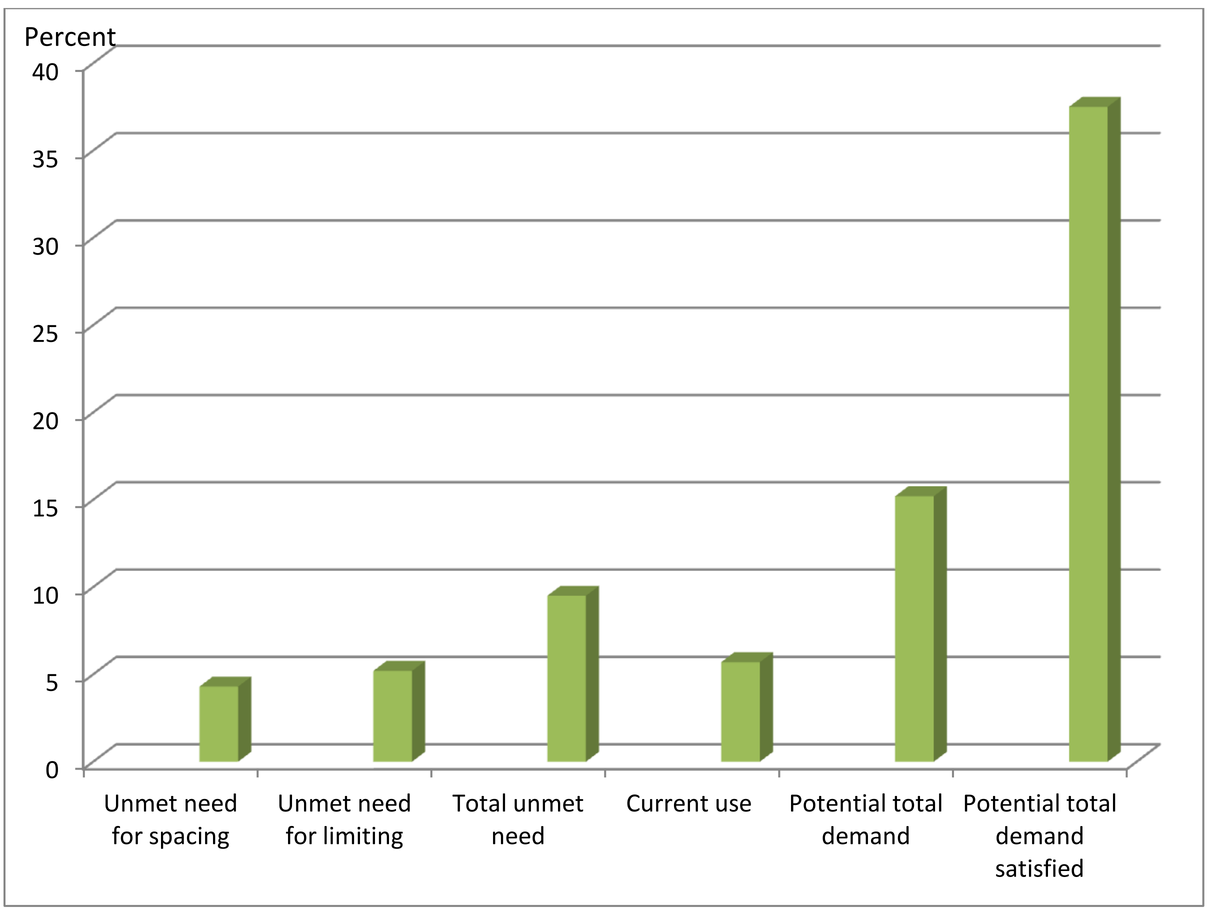
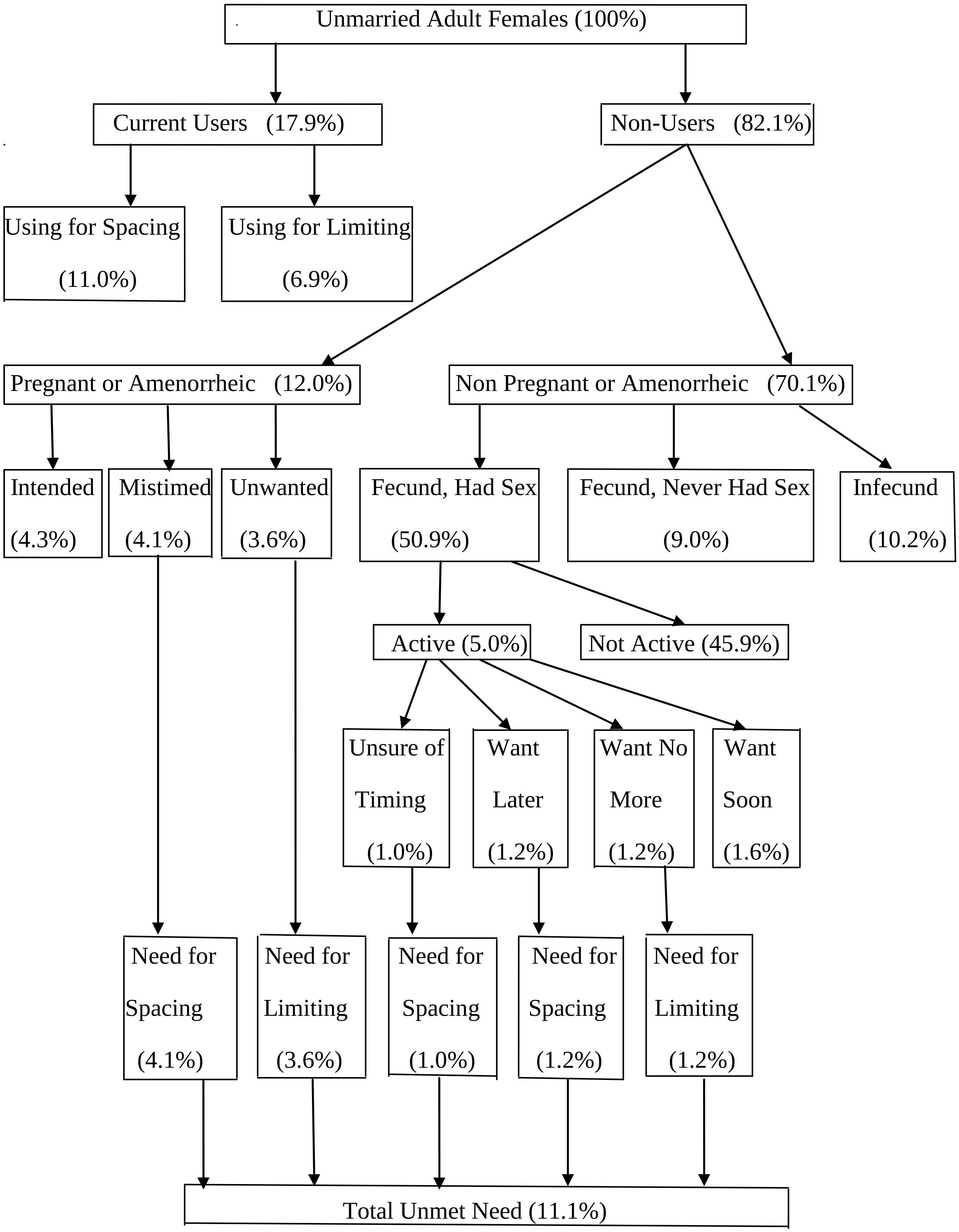


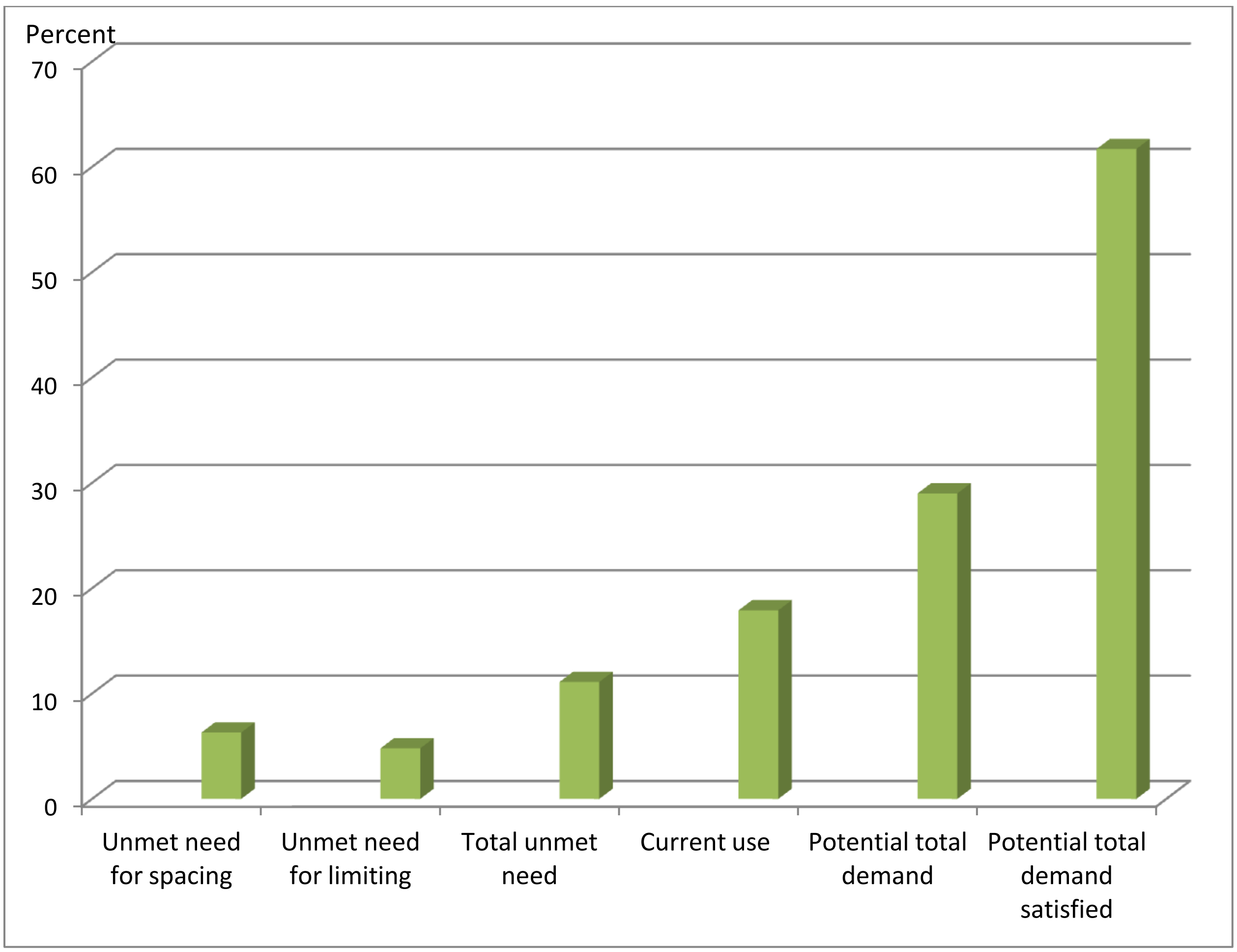
Figure 5.7: Unmet need among unmarried adult females aged 20-49, Zambia DHS 2007



5.1.4 Unmet need among unmarried adults

The total unmet need among unmarried adult females was 11.1%. The level for the spacing and limiting components were 6.3% and 4.8%, respectively (see figure 5.7). Levels of met need, unmet need and potential demand for family planning are presented in figure 5.8. Total met need for contraception among currently unmarried adult females was 17.9% (11.0% for spacing and 6.9% for limiting). Therefore, the total potential demand for family planning was 29.0% (17.3% for spacing and 11.7%). The satisfied total potential demand was 61.7%.

Figure 5.8: Met need, unmet need and potential demand for family planning among unmarried adult females aged 20-49, Zambia DHS 2007



5.2 LEVEL OF UNMET NEED FOR CONTRACEPTION AMONG MALES

The measurement of unmet need for men differs slightly from that for women in that after putting them into two categories depending on whether they or their partners were using any method of contraception (users) or not (non-users), the nonusers are not further divided into fecund and infecund categories. The non-users were straight away divided according to whether they wanted a child later, no more, not sure of timing, undecided or soon. Those in the want later and not sure of timing categories were considered to have unmet need for spacing whereas those who want no more category were classified as having unmet need for limiting. Those who wanted a child soon and the undecided ones were not included in the estimate of unmet need.

5.2.1 Unmet need among currently married adolescent males

Unmet need for spacing among currently married adolescent males was 41.8% and they had no unmet need for limiting. Thus total unmet need among them was 41.8% (see figure 5.9). Levels of met need, unmet need and potential demand for family planning are presented in figure 5.10. Total met need for contraception among currently married adolescent males was 16.4%. All the met need was for spacing their children meaning they were using contraceptives for spacing and not to stop childbearing (using for limiting).The total potential demand for family planning was 58.2% (all of it was for spacing). Thus, the level of potential total demand for family planning satisfied was 28.2%.

Figure 5.9: Unmet need among currently married adolescent males aged 15-19, Zambia DHS 2007

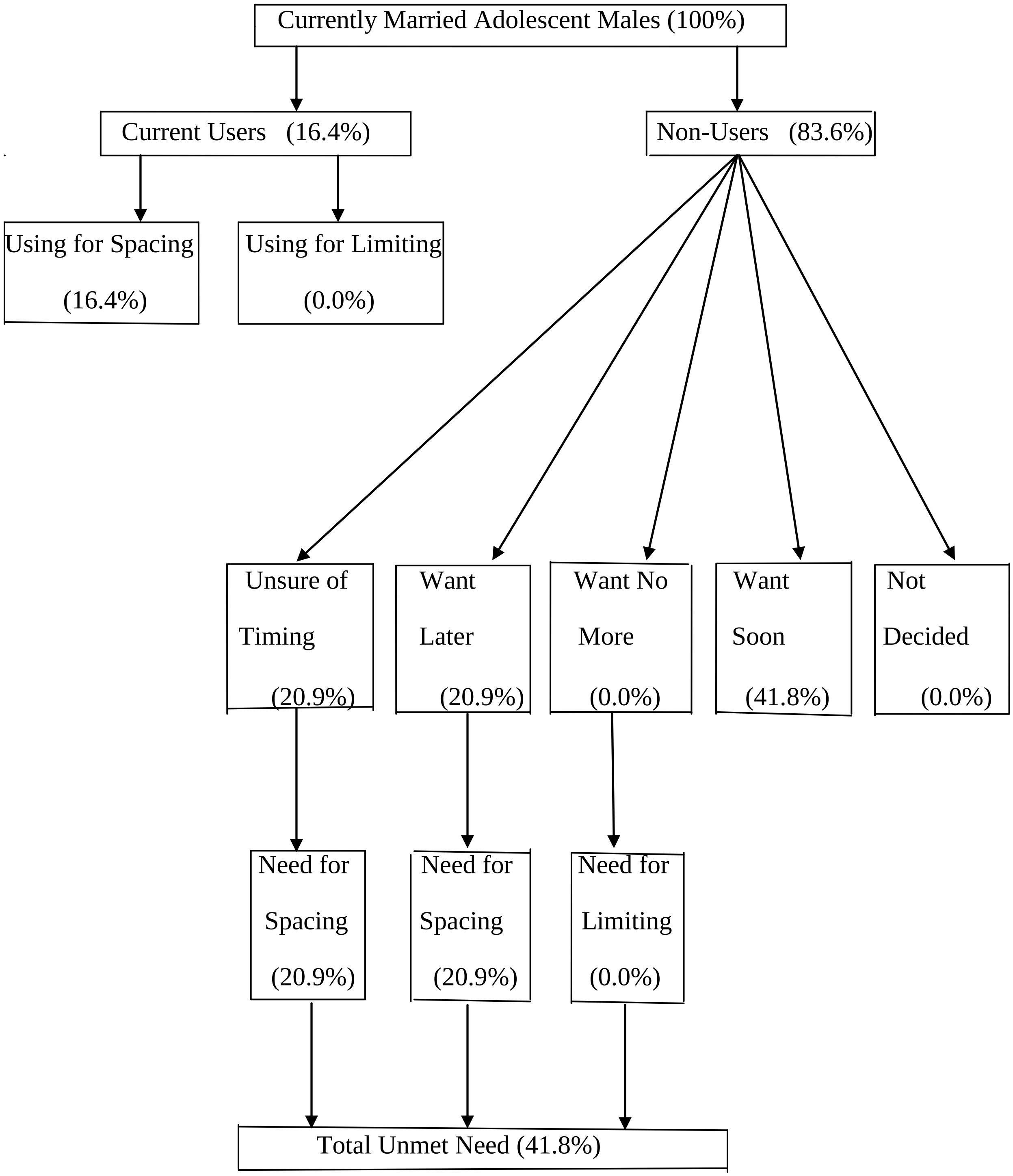
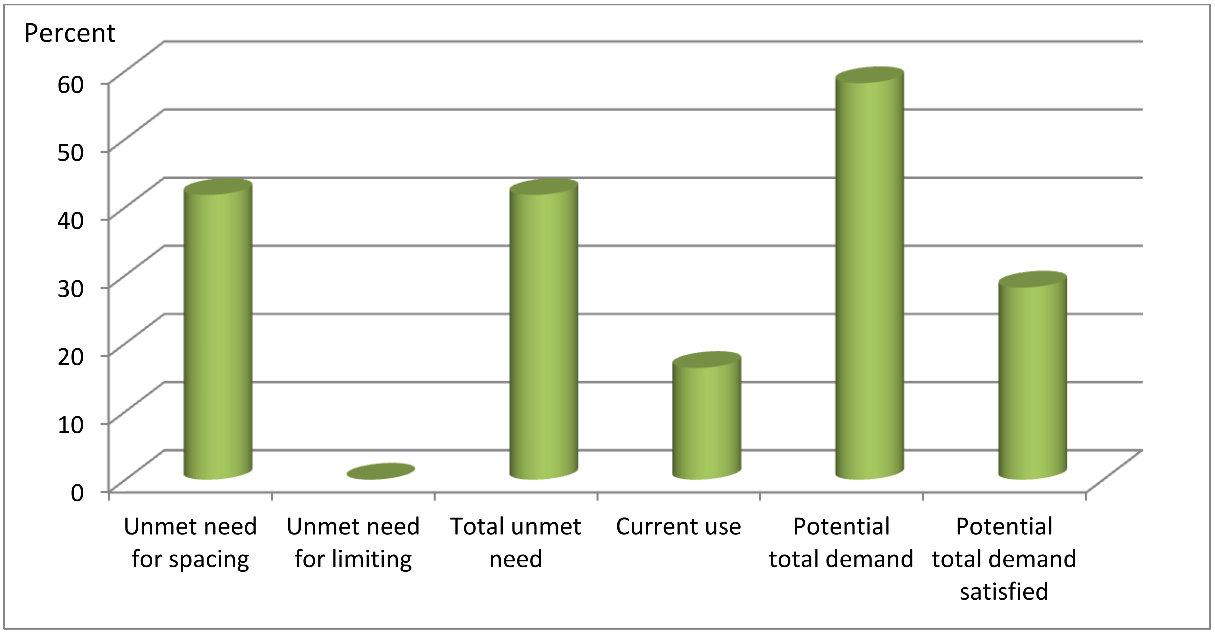


Figure 5.10: Met need, unmet need and potential demand for family planning among currently married adolescent males aged 15-19, Zambia DHS 2007



5.2.2 Unmet need among currently married adult males

Total unmet need among currently married adult males was 34.9%. The level for the spacing and limiting components were 21.4% and 13.5%, respectively (see figure 5.11). Levels of met need, unmet need and potential demand for family planning are presented in figure 5.12. Total met need for contraception among currently married adult males was 52.1% (9.7% for spacing and 42.4% for limiting). The total potential demand for family planning was 87.0% (31.1% for spacing and 55.9% for limiting). Therefore, the total potential demand for family planning satisfied was 60.0%.

Figure 5.11: Unmet need among currently married adult males aged 20-59, Zambia DHS 2007

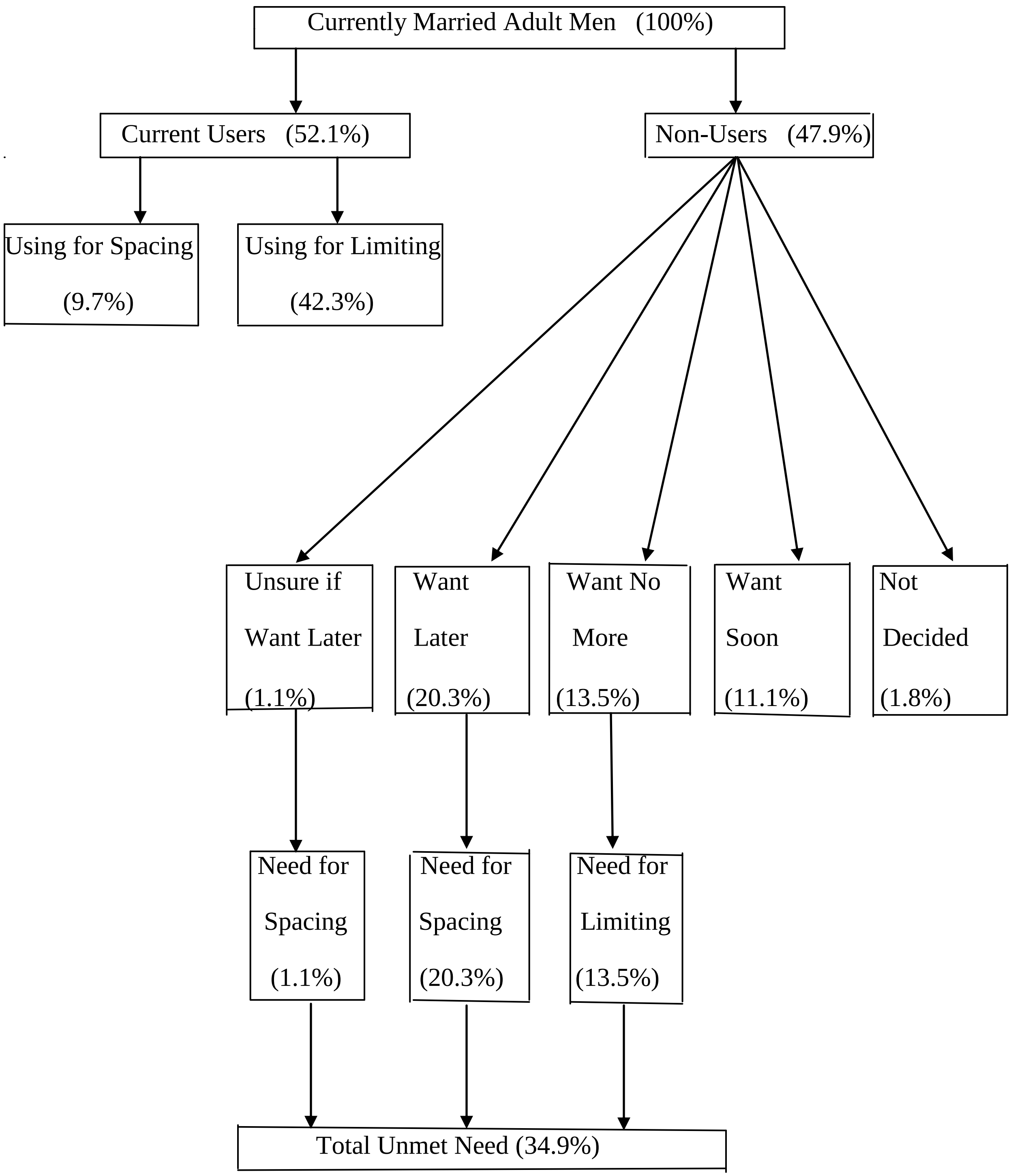
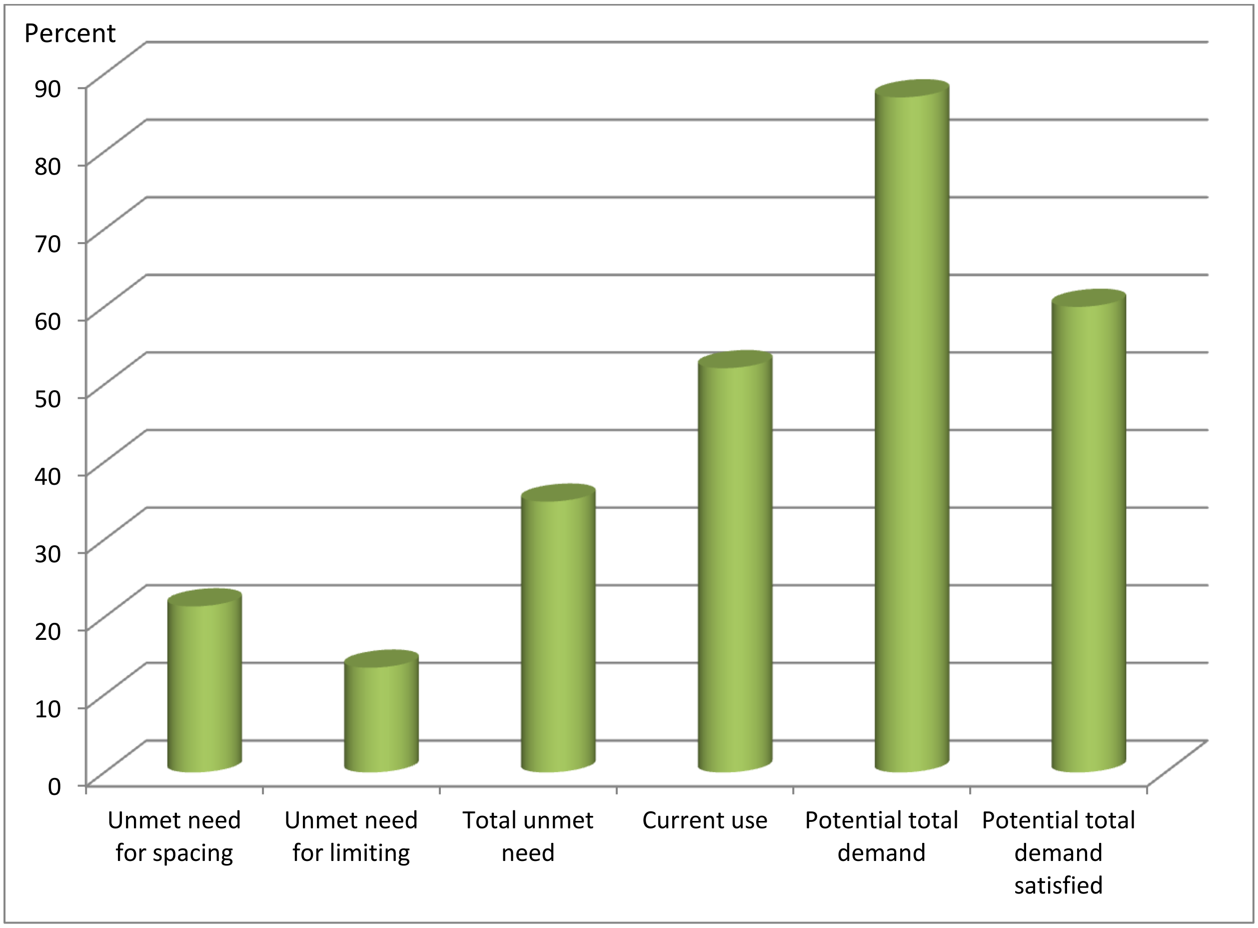


Figure 5.12: Met need, unmet need and potential demand for family planning among currently married adult males aged 20-59, Zambia DHS 2007



5.3 DIFFERENTIALS IN UNMET NEED AMONG FEMALES

Tables 5.1 and 5.2 present the distribution of females with unmet need by selected characteristics. The former addresses adolescents whereas the latter addresses adults. Pearson's Chi-squared tests revealed that the bivariate association between unmet need for contraception and the selected characteristics for adolescent females was significant for eight out of the sixteen variables. In the case of adults, all of the variables had a significant association with unmet need except for religion.

Table 5.1: Percent distribution of adolescent females with unmet need according to selected background characteristics, Zambia DHS 2007

Selected characteristics	Unmet need for spacing %	Unmet need for limiting %	Total Unmet need %	P- value
Marital status				0.082
Never married	53.9	37.1	49.2	
Currently married	46.1	60.0	50.0	
Formerly married	0.0	2.9	0.8	
No. of living children				0.008
0	59.3	45.7	55.6	
1-2	40.7	51.4	43.6	
3-4	0.0	2.9	0.8	
No. of Children ever born				0.007
0	58.2	42.9	54.0	
1-2	41.8	54.3	45.2	
3-4	0.0	2.9	0.8	
Education				0.091
No education	6.6	17.1	9.5	
Primary	58.2	60.0	58.7	
Secondary/Higher	35.2	22.7	31.8	
Occupation				0.474
Not working	61.1	65.7	62.4	
Professional/Clerical	0.0	0.0	0.0	
Sales/service	10.0	14.3	11.2	
Agriculture	24.4	17.1	22.4	
Manual	4.4	2.9	4.0	
Ethnicity				0.097

Bemba	17.6	25.7	19.8	
Tonga	16.5	14.4	17.5	
Lunda, Luvale and Kaonde	25.3	22.9	25.4	
Barotse	11.0	12.4	9.5	
Nyanja	17.6	15.7	17.5	
Mambwe/Tumbuka	9.9	10.5	8.7	
Others	2.2	2.6	1.6	
Religion				0.410
Catholic	22.0	17.1	20.6	
Protestant	78.0	80.0	78.6	
Muslim	0.0	2.9	0.8	
Other	0.0	0.0	0.0	
Wealth index				0.317
Poor	39.6	31.4	37.3	
Middle	24.2	25.7	24.6	
Rich	36.3	42.9	38.1	
Visited by family planning worker				0.003
No	98.9	97.1	98.4	
Yes	1.1	2.9	1.6	
Visited health facility				0.018
No	69.2	62.9	67.5	
Yes	30.8	37.1	32.5	
Ever use of any contraceptive method				0.004
No	6.6	0.0	4.8	
Yes	93.4	100.0	95.2	
Exposure to family planning message through media				0.002
No	71.4	77.1	73.0	
Yes	28.6	22.9	27.0	

Residence				0.403
Rural	61.5	51.4	58.7	
Urban	38.5	48.6	41.3	
Region				0.083
Luapula	6.6	14.3	8.7	
Copperbelt	5.5	5.9	6.4	
Eastern	14.3	11.8	12.7	
Central	3.3	5.9	4.0	
Lusaka	13.2	10.5	11.9	
Northern	7.7	10.5	7.9	
North Western	18.7	18.3	19.8	
Southern	13.2	13.1	13.5	
Western	17.6	8.6	15.1	
Knowledge about any contraceptive				0.004
No	6.6	0.0	4.8	
Yes	93.4	100.0	95.2	
Fertility preference				0.025
Want another	85.7	48.6	75.4	
Undecided	8.8	20.0	11.9	
No more	5.5	31.4	12.7	

5.3.1 Differentials in adolescent females unmet needs.

According to table 5.1, never married adolescent females were more likely to have unmet need for spacing than married ones whereas the formerly married ones did not have any unmet need for spacing. Considering unmet need for limiting, married adolescent females had the highest need, followed by the never married. The formerly married had the least.

Table 5.1 also shows that adolescent females with no living child were more likely to have unmet need for spacing than those with 1-2 living children. In the case of unmet need for limiting, adolescent females with 1-2 children had the highest need whereas those with 3-4 had the least need. In addition, adolescent females with no child ever born had higher unmet need for spacing than those with 1-2 children ever born. Adolescent females with 1-2 children were the most likely to have unmet need for limiting, whereas those with 3-4 were the least likely.
Unmet need for both spacing and limiting was highest among adolescent females with primary education compared to those with no education and those with secondary/higher education. Adolescent females who were not working were more likely to have both unmet need for spacing and limiting than those in employment.

Table 5.1 further shows that protestants were more likely to have unmet need than Catholics though the association between unmet need and religion was not significant. The highest proportion of adolescent females with unmet need for spacing belonged to poor households and the lowest of them belonged to middle class households whereas adolescent females from rich households had the highest unmet need for limiting, followed by those from poor households. Considering ethnicity, adolescent females belonging to the Lunda, Luvale and Kaonde ethnic group were the most likely to have unmet need for spacing followed by those belonging to the Bemba and Nyanja. Those belonging to the Others category were the least likely. In the case of unmet need for limiting, adolescent females belonging to the Bemba ethnic group had the highest need, followed by those belonging to the Lunda, Luvale and Kaonde ethnic group. Those belonging to the Others category were still the least likely.

In relation to those who were visited by a family planning worker or visited a health facility, unmet need for both spacing and limiting was higher among adolescent females who did not than those who did. The same is the case with exposure to family planning messages through media.

The highest proportion of adolescent females with unmet need for both spacing and limiting resided in North western Province. Central Province had the lowest percentage of adolescent females who had unmet need for spacing whereas it shared this position with Copperbelt in the case for limiting.

Additionally, unmet need for both limiting and spacing was higher among adolescent females who had ever used any contraceptive than those who had never. As for fertility preference, adolescent females who wanted another child were most likely to have unmet need for both spacing and limiting. Adolescent women who were undecided about their fertility preference and those wanted no more children were least likely to have unmet need for limiting and spacing, respectively.

5.3.2 Differentials in adult female unmet needs

The distribution of adult females with unmet need according to selected characteristics is presented in Table 5.2. Results show that adult females aged 20-34 were more likely to have unmet need for spacing than those aged 35-49 whereas unmet need for limiting was higher among adult females aged 35-49 than those aged 20-34. Considering marital status, currently married females were the most likely to have both unmet need for spacing and limiting, whereas the never married were the least likely.

Results also show that unmet need for spacing was highest among adult females with 3-4 living children, closely followed by those with 1-2 children. Those with no living children had the least. In the case of unmet need for limiting, adult females with 5 and above living children had the highest proportion, followed by those with 3-4 living children. Those with no living child had the least. Additionally, adult females with 3-4 ever born children were most likely to have unmet need for spacing, whereas those with 5 and above ever born children were most likely to have unmet need for limiting.

Furthermore, results show that both unmet need for spacing and limiting was highest among adult females with primary education and lowest among those with no education. Adult married women who were unemployed were the most likely to have both unmet need for spacing and limiting; those employed in Professional/Clerical were the least likely. With regard to ethnicity, results show that the highest proportion of adult females with both unmet need for spacing and limiting belonged to the Bemba ethnic group and the lowest proportion belonged to the Others. In addition, most of the adult females with both unmet need for spacing and limiting were Protestants whereas the Others were the least. Considering wealth, adult females belonging to poor households were the most likely to have both unmet need for spacing and limiting whereas those from middle class households were the least.

Table 5.2: Percent distribution of adult females with unmet need according to selected background characteristics, Zambia DHS 2007

Selected characteristics	Unmet need for spacing %	Unmet need for limiting %	Total Unmet need %	P- value
Age				
20-34	85.1	33.5	62.9	0.000
35-49	14.9	66.5	37.1	
Marital status				0.000
Never married	3.1	0.9	2.1	
Currently married	93.4	93.2	93.3	
Formerly married	3.5	5.9	4.6	
No. of living children				0.000
0	4.3	0.7	2.8	
1-2	36.1	15.0	27.0	
3-4	36.4	23.7	30.9	
5 & above	23.1	60.6	39.2	
No. of Children ever born				0.000
0	3.3	0.4	2.1	
1-2	29.7	19.7	21.1	
3-4	33.8	29.5	28.9	
5 & above	33.2	49.4	47.9	
Mean no. of children ever born to women aged 35-49				
Education				0.000
No education	12.7	14.4	13.5	
Primary	64.2	67.4	65.5	
Secondary/Higher	23.1	18.2	21.0	
Occupation				0.000
Not working	40.3	37.9	39.3	

Professional/Clerical	1.7	2.6	2.1	
Sales/service	17.7	20.6	19.0	
Agriculture	36.7	34.2	35.6	
Manual	3.6	4.7	4.1	
Ethnicity				0.000
Bemba	37.3	32.0	35.0	
Tonga	14.3	15.7	14.9	
Lunda, luvale and Kaonde	14.7	14.3	14.5	
Barotse	6.6	6.7	6.6	
Nyanja	13.6	19.6	16.2	
Mambwe/Tumbuka	10.2	9.8	10.1	
Others	3.2	1.8	2.6	
Religion				0.091
Catholic	16.7	21.0	18.5	
Protestant	81.1	77.2	79.4	
Muslim	0.4	0.6	0.5	
Other	1.8	1.3	1.6	
Wealth index				0.000
Poor	45.0	39.3	42.5	
Middle	24.8	23.1	24.1	
Rich	30.2	37.6	33.4	
Visited by family planning worker				0.001
No	93.7	93.3	93.5	
Yes	6.3	6.7	6.6	
Visited health facility				0.000
No	44.4	53.6	48.4	
Yes	55.6	46.4	51.6	
Ever use of any contraceptive method				0.000
No	0.8	1.3	1.0	

Yes	99.2	98.7	99.0	
Exposure to family planning message through media				0.000
No	66.5	54.1	60.6	
Yes	34.5	45.9	39.4	
Residence				0.000
Rural	68.9	63.1	66.4	
Urban	31.1	36.9	33.6	
Region				0.000
Luapula	14.7	10.4	12.8	
Copperbelt	11.5	12.0	11.7	
Eastern	11.1	18.7	14.4	
Central	11.5	10.0	10.9	
Lusaka	9.8	9.8	9.8	
Northern	13.3	8.9	11.4	
North Western	10.2	9.4	9.9	
Southern	9.1	11.3	10.1	
Western	8.8	9.4	9.1	
Knowledge about any contraceptive				0.000
No	0.8	1.3	1.0	
Yes	99.2	98.7	99.0	
Fertility preference				0.000
Want another	66.1	8.6	41.4	
Undecided	11.6	3.0	7.9	
No more	22.3	88.4	50.6	

Both unmet need for spacing and limiting was higher among adult females who were not visited by a family planning worker compared to those who were visited. Similarly, unmet need for spacing and limiting was higher among adult females who had no exposure to family planning messages through media compared to those who had. In the case of visiting a health facility, adult females who visited a health facility were more likely to have unmet need for spacing than those who did not, whereas those who visited a health facility were less likely to have unmet need for limiting compared to those who did not. Additionally, the percentage of women with both unmet need for spacing and limiting was higher among women who had ever used any contraceptive method than those who had never.

Results further show that a higher proportion of adult females with both unmet need for spacing and limiting resided in rural areas compared to those in urban areas.The highest proportion of adult females with unmet need for spacing resided in Luapula whereas the least lived in Western. In the case of unmet need for limiting, the highest resided in Eastern and the least in Northern. Both unmet need for spacing and limiting was higher among adult females who had knowledge about any contraceptives than those who did not. Considering fertility preference, adult females who wanted another child were most likely to have unmet need for spacing, whereas those who did not want any more children were most likely to have unmet need for limiting. Those who were undecided about their fertility preferences were least likely to have both unmet need for spacing and limiting.

5.4 DIFFERENTIALS OF UNMET NEED AMONG CURRENTLY MARRIED MALES

The distribution of males with unmet need by selected characteristics is presented in Tables 5.3 and 5.4. Only currently married males whose partners were interviewed were included in the analysis. Pearson’s Chi-squared tests revealed that the bivariate association between unmet need for contraception and the selected characteristics for adolescent males was not significant for all the variables. A possible explanation for this is that the number of married adolescent males was small (less than 30). In the case of adults, all of the variables, apart from religion, had a significant association with unmet need.

Table 5.3: Percent distribution of currently married adolescent males with unmet need according to selected background characteristics, Zambia DHS 2007

Selected characteristics	Unmet need for spacing %	Total Unmet need %	P- value
No. of living children			0.137
0	71.4	71.4	
1-2	28.6	28.6	
No. of Children ever born			0.137
0	71.4	71.4	
1-2	28.6	28.6	
Education			0.308
No education	0.0	0.0	
Primary	57.1	57.1	
Secondary/Higher	42.9	42.9	
Occupation			0.528
Not working	16.7	16.7	
Professional/Clerical	0.0	0.0	
Sales/service	0.0	0.0	
Agriculture	50.0	50.0	
Manual	33.3	33.3	
Ethnicity			0.284
Bemba	28.6	28.6	
Tonga	0.0	0.0	
Lunda, Luvale and Kaonde	42.9	42.9	
Barotse	0.0	0.0	
Nyanja	0.0	0.0	
Mambwe/Tumbuka	28.6	28.6	
Others	0.0	0.0	
Religion			0.898

Catholic	28.6	28.6	
Protestant	71.4	71.4	
Muslim	0.0	0.0	
Other	0.0	0.0	
Wealth index			0.166
Poor	42.9	42.9	
Middle	14.3	14.3	
Rich	42.9	42.9	
Discussed planning with a health worker			0.165
No	100.0	100.0	
Yes	0.0	0.0	
Ever use of any contraceptive method			0.428
No	14.3	14.3	
Yes	89.7	89.7	
Exposure to family planning message through media			0.303
No	57.1	57.1	
Yes	42.9	42.9	
Residence			0.819
Rural	42.9	42.9	
Urban	57.1	57.1	
Region			0.150
Luapula	0.0	0.0	
Copperbelt	28.6	28.6	
Eastern	0.0	0.0	
Central	14.3	14.3	
Lusaka	0.0	0.0	
Northern	28.6	28.6	

North Western	28.6	28.6	
Southern	0.0	0.0	
Western	0.0	0.0	
Knowledge about any contraceptive			0.414
No	0.0	0.0	
Yes	100.0	100.0	
Fertility preference			
Want another	100.0	100.0	0.124
Undecided	0.0	0.0	
No more	0.0	0.0	

5.4.1 Differentials in currently married adolescent males unmet needs

Table 5.3 shows the percent distribution of unmet need among married adolescent males by selected characteristics. Results reveal that all the married adolescent males' unmet need was for spacing. Unmet need was higher among married adolescent males with no living child than among those with 1-2 living children. The pattern was the same with regard to the number of children ever born.

Married adolescent males with primary education were more likely to have unmet need than those with secondary/higher education. Considering occupation, unmet need was highest among currently married adolescents males in the Sales/service category, followed by those employed in agriculture. Those in the Professional/Clerical did not have any unmet need.
Results also show that the highest proportion of currently married adolescent males belonged to the Lunda, Luvale and Kaonde ethnic group, followed by those belonging to Mambwe/Tumbuka and Bemba who had the same percentage. None of those belonging to the Nyanja ethnic group had unmet need. Additionally, results show that Protestants were more likely to have unmet need compared to Catholics.

Furthermore, currently married adolescent males with exposure to family planning messages through media were less likely to have unmet need than their counterparts with no exposure. Contrary, currently married adolescent males who had ever used any contraceptive method were more likely to have unmet need than those who had never. With regard to discussed family planning with a health worker, all those who had unmet need had not discussed family planning with a health worker.

Results further show that a higher proportion of currently married adolescent males with unmet need resided in urban areas than in rural areas. In addition, currently married adolescent males from Copperbelt, Northern and North Western regions were more likely to have unmet need than those from the other regions. Considering knowledge about any contraceptive, all the currently married adolescent males with unmet need had knowledge about any contraceptive. The same was the case for fertility preference in that all those with unmet need wanted another child.

5.4.2 Differentials in unmet need among currently married adult males

The distribution of unmet need among married adult males by selected characteristics is shown in Table 5.4. Results reveal that unmet need for spacing was higher among currently married adult males aged 20-34 than those aged 35 and above. The opposite was the case for unmet need for spacing. Unmet need for spacing was highest among married adult males with 1-2 living children and least among those with no living child. On the other hand, unmet need for limiting was highest among married adult males with 5 and more children. Those with no living child were also least likely to have unmet need for limiting. As for number of children ever born, married adult males with 5 and more children had the highest unmet need for both spacing and limiting and those with no living child had the least unmet need for both spacing and limiting. Results also show that unmet need for both spacing and limiting was higher among married adult males with primary education than those with secondary/higher education. With regard to occupation, unmet need for both spacing and limiting was highest among currently married adult males employed in agriculture and least among those who were not working.

Table 5.4: Percent distribution of currently married adult males with unmet need according to selected background characteristics, Zambia DHS 2007

Selected characteristics	Unmet need for spacing %	Unmet need for limiting %	Total Unmet need %	P- value
Age				
20-34	61.7	17.2	45.6	0.000
35-59	38.3	82.8	54.4	
No. of living children				0.000
0	7.9	0.6	6.6	
1-2	33.4	8.6	24.7	
3-4	29.6	24.8	26.1	
5 & above	29.1	66.0	42.6	
No. of Children ever born				0.000
0	6.9	0.4	7.1	
1-2	28.5	6.4	26.0	
3-4	27.6	18.2	25.0	
5 & above	37.0	75.0	41.9	
Education				0.000
No education	8.9	5.9	7.7	
Primary	55.7	51.3	55.5	
Secondary/Higher	35.4	42.8	36.8	
Occupation				0.000
Not working	1.6	2.8	2.7	
Professional/Clerical	3.8	8.8	5.7	
Sales/service	16.1	15.6	15.0	
Agriculture	60.4	50.6	59.8	
Manual	18.1	22.2	16.8	
Ethnicity				0.000
Bemba	34.0	35.8	37.9	

Tonga	12.4	13.6	12.9	
Lunda, luvale and Kaonde	15.1	15.7	10.5	
Barotse	7.0	5.9	5.0	
Nyanja	15.6	19.2	17.9	
Mambwe/Tumbuka	13.1	7.9	12.9	
Others	2.8	1.9	2.9	
Religion				0.091
Catholic	18.6	24.8	21.0	
Protestant	77.0	69.5	74.3	
Other	4.4	5.7	4.7	
Wealth index				0.000
Poor	50.6	35.5	48.6	
Middle	25.2	23.7	23.1	
Rich	24.2	40.8	28.3	
Discussed planning with a health worker				0.044
No	86.0	83.6	85.0	
Yes	14.0	16.4	15.0	
Ever use of any contraceptive method				0.000
No	28.7	27.6	27.0	
Yes	71.3	72.4	73.0	
Exposure to family planning message through media				0.000
No	43.4	33.2	40.3	
Yes	56.6	66.8	59.7	
Residence				0.000
Rural	73.8	61.9	74.0	
Urban	26.2	38.1	26.0	
Region				0.000

Luapula	14.1	14.0	13.0	
Copperbelt	8.1	13.0	11.3	
Eastern	15.2	14.4	14.6	
Central	9.0	8.5	11.2	
Lusaka	6.8	12.8	10.9	
Northern	16.3	9.7	18.1	
North Western	11.8	10.9	6.7	
Southern	9.1	11.6	8.7	
Western	9.6	5.2	5.5	
Knowledge about any contraceptive				0.001
No	0.1	0.9	0.3	
Yes	99.9	99.1	99.7	
Fertility preference				0.000
Want another	94.6	0.0	59.0	
Undecided	5.4	0.0	3.9	
No more	0.00	100.0	37.1	

Additionally, results show that the highest proportion of currently married adult males with unmet need for both spacing and limiting belonged to the Bemba, whereas the Others had the least. Considering religion, results show that Protestants were most likely to have unmet need and Others were the least likely.

Furthermore, currently married adult males with exposure to family planning messages through media were more likely to have unmet need for both spacing and limiting than their counterparts with no exposure. Similarly, currently married adult males who had ever used any contraceptive method were more likely to have unmet need for both spacing and limiting than those who had never. In relation to discussed family planning with a health worker, those who had not discussed had higher unmet need for both spacing and limiting compared to their counterparts who did.

Results further show that unmet need for both spacing and limiting was higher among currently married adult males residing in rural areas than among their counterparts in urban areas. In addition, currently married adult males from the Northern region had the highest unmet need for spacing whereas; those from Lusaka had the least. In the case of unmet need for limiting, currently married adult males residing in the Eastern region were most likely to have it and those in the Western region were least likely.

With regard to knowledge about any contraceptives, unmet need for both spacing and limiting was higher among currently married adult males with knowledge than among those with none. Finally, results reveal that unmet need for spacing was highest among currently married adult males who wanted another child, whereas all the currently married adult males with unmet need for limiting did not want another child.

5.5 SUMMARY

The levels of total unmet need among married females (22.1% for adolescents and 27.7% for adults) were higher than those of the unmarried ones (9.5% for adolescents and 11.1% for adults). Though total unmet need among both married adolescent and adult females was high, the level for adults was higher than that for adolescents. Married adult's total unmet need was 5.6% higher than that for adolescents. With regards to the unmarried ones, the difference was 1.6%.
Similarly, current contraceptive use among married females was higher (26.8% for adolescents and 40.3% for adults) than that among unmarried ones (5.7% and 17.9% for adolescents and adults, respectively). The average difference in current contraceptive use between adolescents and adults was about 21.6% (22.2% between the married and 21.1% between the unmarried).

It therefore follows that the potential total demand for family planning was higher among married women than among unmarried ones. The gap between the married adolescents and unmarried ones (21.1) was slightly narrower than that for the adults (22.4). On the other hand, potential total demand for family planning that was satisfied was highest among unmarried adult females (61.7%) and lowest among unmarried adolescent females (37.5%). Hence the average potential total demand for family planning that was satisfied among all women was 53.3%.
Considering currently married males, the total unmet need is high with that among adolescents being higher than that among the adults. In addition, all the unmet need among adolescents is for

spacing. Adults have both unmet need for spacing and for limiting though the former is higher than the latter.

The level of contraceptive use among adults was 35.7% higher than that among adolescents. Consequently, the total potential demand for family planning among adults was higher than that among adolescents. Similarly, the total potential demand for family planning satisfied among adults was higher than that among adolescents. The levels of contraceptive use and total potential demand for family planning satisfied among currently married adult males were higher than those for their female counterparts whereas the opposite was the case for adolescents.

The findings indicate that unmet need for contraception was highest among adult females who were currently married. In addition, unmet need for spacing is highest among adult females with 3-4 children ever born, whereas it is highest among adolescent females with no child ever born. On the other hand, unmet need for limiting is highest among older females with 5 and above children ever born whereas for adolescent females, it was among those with 1-2. Adult females with primary education have the highest proportion of unmet need for both spacing and limiting. Results also showed that adult females who were not working are more likely to have unmet need for both spacing and limiting compared to those who were not working. Moreover, currently married adult females belonging to the Bemba ethnic group have the highest unmet need for both spacing and limiting. Furthermore, unmet need for both spacing and limiting is highest among adult females belonging to poor households.

The study also found that adult and adolescent females who were not visited by a family planning worker have higher unmet need compared to those who were visited. Additionally, the percentage of adolescent and adult females with both unmet for spacing and limiting is lower among those who have had exposure to family planning messages through media than those who have not had. Both unmet need for spacing and limiting are higher among women with knowledge about contraceptives than among those without any knowledge. There is a big difference in unmet need between adult females dwelling in urban and rural areas. Unmet need for both spacing and limiting is higher among the rural dwellers.

Just like among adult females, unmet need for spacing is higher among adult males aged 20-34 compared to those aged 35 and above whereas the opposite is the case for unmet need for limiting. Adult males with 5 and above children ever born have the highest unmet need for both spacing and limiting whereas those with none had the least. Unmet need for both spacing and limiting is highest among currently married adult males employed in agriculture.

There are variations in unmet need among currently married adult males by wealth index. Those from poor households are most likely to have unmet need for spacing whereas those from rich households are most likely to have unmet need for limiting. Findings on the association between unmet need among currently married adult males and each of the characteristics that follow are the same as for adult females: education, ethnicity, ever use of contraceptives, place of residence and knowledge about contraceptives.

CHAPTER SIX

CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG MEN AND WOMEN IN ZAMBIA: BINARY AND MULTINOMIAL LOGISTIC REGRESSION ANALYSIS

6.0 INTRODUCTION

This chapter presents the results of the effects of selected individual, community, programme access and intermediate factors on unmet need for contraception among men and women in Zambia. Examining the effects of the various factors on unmet need for contraception advances our understanding of the part these factors play in explaining the differences in unmet need for contraception in Zambia. Particularly, binary and multinomial logistic regressions were employed to determine the effect of each of the variables on unmet need for contraception. Binary and multinomial regressions provide fixed effects (measures of association) which are used to interpret the results. This study used odds ratios, relative risk ratios and p-values.

Six models were fitted for all the three components of unmet need for contraception with the exception of unmet need for spacing and limiting among men and adolescent females where the intermediate factors could not be included as the model failed to converge. Model 1 included community factors only. Model 2 consisted of individual[1] and community factors whereas Model 3 contained individual and programme-access factors. Besides, Model 4 included individual, community and programme access factors and Model 5 (full model) consisted of all factors: individual, community, programme access and intermediate. The final model (Model 6) comprised only those variables that were significantly associated with unmet need for contraception in the forward stepwise regression analysis (see Appendix D for the stepwise regression details).

The equations for the models are as follows:

Model 1

$$Logit(p) = a + b1x1 + b2x2 \ldots bnxn$$

[1] Individual factors included the household factor as well.

where Logit(p) is the log (to base e) of the odds ratio that the outcome variable (unmet need) is 1, a is a constant (analogous to the y-intercept of the simple linear regression model); $b1$, $b2$ and bn are regression coefficients for each explanatory variable (community factors) and $x1$, $x2$ and xn represent the values of each variable (community factors) for a particular woman.

Model 2

$Logit(p) = a + (b1x1 + b2x2 \dots bnxn) + (c1y1 + c2y2 \dots cnyn)$

Where Logit(p); a; $b1$, $b2$ and bn; and $x1$, $x2$ and xn are as already explained; $c1$, $c2$ and cn are regression coefficients for each explanatory variable (individual factors) and $y1, y2$ and yn represent the values of each variable (individual factors) for a particular woman.

Model 3

$$Logit(p) = a + (c1\,y1 + c2\,y2 \dots cn\,yn) + b1x1 + b2x2 \dots bnxn + (d1k1 + d2k2 + dnkn)$$

Where Logit(p); a; $b1$, $b2$ and bn; and $x1$, $x2$ and xn; $c1$, $c2$ and cn; $y1, y2$ and yn are as already explained; $d1, d2,$ and $d2$ are regression coefficients for each explanatory variable (programme access factors) and $k1, k2$ and kn represent the values of each variable (programme access factors) for a particular woman.

Model 4

$$Logit(p) = a + (c1\,y1 + c2\,y2 \dots cn\,yn) + (b1x1 + b2x2 \dots bnxn) + (d1k1 + d2k2 + dnkn)$$

All the symbols are as already explained in the previous models.

Model 5

$$Logit(p) = a + (c1\,y1 + c2\,y2 \dots cn\,yn) + (b1x1 + b2x2 \dots bnxn) + (d1k1 + d2k2 + \cdots dnkn) + (f1v1 + f2v2 + \cdots fnvn)$$

Where all symbols are as explained earlier except for $f1, f2,$ and fn which are regression coefficients for each explanatory variable (intermediate factors) and $v1, v2$ and vn represent the values of each variable (intermediate factors) for a particular woman.

The first section presents the results of the effects of the selected variables on unmet need for contraception among currently married men. As earlier indicated, it was not possible to analyse the data for unmarried men and currently married men whose partners were not interviewed because part of the information which is used to construct the unmet need for contraception variable was not available in their case. In addition, it was not possible to disaggregate the analysis into adolescents and adults because only 10 adolescent males had unmet need for contraception. The second section deals with factors underlying unmet need for contraception among adolescent females. This is followed by one which considers the factors underlying unmet need for contraception among adult women. Results of the effects of selected variables on unmet need among all women are presented in section four. The final section provides a highlight of the chapter.

6.1 CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG CURRENTLY MARRIED MEN IN ZAMBIA

Results for the multinomial regression estimates of relative risk ratios for selected characteristics on unmet need for spacing among currently married men are presented in Tables 6.1. In Model 1 which included only community factors, men residing in urban areas were 60% less likely to have unmet need for spacing compared to their rural counterparts. In addition, unmet need for spacing was significantly lower among men residing in all the regions than those living in Luapula.

When individual factors were controlled for in Model 2, men residing in urban areas were still less likely to have unmet need for spacing than their rural counterparts but the association was no longer significant. The pattern of the influence of region on unmet need for spacing was similar to that in Model 1 except for North Western which ceased to be significant. Among the added variables, unmet need for spacing was inversely related to the number of living children and education attainment. In other words, unmet need for spacing declined with the increase in number of living children and educational attainment. Moreover, wealth was negatively associated with unmet need for spacing.

Model 3 consisted of individual and programme access factors. The pattern showing the association between unmet need for spacing and individual factors was almost the same as that in Model 2. The difference is that the relationship between unmet need for spacing and wealth (middle) ceased to be significant whereas ethnicity (Tonga, Nyanja Mambwe and Tumbuka) became significant.

Table 6.1: Relative risk ratios from multinomial logistic regression predicting unmet need for spacing and limiting among currently married men aged 15-59, Zambia DHS 2007

Base Outcome	Model 1 **Met Need**	Model 2	Model 3	Model 4	Model 5
Unmet need for Spacing					
Selected characteristics	RRR	RRR	RRR	RRR	RRR
No. of living children					
0 [R]		1.00	1.00	1.00	1.00
1-2		0.12***	0.12***	0.11***	0.12***
3-4		0.06***	0.06***	0.06***	0.06***
5 & above		0.05***	0.06***	0.05***	0.05***
Highest education					
No education [R]		1.00	1.00	1.00	1.00
Primary		0.60*	0.65*	0.62*	0.63*
Secondary/Higher		0.48**	0.55***	0.53**	0.52**
Occupation					
Not working [R]		1.00	1.00	1.00	1.00
Professional/clerical		0.55	0.58	0.58	0.97
Sales/service		1.08	1.16	1.13	1.59
Agriculture		0.80	0.89	0.81	1.46
Manual		0.90	1.02	0.92	1.86
Ethnicity					
Bemba[R]		1.00	1.00	1.00	
Tonga		0.91	0.56**	0.93	
Lunda, Luvale and Kaonde		0.71	0.78	0.75	
Barotse		0.74	0.61	0.75	
Nyanja		0.87	0.39***	0.86	
Mambwe and Tumbuka		0.83	0.55**	0.81	

Other		1.18	0.93	1.13	
Wealth					
Poor		1.00	1.00	1.00	1.00
Middle		0.74*	0.85	0.78	0.79
Rich		0.35***	0.25***	0.38***	0.35***
Residence					
Rural ^{R}	1.00	1.00		1.00	
Urban	0.40***	0.82		0.78	
Region					
Luapula ^{R}	1.00	1.00		1.00	1.00
Central	0.35***	0.37***		0.38***	0.37***
Copperbelt	0.18***	0.18***		0.20***	0.18***
Eastern	0.17**	0.13***		0.14***	0.12***
Lusaka	0.17***	0.17***		0.18***	0.17***
Northern	0.35***	0.30***		0.33***	0.31***
North western	0.44**	0.54		0.51	0.41***
Southern	0.17***	0.18***		0.18***	0.17***
Western	0.36***	0.34**		0.35**	0.29***
Exposure to family planning messages through media					
No ^{R}			1.00	1.00	1.00
Yes			0.65**	0.67**	0.64**
Discussed family planning with a health worker					
No ^{R}			1.00	1.00	
Yes			0.77	0.77	
Unmet need for Limiting					

Selected characteristics	Model 1 RRR	Model 2 RRR	Model 3 RRR	Model 4 RRR	Model 6 RRR
No. of living children					
0 [R]		1.00	1.00	1.00	1.00
1-2		0.57	0.57	0.56	0.54
3-4		0.90	0.90	0.89	0.86
5 & above		2.06	2.05	2.01	1.99
Highest education					
No education [R]		1.00	1.00	1.00	1.00
Primary		0.89	0.89	0.85	0.87
Secondary/Higher		0.60	0.60	0.57*	0.63
Occupation					
Not working [R]		1.00	1.00	1.00	
Professional/clerical		0.93	1.02	0.94	
Sales/service		0.63	0.71	0.62	
Agriculture		0.77	0.84	0.77	
Manual		0.68	0.82	0.69	
Ethnicity					
Bemba[R]		1.00	1.00	1.00	
Tonga		0.72	0.65	0.72	
Lunda, Luvale and Kaonde		0.93	0.88	0.94	
Barotse		1.22	1.01	1.16	
Nyanja		0.92	0.68*	0.93	
Mambwe and Tumbuka		0.57*	0.42***	0.58*	
Other		0.66	0.57	0.65	
Wealth					
Poor		1.00	1.00	1.00	1.00
Middle		1.22	1.42	1.25	1.22
Rich		0.92	1.14	0.95	1.00

Residence					
Rural R	1.00	1.00		1.00	
Urban	0.77*	1.14		1.12	
Region					
Luapula R	1.00	1.00		1.00	1.00
Central	0.33***	0.44***		0.45**	0.39***
Copperbelt	0.24***	0.34***		0.35***	0.30***
Eastern	0.19***	0.25***		0.25***	0.21***
Lusaka	0.26***	0.42***		0.44**	0.36***
Northern	0.30***	0.25***		0.26***	0.22***
North western	0.38**	0.42**		0.43*	0.39***
Southern	0.21***	0.33***		0.34**	0.25***
Western	0.28***	0.30***		0.33**	0.32***
Exposure to family planning messages through media					
No R			1.00	1.00	1.00
Yes			0.87	0.90	0.91
Discussed family planning with a health worker					
No R			1.00	1.00	
Yes			1.03	1.03	
Constant	**2.31 c1** **1.39 c2**	**91.17 c1** **1.47 c2**	**32.69 c1** **0.54 c2**	**103.98 c1** **1.60 c2**	**83.87 c1** **120.00 c2**
Log pseudolikelihood	**-2.411e+09**	**-2.208e+09**	**-2.2334e+09**	**-2.190e+09**	**-2.224e+09**
Wald chi²	**187.97**	**480.79**	**408.84**	**490.98**	**466.04**
Prob > chi²	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^2	**0.0464**	**0.1220**	**0.1080**	**0.1250**	**0.1204**

R = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001, c1= unmet need for spacing, c2= unmet need for limiting

One of the added variables had a significant association with unmet need for spacing. Men who were exposed to family planning through media had a lower risk (0.7 times) of having unmet need for spacing compared to those who did not.

In Model 4 (full model) which comprised individual, community and programme access factors, the pattern showing the influence of individual factors on unmet need for spacing was the same as in Model 3. The difference was that ethnicity (Tonga, Nyanja and Mambwe and Tumbuka) lost its significance. Considering the association between unmet need for spacing and programme access factors, the odds of having unmet need for spacing among men with exposure to family planning messages were still 0.7 times lower than for those who did not have the exposure. As for community factors, the relationship between unmet need for spacing and region was significant. Married men residing in all the other regions were less likely to have unmet need for spacing compared to those living in Luapula.

Results of the final model show that number of living children was inversely associated with unmet need for spacing. Similarly, the more educated a man was, the lower the risk of having unmet need for spacing. Moreover, males from rich households were less likely to have unmet need for spacing than those from poor households. In addition, residing in all the other regions was negatively related to unmet need for spacing. Besides, men who had exposure to family planning messages in media had a lower risk of having unmet need for spacing compared to their counterparts who did not.

Table 6.1 also shows the multinomial logistic regression estimates of relative risk ratios for selected characteristics on unmet need for limiting among currently married men. Model 1 reveals that men living in urban areas were about 0.8 times less likely to have unmet need for limiting than the rural dwellers. Furthermore, the odds of having unmet need for limiting were significantly lower among men living in all the other regions than those residing in Luapula.

After adjusting for individual factors in model 2, the significant association between residence and unmet need for limiting was eliminated. Contrary to the first model, urban dwellers were more likely to have unmet need for limiting than the rural ones though the association was not significant. The association between region and unmet need for limiting was still the same as in

Model 1. Moreover, the Mambwe/ Tumbuka men's odds of having unmet need for limiting were significantly lower than those of Bemba men.

Model 3 contained of individual and programme access factors. The pattern of the association between individual factors and unmet need for limiting was almost the same as in the previous model. The slight difference is that the Nyanja ethnic group were significantly less likely to have unmet need for limiting than Bemba men. Both the added variables (exposure to family planning in media and discussed family planning with a health worker) were not significantly related to unmet need for limiting.

Model 4 consisted of individual, community and programme access factors. Results indicate that the pattern showing the influence of individual factors and programme access on unmet need for limiting did not deviate much from one in the previous model. Married men with secondary/higher education were 43% less likely to have unmet need for limiting than their uneducated counterparts. Moreover, the significant association between ethnicity (Nyanja) and unmet need for limiting was eliminated. Among the community variables, residing in all the other regions was negatively related to unmet need for limiting.

The final model included only the variables that were selected by the forward stepwise regression. Results indicate that men residing in all the other regions were between 0.2 and 0.4 times less likely to have unmet for limiting compared to those living in Luapula.

Overall, the models estimate unmet need for spacing and limiting well considering that p-values for each model are 0.0000. The Wald chi square value of the full model is higher than for each of the preceding models suggesting that the former is an improvement over the latter. Moreover, the pseudo R-square values which indicate the strength of association show that the full model has the highest value (0.1250). Therefore, this model has a better model fit compared to the others.

The odds ratios of total unmet need among currently married men are presented in Table 6.2. Model 1 reveals that the likelihood of urban men having total unmet need was 0.6 times lower compared to the rural ones. The model also shows that men residing in all the other regions were significantly less likely to have total unmet need than men living in Luapula.

After controlling for individual factors in model 2, the association between total unmet need and residence ceased being significant. Among the added variables, number of living children was negatively associated with total unmet need. Men with secondary/higher education were 48% less likely to have total unmet need than their uneducated counterparts. Furthermore, men belonging to rich households had lower odds of having total unmet need than those from poor ones.

Model 3 comprised individual and programme access factors. Results of this model differed slightly to those of the previous model in that belonging to some ethnic groups (Tonga, Nyanja and Mambwe/Tumbuka) was significantly negatively associated with total unmet need. Moreover, exposure to family planning messages in media lowered a man's odds of having total unmet need.

In Model 4 which contained individual, community and programme access factors, the pattern showing the influence of individual and programme factors was almost the same as in Model 3. The only difference is that the three ethnic groups (Tonga, Nyanja and Mambwe/Tumbuka) were no longer significantly negatively associated with total unmet need. Among the added variables, men with exposure to family planning in media had a lower risk of having total unmet need than those with no exposure.

In model 5 (full model) which added an intermediate factor to the previous model, results indicate that number of living children was negatively associated with total unmet need. In addition, married men with secondary/higher education and from rich households were 0.6 times each less likely to have total unmet need than those with no education and from poor households. Moreover, living in all the other regions significantly reduced a married man's odds of having total unmet need. Results also show that being exposed to family planning messages in media was negatively associated with total unmet need. The added variable (fertility preference) was not significantly related to total unmet need.

Results from the final model (Model 6) show that the odds of having total unmet need among men who had living children were lower (ranging between 0.12 and 0.17) compared to those who had no children at all. Moreover, having secondary/higher education was negatively associated with total unmet need.

Table 6.2: Odds ratios from binary logistic regressions showing the association between selected characteristics and total unmet need among currently married men aged 15-59, Zambia DHS 2007

Selected characteristics	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR
Age						
15-19 [R]		1.00	1.00	1.00	1.00	
20-59		0.54	0.64	0.57	0.55	
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.17***	0.17 ***	0.16***	0.16***	0.16***
3-4		0.12***	0.13***	0.12***	0.11***	0.12***
5 & above		0.17***	0.18***	0.17 ***	0.15 ***	0.17***
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.71	0.74	0.71	0.72	0.73
Secondary/Higher		0.52***	0.57**	0.55**	0.55**	0.56**
Occupation						
Not working [R]		1.00	1.00	1.00	1.00	
Professional/clerical		0.70	0.77	0.72	0.73	
Sales/service		0.78	0.87	0.79	0.82	
Agriculture		0.75	0.84	0.76	0.78	
Manual		0.75	0.89	0.77	0.78	
Ethnicity						
Bemba[R]		1.00	1.00	1.00	1.00	
Tonga		0.81	0.60***	0.82	0.83	
Lunda, Luvale and Kaonde		0.84	0.82	0.86	0.85	
Barotse		0.94	0.76	0.92	0.91	
Nyanja		0.92	0.51***	0.92	0.92	

Mambwe and Tumbuka		0.74	0.51***	0.73	0.74	
Other		0.97	0.78	0.93	0.96	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		0.91	1.05	0.95	0.93	0.94
Rich		0.55**	0.51***	0.59***	0.57***	0.57***
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.59***	0.95		0.93	0.92	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.34***	0.40***		0.41***	0.42***	0.38***
Copperbelt	0.21***	0.25***		0.26***	0.25***	0.23***
Eastern	0.18***	0.17***		0.19***	0.17***	0.16***
Lusaka	0.21***	0.26***		0.28***	0.27***	0.24***
Northern	0.29 ***	0.29***		0.31***	0.31***	0.28***
North western	0.42***	0.46**		0.46**	0.46**	0.40***
Southern	0.19***	0.24***		0.24***	0.24***	0.20***
Western	0.33***	0.32***		0.34***	0.34***	0.30***
Exposure to family planning messages through media						
No [R]			1.00	1.00	1.00	1.00
Yes			0.78**	0.76*	0.75*	0.74**
Discussed family planning with a health worker						
No [R]			1.00	1.00	1.00	
Yes			0.88	0.89	0.88	
Fertility preference						

Want another[R]					1.00	
Undecided					0.82	
No more					0.88	
Constant	**3.70**	**96.00**	**28.64**	**98.82**	**126.07**	**43.75**
Log pseudolikelihood	**$-1.664e^{+09}$**	**$-1.598e^{+09}$**	**$-1.619e^{+09}$**	**$-1.586e^{+09}$**	**$-1.584e^{+09}$**	**$-1.603e^{+09}$**
Wald chi^2	**157.69**	**241.19**	**176.60**	**250.56**	**251.32**	**249.46**
Prob > chi^2	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^2	**0.0517**	**0.0849**	**0.0693**	**0.0884**	**0.0895**	**0.0862**

[R] = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001

Similarly, wealth was inversely associated with total unmet need with men belonging to rich households being 0.6 times significantly less likely to have total unmet need. Results also reveal that residing in all the other regions was negatively associated with total unmet need. Additionally, men who were exposed to a family planning message in media were 26% less likely to have total unmet need than those who had no exposure.

All six models are statistically significant in that each of them has a p-value of 0.0000. The full model is an improvement over the preceding models in that its Wald chi square value (251.32) is the highest. Moreover, the full model has the highest pseudo R-square (0.0895) indicating a better model fit than the rest.

6.2 CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG ADOLESCENT WOMEN IN ZAMBIA

Table 6.3 presents the multinomial regression estimates of relative risk ratios for factors associated with unmet need for spacing and limiting among adolescent women. Model 1 comprised community factors (place of residence and region of residence). Results indicate that none of the community factors were significantly associated with unmet need for spacing among adolescent females. The same applies with the case of unmet need for limiting among adolescents females.

Table 6.3: Relative risk ratios from multinomial logistic regression predicting unmet need for spacing and limiting among adolescent females aged 15-19, Zambia DHS 2007

Selected characteristics	Model 1	Model 2	Model 3	Model 4	Model 5
Base Outcome	Met Need				
Unmet need for Spacing					
Selected characteristics	RRR	RRR	RRR	RRR	RRR
Marital Status					
Unmarried		1.00	1.00	1.00	1.00
Married		5.86**	3.17*	7.65**	4.82*
No. of living children					
0 [R]		1.00	1.00	1.00	1.00
1-2		0.05***	0.11**	0.05***	0.10***
Highest education					
No education [R]		1.00	1.00	1.00	
Primary		2.39	1.23	3.26	
Secondary/Higher		1.59	0.83	3.13	
Occupation					
Not working [R]		1.00	1.00	1.00	
Professional/ Sales		0.17	0.18	0.16	
Agriculture		2.73	2.30	4.18	
Manual		4.81	2.18	7.59	
Wealth					
Poor		1.00	1.00	1.00	
Middle		1.28	1.04	1.05	
Rich		2.48	3.10	4.90	
Residence					
Rural [R]	1.00	1.00		1.00	
Urban	0.47	0.74		0.56	
Region					
Luapula [R]	1.00	1.00		1.00	1.00

Central	0.19	0.11		0.12	0.12
Copperbelt	0.90	0.26		0.11	0.30
Eastern	1.27	0.67		0.39	0.93
Lusaka	2.83	1.10		0.90	1.58
Northern	0.21	0.02*		0.02*	0.10
North western	1.43	0.81		0.50	1.14
Southern	1.03	0.54		0.56	0.64
Western	0.71	0.39		0.25	0.40
Exposure to family planning messages through media					
No [R]			1.00	1.00	
Yes			0.59	0.31	
Visited by family planning worker					
No [R]			1.00	1.00	
Yes			0.11	0.13	
Visited health facility					
No [R]			1.00	1.00	
Yes			0.53	0.37	
Unmet need for limiting					
Selected characteristics	Model 1 RRR	Model 2 RRR	Model 3 RRR	Model 4 RRR	
Marital Status					
Unmarried		1.00	1.00	1.00	1.00
Married		7.32*	3.33	9.86**	5.14*
No. of living children					
0 [R]		1.00	1.00	1.00	1.00
1-2		0.08**	0.14**	0.07**	0.14**
Highest education					

No education [R]		1.00	1.00	1.00	
Primary		0.60	0.54	0.80	
Secondary/Higher		0.11	0.15	0.20	
Occupation					
Not working [R]		1.00	1.00	1.00	
Professional/ Sales		0.25	0.39	0.24	
Agriculture		1.11	1.01	1.69	
Manual		3.15	1.57	5.26	
Wealth					
Poor		1.00	1.00	1.00	
Middle		1.96	1.65	1.43	
Rich		7.17	6.41*	12.42	
Residence					
Rural [R]	1.00	1.00		1.00	
Urban	1.61	0.90		0.74	
Region					
Luapula [R]	1.00	1.00		1.00	1.00
Central	0.20	0.14		0.11	0.12
Copperbelt	0.74	0.19		0.08	0.37
Eastern	0.53	0.15		0.07	0.34
Lusaka	0.69	0.14		0.12	0.57
Northern	0.15	0.03*		0.02*	0.07*
North western	0.87	0.63		0.35	0.68
Southern	0.47	0.21		0.21	0.28
Western	0.19	0.16		0.09	0.11
Exposure to family planning messages through media					
No [R]			1.00	1.00	
Yes			0.34	0.25	

Visited by family planning worker					
No R			1.00	1.00	
Yes			0.42	0.57	
Visited health facility					
No R			1.00	1.00	
Yes			0.69	0.40	
Constant	**4.32 c1** **2.75 c2**	**9.37 c1** **19.29 c2**	**7.73 c1** **5.03 c2**	**16.05 c1** **37.52 c2**	**12.32 c1** **7.64 c2**
Log pseudolikelihood	**$-1.283e^{+08}$**	**$-1.081e^{+08}$**	**$-1.150e^{+08}$**	**$-1.044e^{+08}$**	**$-1.218e^{+08}$**
Wald chi^2	**16.09**	**66.70**	**47.26**	**67.34**	**34.63**
Prob > chi^2	**0.5863**	**0.0014**	**0.0031**	**0.0078**	**0.0221**
Pseudo R^2	**0.0707**	**0.2033**	**0.1528**	**0.2309**	**0.1174**

R = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001, c1= unmet need for spacing, c2= unmet need for limiting

The adding of individual factors in Model 2 yielded similar results concerning the relationship between community factors and unmet need for spacing among adolescent females except that adolescent females residing in the Northern Region were significantly less likely to have unmet need for spacing than those living in Luapula. Among the added variables, married adolescent females were about six times more likely to have unmet need for spacing than their unmarried counterparts. Moreover, adolescent females with children were 95% less likely to have unmet need for spacing compared to their counterparts who had no children. In the case of unmet need for limiting, married adolescents were seven times more likely to have unmet need for limiting than those who were unmarried. In addition, the risk of having unmet need for limiting among adolescents with children was almost 0.1 times lower than that for those with no children. Besides, adolescents residing in the Northern region were 97% less likely to have unmet need for limiting than those in Luapula.

Model 3 consisted of individual and programme access factors. Results show that married adolescents had higher odds of having unmet need for spacing than those who were unmarried. Findings also indicate that adolescents with children were 89% less likely to have unmet need for spacing compared to those with no children. With regards to unmet need for limiting, having living children put one at a lower risk of having unmet need for limiting than not having any children. Furthermore, adolescents belonging to rich households were 6.4 times more likely to have unmet need for limiting compared to their counterparts from poor households.

According to Model 4 which included individual, community and programme access factors , married adolescents were at a higher risk of having unmet need for spacing compared to their unmarried counterparts. Results also show that the number of living children was negatively associated with unmet need for spacing. Additionally, adolescent females living in the Northern region were 95% less likely to having unmet need for spacing than those residing in Luapula.
Considering unmet need for limiting, being married increased the odds of having unmet need than being unmarried whereas having living children reduced the odds of having unmet need for limiting. Moreover, adolescents belonging to rich households were 6.4 times more likely to have unmet need for limiting than those from poor households.

Results from the final model (Model 5) indicate that the likelihood of having unmet need for spacing among married adolescent females was higher than among those who were unmarried. Adolescent females with children were 89% less likely to have unmet need for spacing compared to those with no children. Regarding unmet need for limiting, results indicate that married female adolescents were about five times at a higher risk than their unmarried counterparts. In addition, adolescent females with children had a lower risk (0.14 times) of having unmet need for limiting than those with no children.

All the models except for model 1 are statistically significant in that each of them has a p-value of less than 0.05. The full model has the highest Wald chi square value (67.34). Therefore, it is an improvement over the preceding models. Besides, the full model has the highest pseudo R-square (0.2309) indicating a better model fit than the rest.

The odds ratios from the binary logistic regression showing the factors related to total unmet need are presented in Table 6.4. Model 1 included community factors only. Results reveal that none of variables in this model was significantly associated with total unmet need.

In Model 2 which adjusted for individual factors, married adolescents were six times more likely to have total unmet need than those who were unmarried. Adolescents with living children were 0.06 times less likely to have total unmet need compared to their counterparts without children. Moreover, adolescents from the Northern region were at a lower risk of having total unmet need than those from Luapula.

Results from Model 3 which consisted of individual and programme access factors indicate that that married adolescents were more likely to have total unmet need than their unmarried counterparts. Additionally, number of living children was negatively associated with total unmet need. In the fourth model comprising individual, community, and programme access factors, married women were at a higher risk (eight times) of having total unmet need compared to their unmarried counterparts. Moreover, number of living children was negatively associated with total unmet need. Furthermore, the odds of having total unmet need among adolescents residing in the Northern region were 0.02.

Results from the final model (Model 5) reveal that the likelihood of having total unmet need was higher (five times) among married adolescent females than those who were unmarried. Moreover, number of living children was negatively related to total unmet need. Additionally, adolescent females who resided in the Northern region were 92% less likely to have total unmet need compared to those who resided in Luapula.

All the models apart from Model 1 are statistically significant in that each of them has a p-value of less than 0.05. Model 2 has the highest Wald chi square value (39.93). Hence, the proceeding models are not an improvement over Model 2. However, the full model has the better model fit than the rest in that it has the highest pseudo R-square (0.3264

Table 6.4: Odds ratios from binary logistic regression predicting total unmet need among adolescent females aged 15-19, Zambia DHS 2007

Selected characteristics	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR
Marital Status					
Unmarried		1.00	1.00	1.00	1.00
Married		5.99**	3.13*	7.73**	4.94**
No. of living children					
0 [R]		1.00	1.00	1.00	1.00
1-2		0.06***	0.12***	0.06***	0.11***
Highest education					
No education [R]		1.00	1.00	1.00	
Primary		1.48	0.93	2.00	
Secondary/Higher		0.67	0.48	1.28	
Occupation					
Not working [R]		1.00	1.00	1.00	
Professional/Sales		0.19	0.24	0.18	
Agriculture		2.14	1.87	3.24	
Manual		4.01	1.92	6.40	
Wealth					
Poor		1.00	1.00	1.00	
Middle		1.41	1.22	1.15	
Rich		3.16	3.93	6.25	
Residence					
Rural [R]	1.00	1.00		1.00	
Urban	1.07	0.86		0.63	
Region					
Luapula [R]	1.00	1.00		1.00	1.00
Central	0.20	0.11		0.10	0.12
Copperbelt	0.85	0.23		0.09	0.32

Eastern	0.96	0.39		0.20	0.67
Lusaka	1.77	0.56		0.40	1.12
Northern	0.19	0.04*		0.02*	0.08*
North western	1.19	0.69		0.39	0.94
Southern	0.79	0.38		0.35	0.47
Western	0.49	0.27		0.15	0.28
Exposure to family planning messages through media					
No [R]			1.00	1.00	
Yes			0.50	0.31	
Visited by family planning worker					
No [R]			1.00	1.00	
Yes			0.18	0.21	
Visited health facility					
No [R]			1.00	1.00	
Yes			0.55	0.37	
Fertility preference					
Want another[R]					
No more					
Constant	**7.20**	**27.26**	**13.78**	**52.57**	**28.08**
Log likelihood	**-62029584**	**-48076312**	**-52179354**	**-44918443**	**-55306291**
Wald chi^2	**10.78**	**39.93**	**33.47**	**39.42**	**28.08**
Prob > chi^2	**0.2909**	**0.0021**	**0.0008**	**0.0087**	**0.0018**
Pseudo R^2	**0.0976**	**0.2790**	**0.2175**	**0.3264**	**0.1954**

[R] = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001

6.3 CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG ADULT WOMEN IN ZAMBIA

Table 6.5 presents relative risk ratios from multinomial logistic regression showing factors associated with unmet need for spacing and limiting among adult women aged 20-49 in Zambia. In the first model which consisted of community factors only, adult women who resided in urban areas were 56% less likely to have unmet need for spacing than the rural dwellers. Likewise, adult women living in all the regions were significantly less likely to have unmet need for spacing compared to those residing in Luapula. The pattern showing the association between unmet need for limiting and community factors was the same as that for unmet need for spacing except that residing in the Central Region was not significantly related to unmet need for limiting.

The second model adjusted for individual factors. Results reveal that the association between community factors and unmet need for spacing was the same except that place of residence and residing in the Central Region lost the significance status. Among the added variables, being married put a woman at a higher risk (2.4 times) of having unmet need for spacing than the unmarried. Besides, number of living children was inversely associated with unmet need for spacing. Adult women with secondary/higher education were 37% less likely to have unmet need for spacing compared to their uneducated counterparts. Adult women in professional/clerical jobs had a lower risk of having unmet need for spacing compared to those who were not working. Furthermore, the risk of having unmet need for spacing was 0.4 times lower among adult women belonging to rich households than those from poor households.

With regard to unmet need for limiting, women residing in four out of the nine regions (Central, Copperbelt, Eastern, Northern and Southern) were significantly less likely to have unmet need for limiting than those from Luapula. Married women were 1.8 times more likely to have unmet need for limiting compared to their unmarried counterparts. Moreover, women with secondary/higher education had a lower risk of having unmet need for limiting than those who were not educated. Furthermore, adult women in professional/clerical and manual employment were less likely to have unmet need for limiting compared to their unemployed counterparts.

Table 6.5: Relative risk ratios from multinomial logistic regressions predicting unmet need for spacing and limiting among adult women aged 20-49, Zambia DHS 2007

Selected characteristics **Base Outcome**	Model 1 Met Need	Model 2	Model 3	Model 4	Model 5	Model 6
Unmet need for Spacing						
Selected characteristics	RRR	RRR	RRR	RRR	RRR	
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		2.36***	2.46 ***	2.45 ***	1.53*	1.70*
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.28*	0.27 *	0.28 **	0.64	0.76
3-4		0.12***	0.12***	0.12***	0.41	0.46
5 & above		0.05***	0.05***	0.05***	0.33*	0.37*
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.94	1.00	0.96	0.87	0.90
Secondary/Higher		0.63*	0.71	0.67	0.66	0.64*
Occupation						
Not working [R]		1.00	1.00	1.00	1.00	
Professional/clerical		0.21***	0.22***	0.22***	0.36*	
Sales/service		0.73	0.72	0.75	0.80	
Agriculture		1.08	0.87	1.10	1.13	
Manual		0.63	0.54*	0.64	0.62	
Ethnicity						
Bemba[R]		1.00	1.00	1.00	1.00	
Tonga		0.99	0.77*	0.96	1.28	
Lunda, Luvale and		1.00	0.83	0.99	1.16	

Kaonde						
Barotse		0.74	0.69	0.73	0.72	
Nyanja		0.70	0.43***	0.70	0.56	
Mambwe and Tumbuka		0.93	0.60*	0.93	0.73	
Other		1.38	1.09	1.26	0.85	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		0.79	0.89	0.80	0.81	0.82
Rich		0.38***	0.47***	0.40***	0.51*	0.49**
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.44***	0.97		0.97	1.30	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.45**	0.55		0.56	0.60	0.58
Copperbelt	0.27***	0.33***		0.35***	0.39**	0.38**
Eastern	0.13***	0.15***		0.15***	0.31**	0.19***
Lusaka	0.30***	0.38**		0.39 **	0.37**	0.31***
Northern	0.26 ***	0.20***		0.19***	0.15***	0.14***
North western	0.28***	0.24**		0.24**	0.18***	0.23***
Southern	0.19***	0.20***		0.20***	0.15***	0.19***
Western	0.32***	0.33*		0.31**	0.26 **	0.24***
Exposure to family planning messages through media						
No [R]			1.00	1.00	1.00	
Yes			0.75*	0.76*	0.93	
Visited by family planning worker						
No [R]			1.00	1.00	1.00	

Yes			0.83	0.84	0.71	
Visited health facility						
No ^{R}			1.00	1.00	1.00	1.00
Yes			0.90	0.85	0.77	0.74*
Fertility preference						
Want another^{R}				1.00	1.00	1.00
Undecided					2.61**	2.48**
No more					0.14***	0.14***
Unmet need for limiting						
Selected characteristics	Model 1 RRR	Model 2 RRR	Model 3 RRR	Model 4 RRR	Model 5 RRR	
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		1.85 *	1.99**	2.05**	2.15**	2.33**
No. of living children						
0 ^{R}		1.00	1.00	1.00	1.00	1.00
1-2		1.05	1.14	1.16	1.74	1.89
3-4		0.91	1.01	1.03	1.40	1.42
5 & above		1.64	1.85	1.83	2.26	2.32
Highest education						
No education ^{R}		1.00	1.00	1.00	1.00	1.00
Primary		0.90	0.91	0.89	0.81	0.84
Secondary/Higher		0.50**	0.53*	0.51**	0.48**	0.46**
Occupation						
Not working ^{R}		1.00	1.00	1.00	1.00	
Professional/clerical		0.41*	0.42*	0.42*	0.47	
Sales/service		0.73	0.77	0.77	0.76	
Agriculture		0.96	0.87	1.01	1.04	
Manual		0.55*	0.51*	0.54*	0.55*	

Ethnicity						
Bemba[R]		1.00	1.00	1.00	1.00	
Tonga		1.04	1.08	0.99	1.00	
Lunda, Luvale and Kaonde		0.86	0.99	0.91	0.83	
Barotse		0.63	0.92	0.58	0.57	
Nyanja		0.76	0.76	0.74	0.72	
Mambwe and Tumbuka		0.96	0.78	0.95	0.93	
Other		0.72	0.67	0.63	0.57	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		1.10	1.14	1.08	1.12	1.10
Rich		0.75	0.87	0.70	0.78	0.66*
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.62***	1.16		1.11	0.97	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.55	0.74*		0.72	0.50*	0.45*
Copperbelt	0.36***	0.48*		0.53*	0.46 **	0.42**
Eastern	0.33***	0.45*		0.44*	0.32	0.25***
Lusaka	0.37**	0.57		0.61	0.46*	0.38**
Northern	0.23 ***	0.25***		0.23***	0.19 ***	0.18***
North western	0.36**	0.43		0.39*	0.49	0.43*
Southern	0.34***	0.48*		0.45*	0.32**	0.31***
Western	0.51**	0.89		0.86	0.79	0.52
Exposure to family planning messages through media						
No [R]			1.00	1.00	1.00	

Yes			1.12	1.00	1.17	
Visited by family planning worker						
No ^{R}			1.00	1.00	1.00	
Yes			0.72	0.78	0.73	
Visited health facility						
No ^{R}			1.00	1.00	1.00	1.00
Yes			0.60***	0.55***	0.50***	0.50***
Fertility preference						
Want another^R					1.00	1.00
Undecided					4.71**	4.62**
No more					3.64***	3.67***
Constant	**4.32** ^{c1} **2.12** ^{c2}	**25.98** ^{c1} **1.03** ^{c2}	**9.78** ^{c1} **0.54** ^{c2}	**29.30** ^{c1} **1.17** ^{c2}	**27.69** ^{c1} **0.47** ^{c2}	**20.98** ^{c1} **0.39** ^{c2}
Log pseudolikelihood	**-2.243e^{+09}**	**-2.037e^{+09}**	**-2.053e^{+09}**	**-2.015e^{+09}**	**-1.701e^{+09}**	**-1.724e^{+09}**
Wald chi^2	**126.73**	**404.90**	**362.23**	**434.28**	**672.77**	**645.39**
Prob > chi^2	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^2	**0.0313**	**0.1177**	**0.1094**	**0.1261**	**0.2279**	**0.2196**

^{R} = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001, ^{c1}= unmet need for spacing, ^{c2}= unmet need for limiting

In the third model which consisted of individual and programme access factors, the pattern showing the relationship between individual factors and unmet need for spacing was somehow similar to that in the previous model. The exception is that women doing manual jobs were 0.5 times less likely to have unmet need for spacing than those who were not working. Similarly, women belonging to some ethnic groups (Tonga, Nyanja and Mambwe/Tumbuka) were significantly less likely to have unmet need for spacing than Bemba women. Only one of the added variables was significantly associated with unmet need for spacing (exposure to family planning messages in media was negatively related to unmet need for spacing). As for unmet need for limiting, the pattern of the association between individual factors and unmet need for limiting was the same as in Model 2. Among the added variables, visiting a health facility was negatively associated with unmet need for limiting (0.6 times).

The fourth model included individual, community and programme access factors. The pattern showing the association between unmet need for spacing and individual factors was the same as in the previous model except for the manual occupation category and ethnicity (Tonga, Nyanja and Mambwe/Tumbuka) which lost their significance. Women residing in all regions except for Central were significantly less likely to have unmet need for spacing than those living in Luapula. In addition, adult women who were exposed to family planning messages in media were 34% less likely to have unmet need for spacing than those who did not.

Similarly, the pattern showing the association between unmet need for limiting and individual and programme access was the same as that in the previous model. In the case of community factors, women who resided in Copperbelt, Eastern, Northern, North Western and Southern were significantly less likely to have unmet need for limiting than those who lived in Luapula.

The fifth model added an intermediate factor to the previous model. Results show that unmet need for spacing was 1.5 times higher among married adult women than among the unmarried ones. Having five and more children and being in a professional/clerical job were negatively associated with unmet need for spacing. In addition, adult women belonging to rich households were 60% less likely to have unmet need for spacing compared to their counterparts from poor ones. Residing in all the other regions except for Central significantly lowered the risk of an adult women having unmet need for spacing. Moreover, adult women who were not decided about whether they wanted another child or not were at a higher risk (2.6 times) of having unmet need for spacing whereas those who did not want any more children had a lower risk (0.1 times) of having unmet need for spacing.

Regarding unmet need for limiting, results indicate that married women were twice as likely to have unmet need for limiting compared to their unmarried counterparts. Results also show that women with secondary/higher education had a lower risk of having unmet need for limiting than the uneducated ones. Moreover, residing in all the other regions apart from Eastern, North Western and Western was significantly negatively associated with unmet need for limiting. Besides, visiting a health facility was negatively related to unmet need for limiting. Additionally, women who were not decided about whether they wanted another child or not and those who did not want any more children were at a higher risk (4.7 times and 3.6 times, respectively) of having unmet need for limiting than those who wanted another child.

The final model (Model 6) included only those variables which were significant in the forward stepwise regression. Results show that married adult women were 70% more likely to have unmet need for spacing than those who were not married. Moreover, adult women with five and more children had a lower likelihood of having unmet need for spacing compared to those who had no child at all. In addition, adult women belonging to rich households had a lower risk (0.5 times) of having unmet need for spacing. Results also show that residing in all the other regions apart from central was negatively associated with unmet need for spacing. Besides, adult women who visited a health facility were 0.7 times less likely to have unmet need for spacing than their counterparts who did not. Furthermore, women who were not decided about whether they wanted another child or not had a higher risk (2.5 times) of having unmet need for spacing than those who wanted another child whereas those who did not want any more children had a lower risk (0.1 times).

In the case of unmet need for limiting, results from Model 6 indicate that married adult women had a higher risk compared to their unmarried counterparts. Additionally, having secondary/higher education and belonging to a rich household were negatively associated with unmet need for limiting. Moreover, adult women living in all the other regions except for Western were less likely to have unmet need for limiting than those who resided in Luapula. Results also reveal that the risk of having unmet need for limiting was lower among adult women who visited a health facility compared to those who did not. Furthermore, women who were not decided about whether they wanted another child or not and those who did not want any more children had a lower risk (4.6 times and 3.7 times, respectively) of having unmet need for limiting compared to those who wanted another child.

All models were statistically significant as indicated by the p-value of 0.0000 for each of them. Moreover, the full model (Model 5) has the highest Wald chi square value (672.77) indicating an improvement over the preceding models. Furthermore, the full model has the highest pseudo R-square value meaning it has a better model fit than the rest.

The odds ratios from binary logistic regression showing factors associated with total unmet need among adult women aged 20-49 in Zambia are presented in Table 6.6. The first model contained community factors only. Results show that adult women living in urban areas were 49% less likely to have total unmet need than the rural dwellers. In addition, adult women from all the other regions had a lower risk of having total unmet need compared to their counterparts from Luapula.

In the second model which added individual factors, urban adult women were slightly more likely to have total unmet need though the relationship was not statistically significant. Among the individual factors, the odds of having total unmet need among married women were 2.2 times higher than among their unmarried counterparts. Results also revealed that number of living children was inversely associated with total unmet need. Moreover, adult women with secondary/higher education and those in professional/clerical and manual jobs had lower odds of having total unmet need. Furthermore, adult women belonging to rich households were less likely to have total unmet need.

The third model consisted of individual and programme access factors. Results indicate that a slight difference in the pattern showing the association between total unmet need and individual factors in that adult women from the Nyanja and Mambwe/Tumbuka ethnic groups were significantly less likely to have total unmet need. Among the programme access factors, visiting a health facility lowered the odds of having total unmet need.

The fourth model comprised individual, community and programme access factors. Results show that the relationship between ethnicity (Nyanja and Mambwe/Tumbuka) and total unmet need ceased being significant. The same applies to occupation (manual). The rest remained as they were in the previous model. Additionally, adult women living in all the other regions except for Central and Western were significantly less likely to have total unmet need compared to those residing in Luapula.

Table 6.6: Odds ratios from binary logistic regression predicting total unmet need among adult women aged 20-49, Zambia DHS 2007

Selected characteristics	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		2.15***	2.29***	2.33***	1.81**	1.86**
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.39	0.39	0.40	0.70	0.75
3-4		0.21**	0.22**	0.22**	0.48	0.50
5 & above		0.19**	0.20**	0.20**	0.61	0.62
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.92	0.94	0.92	0.84	0.88
Secondary/Higher		0.55**	0.60*	0.58*	0.57**	0.60*
Occupation						
Not working [R]		1.00	1.00	1.00	1.00	1.00
Professional/clerical		0.28***	0.29***	0.29***	0.41**	0.43**
Sales/service		0.73*	0.75*	0.76	0.78	0.77
Agriculture		1.03	0.87	1.06	1.07	1.10
Manual		0.59*	0.53*	0.60*	0.59*	0.63
Ethnicity						
Bemba [R]		1.00	1.00	1.00	1.00	
Tonga		1.02	0.91	1.00	1.11	
Lunda, Luvale and Kaonde		0.93	0.89	0.95	0.97	
Barotse		0.68	0.79	0.66	0.64	
Nyanja		0.74	0.57***	0.74	0.65	
Mambwe and Tumbuka		0.92	0.67*	0.92	0.82	

Other		1.06	0.92	0.97	0.73	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		0.92	0.99	0.92	0.95	0.98
Rich		0.54**	0.64**	0.54**	0.64*	0.67*
Residence						
Rural ^{R}	1.00	1.00		1.00	1.00	
Urban	0.51***	1.05		1.04	1.12	
Region						
Luapula ^{R}	1.00	1.00		1.00	1.00	1.00
Central	0.48**	0.63		0.62	0.55*	0.53*
Copperbelt	0.30***	0.39***		0.43**	0.43**	0.41 **
Eastern	0.20 **	0.26***		0.25***	0.32***	0.22***
Lusaka	0.32***	0.45**		0.47*	0.42**	0.37**
Northern	0.25***	0.23***		0.22***	0.18***	0.16***
North western	0.31***	0.32**		0.30**	0.30**	0.30***
Southern	0.24***	0.29***		0.29***	0.23***	0.24***
Western	0.38***	0.52		0.50	0.47*	0.35**
Exposure to family planning messages through media						
No ^{R}			1.00	1.00	1.00	
Yes			0.90	0.90	1.00	
Visited by family planning worker						
No ^{R}			1.00	1.00	1.00	
Yes			0.77	0.78	0.73	
Visited health facility						
No ^{R}			1.00	1.00	1.00	1.00
Yes			0.74**	0.69**	0.60***	0.60***

Fertility preference						
Want another[R]				1.00	1.00	1.00
Undecided					2.49**	2.32**
No more					0.43***	0.44***
Constant	**6.40**	**17.53**	**7.73**	**20.16**	**20.66**	**19.43**
Log pseudolikelihood	**-1.0383^{+09}**	**-1.306e^{+09}**	**-1.322e^{+09}**	**-1.294e^{+09}**	**-1.179e^{+09}**	**-1.184e^{+09}**
Wald chi^2	**100.13**	**196.22**	**146.85**	**205.78**	**232.04**	**220.79**
Prob > chi^2	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^2	**0.0382**	**0.0894**	**0.0766**	**0.0962**	**0.1151**	**0.1122**

[R] = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001

In Model 5 which included individual, community, programme access and intermediate factors, married women had higher odds (1.8) of having total unmet need than those who were unmarried. Moreover, adult women having secondary/higher education were 43% less likely to have total unmet need than their uneducated counterparts. Similarly, being engaged in professional/clerical and manual jobs lowered an adult woman's odds of having total unmet need. Results also show that adult women belonging to rich households were 36% less likely to have total unmet need than those from poor households. Moreover, residing in all the other regions was negatively associated with total unmet need. In addition, visiting a health facility lowered the odds of having total unmet need. Furthermore, adult women who were not decided about whether they wanted another child or not were at a higher risk (2.5 times) of having total unmet need whereas those who did not want any more children had a lower risk (0.4 times) of having total unmet need than those who wanted another child.

Results from the final model (Model 6) indicate that the odds of having total unmet need were higher among married adult women compared to their unmarried counterparts. Moreover, having secondary/higher education and being engaged in professional/clerical jobs were negatively associated with total unmet need. Results also reveal that belonging to a rich household was negatively associated with total unmet need. In addition, adult women who resided in all the other regions had lower odds of having total unmet need compared to those who resided in Luapula. The odds of having total unmet need were lower (0.6) among adult women who visited a health facility compared to those who did not. Furthermore, adult women who were not decided about whether they wanted another child or not had higher odds (2.3) of having total unmet need than those who wanted another child whereas those who did not want any more children had a lower odds (0.4).

According to the chi square statistics of the models, all of them were statistically significant at the 0.001 level. The full model (Model 5) has the highest Wald chi square and pseudo R–square. Therefore, it is an improvement over the preceding models and has a better model fit.

6.4 CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG WOMEN AGED 15-49 IN ZAMBIA

Table 6.7 presents the multinomial logistic regression estimates of relative risk ratios for selected characteristics on unmet need for spacing and limiting among all women. According to Model 1 which consists of community factors only, women residing in urban areas were 53% less likely to have unmet need for spacing than those living in rural areas. In addition, women from all the other regions had less likelihood of having unmet need for spacing compared to those residing in Luapula. In the case of unmet need for limiting, women residing in urban areas had lower odds (0.7) of having unmet need compared to the rural dwellers. Moreover, women from all the other regions except for Central, Lusaka, North western and Western were significantly less likely to have unmet need for limiting than their counterparts residing in Luapula.

After adjusting for individual factors in Model 2, urban women were 5% less likely to have unmet need for spacing than rural ones but the association was not statistically significant. Among the individual factors, being married put a woman at higher risk (2.4 times) of having unmet need for spacing compared to being unmarried. Moreover, the number of children a woman had was inversely related to unmet need for spacing. Women with secondary/higher education and employed in professional/clerical and sales/service jobs were significantly less likely to have unmet need for spacing.

Table 6.7: Relative risk ratios from multinomial logistic regression predicting unmet need for spacing and limiting among women aged 15-49, Zambia DHS 2007

Selected characteristics	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Base Outcome	Met Need					
Unmet need for Spacing						
Selected characteristics	RRR	RRR	RRR	RRR	RRR	RRR
Age						
15-19 [R]		1.00	1.00	1.00	1.00	1.00
20-59		0.86	0.90	0.87	1.08	1.10
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		2.38***	2.49***	2.52***	1.61*	1.64*
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.22***	0.22**	0.22**	0.40*	0.40*
3-4		0.09***	0.10***	0.10***	0.27**	0.27**
5 & above		0.04***	0.05***	0.04***	0.22**	0.21***
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.96	1.01	0.98	0.91	0.94
Secondary/Higher		0.64*	0.72	0.70	0.71	0.73
Occupation						
Not working [R]		1.00	1.00	1.00	1.00	1.00
Professional/clerical		0.19***	0.21***	0.20***	0.31**	0.32**
Sales/service		0.67*	0.66	0.69*	0.72	0.71
Agriculture		1.12	0.90	1.16	1.13	1.14
Manual		0.65	0.56*	0.66	0.64	0.67
Ethnicity						
Bemba [R]		1.00	1.00	1.00	1.00	

Tonga		1.09	0.85	1.04	1.31	
Lunda, Luvale and Kaonde		1.03	0.86	1.02	1.17	
Barotse		0.66	0.67	0.65	0.64	
Nyanja		0.72	0.48***	0.73	0.60	
Mambwe and Tumbuka		0.92	0.61**	0.92	0.73	
Other		1.25	1.00	1.14	0.81	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		0.79	0.88	0.80	0.82	0.85
Rich		0.43***	0.53***	0.44**	0.56*	0.61*
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.47***	0.95		0.95	1.22	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.43**	0.51*		0.51*	0.57	0.57
Copperbelt	0.27 ***	0.33***		0.35***	0.41**	0.40**
Eastern	0.15***	0.17***		0.17***	0.33**	0.21***
Lusaka	0.35***	0.40**		0.43**	0.43*	0.37**
Northern	0.26 ***	0.19***		0.18***	0.15***	0.13***
North western	0.33***	0.25**		0.24**	0.21***	0.25***
Southern	0.21***	0.20***		0.20***	0.17***	0.21***
Western	0.35***	0.37*		0.35*	0.33*	0.27***
Exposure to family planning messages through media						
No [R]			1.00	1.00	1.00	
Yes			0.75*	0.76*	0.95	
Visited by family						

planning worker						
No [R]			1.00	1.00	1.00	
Yes			0.80	0.81	0.68	
Visited health facility						
No [R]			1.00	1.00	1.00	1.00
Yes			0.86	0.80	0.74*	0.72*
Fertility preference						
Want another[R]					1.00	1.00
Undecided					2.49**	2.30*
No more					0.13***	0.14***
Unmet need for limiting						
Selected characteristics	Model 1 RRR	Model 2 RRR	Model 3 RRR	Model 4 RRR	Model 5 RRR	Model 6 RRR
Age						
15-19 [R]		1.00	1.00	1.00	1.00	1.00
20-59		0.44*	0.44*	0.44*	0.28**	0.29**
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		1.92**	2.03**	2.11**	2.28**	2.31**
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.44	0.49	049	0.69	0.69
3-4		0.41	0.46	0467	0.60	0.58
5 & above		0.73	0.84	0.81	0.96	0.93
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.88	0.89	0.88	0.81	0.84
Secondary/Higher		0.46**	0.50**	0.48**	0.45**	0.47**
Occupation						

Not working [R]		1.00	1.00	1.00	1.00	1.00
Professional/clerical		0.40*	0.41*	0.41*	0.47	0.48
Sales/service		0.71	0.75	0.75	0.74	0.74
Agriculture		0.94	0.85	0.99	1.03	1.06
Manual		0.57	0.52*	0.56*	0.58	0.60
Ethnicity						
Bemba[R]		1.00	1.00	1.00	1.00	
Tonga		1.18	1.15	1.14	1.16	
Lunda, Luvale and Kaonde		0.88	1.04	0.93	0.86	
Barotse		0.58	0.87	0.55	0.52	
Nyanja		0.80	0.77	0.79	0.74	
Mambwe and Tumbuka		0.95	0.76	0.95	0.92	
Other		0.65	0.60	0.58	0.50	
Wealth						
Poor		1.00	1.00	1.00	1.00	1.00
Middle		1.11	1.15	1.10	1.14	1.16
Rich		0.79	0.93	0.75	0.86	0.84
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.65**	1.18		1.19	1.01	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.67	0.48*		0.65	0.46*	0.45*
Copperbelt	0.47*	0.50*		0.52*	0.46*	0.43*
Eastern	0.42*	0.67		0.41*	0.32**	0.25***
Lusaka	0.52	0.49*		0.55	0.41*	0.36**
Northern	0.25***	0.29***		0.22***	0.19***	0.18***
North western	0.46	0.43*		0.40*	0.49	0.43*
Southern	0.42*	0.38**		0.40*	0.28**	0.29***

Western	0.89	0.64		0.84	0.78	0.48*
Exposure to family planning messages through media						
No ^{R}			1.00	1.00	1.00	
Yes			1.05	1.05	0.99	
Visited by family planning worker						
No ^{R}			1.00	1.00	1.00	
Yes			0.72	0.73	0.74	
Visited health facility						
No ^{R}			1.00	1.00	1.00	1.00
Yes			0.60***	0.56***	0.51***	0.50***
Fertility preference						
Want another^{R}					1.00	1.00
Undecided					5.92***	5.56***
No more					3.40***	3.45***
Constant	**4.31** ^{c1} **2.16** ^{c2}	**35.55** ^{c1} **5.37** ^{c2}	**11.94** ^{c1} **2.71** ^{c2}	**38.74** ^{c1} **6.14** ^{c2}	**34.88** ^{c1} **3.92** ^{c2}	**31.60** ^{c1} **3.55** ^{c2}
Log pseudolikelihood	**-2.406e**$^{+09}$	**- 2.170e**$^{+09}$	**- 2.186e**$^{+09}$	**- 2.148e**$^{+09}$	**- 1.822e**$^{+09}$	**-1.833e**$^{+09}$
Wald chi^{2}	**118.22**	**431.06**	**392.40**	**459.71**	**719.52**	**708.56**
Prob > chi^{2}	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^{2}	**0.0269**	**0.1194**	**0.1115**	**0.1271**	**0.2259**	**0.2216**

^{R} = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001, ^{c1}= unmet need for spacing, ^{c2}= unmet need for limiting

Furthermore, women belonging to rich households had a lower risk (0.4 times) of having unmet need for spacing than their counterparts from poor households.

The pattern showing the association between unmet need for limiting and community factors in Model 2 changed in that urban women were 18% more likely to have unmet need for limiting than their rural counterparts though the association was not statistically significant. Moreover, results also show that women from all regions except Eastern and Western were significantly less likely to have unmet need for limiting. Among the added variables, adult women were 54% less likely to have unmet need for limiting than adolescents. In addition, married women were 1.9 times more likely to have unmet need for limiting compared to unmarried ones. Furthermore, women with secondary/higher education and those engaged in professional/clerical occupations had a lower risk of having unmet need for limiting.

In Model 3 which comprised individual and programme access factors, the effect of individual factors on unmet need for spacing was almost similar to that in the previous model. The differences are that women belonging to some ethnic groups (Barotse, Nyanja and Mambwe/Tumbuka) were significantly less likely to have unmet need for spacing than Bemba women whereas the relationship between education (secondary and higher) with unmet need for limiting ceased being significant. Among the added variables, being exposed to family planning messages in media lowered the risk of having unmet need for spacing among the women.

Regarding unmet need for limiting, results indicate a slight difference in the pattern showing the effect of individual factors on unmet need in that being employed in an agriculture related job significantly lowered unmet need for limiting. Among the programme access factors, women who visited a health facility had a lower likelihood of having unmet need for limiting than those who did not.

Model 4 included individual, community and programme access factors. According to the results, marital status, number of living children, occupation (professional/clerical) and wealth (rich) were still significantly related to unmet need for spacing. Among community and programme access factors, the likelihood of having unmet need for spacing among women from all the other regions was lower compared to those from Luapula. Moreover, exposure to family planning messages in media lowered a woman’s chances of having unmet need for spacing.

In the case of unmet need for limiting, age, marital status, education (secondary/higher) and occupation (professional/clerical and manual) were still significantly related to unmet need for limiting. Additionally, women from all regions excluding Central, Lusaka and Western had a significant lower risk of having unmet need for limiting than those residing in Luapula. Similarly, women who visited a health facility were less likely to have unmet need for limiting compared to those who did not do so.

In Model 5 which comprised individual, community, programme access and intermediate factors, married women were 1.6 times more likely to have unmet need for spacing than their unmarried counterparts. Moreover, unmet need for spacing was inversely associated with the number of living children a woman had. Women engaged in professional/clerical jobs and those from rich households were 0.3 times and 0.6 times, respectively, less likely to have unmet need for spacing. Similarly, residing in all other regions except for Central lowered a woman's risk of having unmet need for spacing. In addition, visiting a health facility was negatively associated with unmet need for spacing. Furthermore, women who were not decided about having another child were 2.5 times more likely to have unmet need for spacing whereas those who did not want any more children were 0.1 times less likely to have unmet need for spacing.

Results still show that adult women were less likely to have unmet need for limiting compared to adolescents. Results also indicate that married women were 2.3 times more likely to have unmet need for limiting compared to the unmarried ones. Moreover, women with secondary education had a lower risk of having unmet need for limiting. Residing in all the other regions except for North Western and Western was significantly negatively associated with unmet need for limiting. In addition, visiting a health facility halved the risk of having unmet need for limiting among the women. Furthermore, the risk of having unmet need for limiting was 5.9 times and 3.4 times higher among women who were not decided about having another child and those who did not want any more children, respectively.

Results from the final model (Model 6) show that married women were 64% more likely to have unmet need for spacing than those who were not married. Moreover, number of living children was inversely associated with unmet need for spacing. Besides, women engaged in professional/clerical jobs were 0.3 times less likely to have unmet need for spacing than their employed counterparts. Findings also show that women from rich households had lower risks of having unmet need for spacing than those from poor households. Residing in all the other regions except for Central was negatively related to unmet need for spacing. In addition, women who visited a health facility had a lower risk of having unmet need for spacing compared to those who did not. Furthermore, women who were not decided about having another child were 2.3 times more likely to have unmet need for spacing than those who wanted another child whereas those who did not want any more children were 0.1 times less likely to.

Considering unmet need for limiting, adult women were 0.3 times less likely to have unmet need for limiting compared to adolescents whereas married women were 2.3 times more likely to have unmet need for limiting than the unmarried ones. Moreover, having secondary/higher education was negatively associated with unmet need for limiting. Besides, the risk of having unmet need for limiting was lower among women residing in all the other regions than among those from Luapula. Similarly, women who visited a health facility had a lower risk of having unmet need for limiting compared to those who did not. In addition, women who did not want any more children and those who were not decided about having another child were more likely to have unmet need for limiting compared to those who wanted another child.

Overall, all the models are statistically significant. The fact that the Wald chi square value of the full model (model 5) is higher than for each of the preceding models suggests that it is an improvement over the others. Besides, its pseudo R-square value is the highest (0.2259). Hence, this model has a better model fit compared to the rest.

Table 6.8 presents the binary logistic regression estimates of odds ratios for total unmet need among women in relation to selected characteristics. Results for Model 1 which included only community factors indicate that women residing in urban areas were 46% less likely to have total unmet need than the rural dwellers. Moreover, the risk of having total unmet need among women living in all the other regions was significantly lower than for those residing in Luapula.

When individual factors were added in Model 2, the risk of having total unmet need among women residing in urban areas became higher than for those living in rural areas though the association was not statistically significant. The pattern of the association between region of residence and total unmet need was still the same as in Model 1 except that the Western region lost its significance. Among the individual factors, adult women were 45% less likely to have total unmet need than adolescents.

Table 6.8: Odds ratios from binary logistic regression analyses showing the association between selected characteristics and total unmet need among currently women aged 15-49, Zambia DHS 2007

Selected characteristics	Model 1 OR	Model 2 OR	Model 3 OR	Model 4 OR	Model 5 OR	Model 6 OR
Age						
15-19 [R]		1.00	1.00	1.00	1.00	
20-59		0.70	0.72	0.71	0.76	
Marital Status						
Unmarried		1.00	1.00	1.00	1.00	1.00
Married		2.21***	2.32***	2.39***	1.86**	1.88**
No. of living children						
0 [R]		1.00	1.00	1.00	1.00	1.00
1-2		0.27**	0.29**	0.29**	0.43*	0.40**
3-4		0.15***	0.17***	0.16***	0.31**	0.28**
5 & above		0.14***	0.16***	0.15***	0.39*	0.35**
Highest education						
No education [R]		1.00	1.00	1.00	1.00	1.00
Primary		0.92	0.95	0.93	0.85	0.86
Secondary/Higher		0.54**	0.60**	0.58**	0.56**	0.53**
Occupation						
Not working [R]		1.00	1.00	1.00	1.00	1.00
Professional/clerical		0.27***	0.28***	0.28***	0.39**	0.37**
Sales/service		0.69*	0.71*	0.72*	0.73*	0.69*
Agriculture		1.04	0.88	1.07	1.08	1.15
Manual		0.61*	0.55**	0.62*	0.62	0.63
Ethnicity						
Bemba[R]		1.00	1.00	1.00	1.00	
Tonga		1.14	0.99	1.10	1.21	
Lunda, Luvale and		0.95	0.95	0.98	0.99	

Kaonde						
Barotse		0.62	0.75	0.61	0.58	
Nyanja		0.72	0.61**	0.77	0.68	
Mambwe and Tumbuka		0.92	0.67*	0.92	0.82	
Other		0.97	0.84	0.88	0.68	
Wealth						
Poor		1.00	1.00	1.00	1.00	
Middle		0.92	0.99	0.92	0.96	
Rich		0.58**	0.70*	0.58**	0.70	
Residence						
Rural [R]	1.00	1.00		1.00	1.00	
Urban	0.54***	1.05		1.04	1.12	
Region						
Luapula [R]	1.00	1.00		1.00	1.00	1.00
Central	0.46**	0.57*		0.57*	0.52*	0.49**
Copperbelt	0.30***	0.39***		0.42**	0.43**	0.34***
Eastern	0.21***	0.26***		0.25***	0.32***	0.23***
Lusaka	0.35***	0.45**		0.47**	0.42**	0.31***
Northern	0.25 ***	0.22***		0.21***	0.17***	0.15***
North western	0.35***	0.33**		0.31**	0.32**	0.31***
Southern	0.26***	0.28***		0.27***	0.23***	0.24***
Western	0.40***	0.55		0.52	0.51	0.36**
Exposure to family planning messages through media						
No [R]			1.00	1.00	1.00	
Yes			0.88	0.88	0.98	
Visited by family planning worker						
No [R]			1.00	1.00	1.00	

Yes			0.75	0.76	0.72	
Visited health facility						
No [R]			1.00	1.00	1.00	1.00
Yes			0.73**	0.67***	0.60***	0.59***
Fertility preference						
Want another[R]					1.00	1.00
Undecided					2.59**	2.39**
No more					0.42***	0.41***
Constant	**6.45**	**33.29**	**13.57**	**37.37**	**40.57**	**32.22**
Log pseudolikelihood	**1.468e^{+09}**	**-1.367e^{+09}**	**-1.383e^{+09}**	**-1.354e^{+09}**	**-1.233e^{+09}**	**-1.245e^{+09}**
Wald chi^2	**95.16**	**218.92**	**169.59**	**229.91**	**257.66**	**235.64**
Prob > chi^2	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
Pseudo R^2	**0.0340**	**0.0976**	**0.0855**	**0.1052**	**0.1252**	**0.1180**

[R] = Reference category, *= p<0.05, **=p<0.01, ***=p<0.001

In addition, married women were 2.2 times more likely to have total unmet need than their unmarried counterparts. Results also indicate that number of living children was inversely associated with total unmet need. Moreover, women with secondary/higher education had a lesser risk (0.5 times) of having total unmet need compared to their uneducated counterparts. Besides, women in employment, except for those engaged in agriculture related jobs, were significantly less likely to have total unmet need. Furthermore, women belonging to rich households had reduced odds of having total unmet need.

Results for Model 3 which consisted of individual and programme access factors show that the risk of having total unmet need among married women was 2.3 times higher than that for their unmarried counterparts. The pattern for the association between number of living children and total unmet need was the same as in the previous model. The same applies to the association between education and total unmet need. Results also still indicate that women in all occupation categories except agriculture were significantly less likely to have total unmet need than those who were not working. Moreover, women belonging to the Nyanja and Mambwe/Tumbuka ethnic groups were less likely to have total unmet need than the Bemba women. Additionally, visiting a health facility reduced a woman's risk of having total unmet need.

In Model 4 which included individual, community and programme access factors, the pattern of the association between individual factors and total unmet need was almost the same as that in Model 3. The difference is that the relationship between the Nyanja and Mambwe/Tumbuka ethnic groups and total unmet need ceased being significant.

Results from Model 5 which comprised individual, community, programme access and intermediate factors differed slightly from those in Model 4 in that the relationship between occupation (manual) and total unmet need ceased being significant. The same applies to that between wealth (rich) and total unmet need. Considering the added intermediate factor (fertility preference), the risk of having total unmet need among women who were not decided as to whether they wanted a another child or not was 2.6 times higher than those who wanted another child whereas those who did not want any more children had a lesser risk (0.4 times).

In the final model (Model 6), results show that married women were 1.9 times more likely to have total unmet need than those who were not married. Additionally, number of living children was negatively related to total unmet need. Moreover, women with secondary/higher education and those engaged in professional/clerical and sales/service jobs were less likely to have total unmet need. Similarly, women who resided in all the other regions had lower odds of having total unmet need than those who resided in Luapula. Results also reveal that visiting a health facility was negatively associated with total unmet need. Furthermore, the odds of having total unmet need were higher (2.4 times) among women who were undecided as to whether they wanted another child or not compared to those who wanted another child. On the contrary, women who did not want any more children had lower odds (0.4 times) of having total unmet need than those who wanted another child.

According to the chi square statistics of the models, all of them were statistically significant at the 0.001 level. The full model (Model 5) has the highest Wald chi square and pseudo R–square. This indicates that it is an improvement over the preceding models and has a better model fit.

Table 6.9: Major predictors of unmet need for spacing and limiting among adolescent, adult and all females in Zambia

	Spacing			Limiting		
Variable	**Adolescents**	**Adults**	**All**	**Adolescents**	**Adults**	**All**
Age						
Marital Status						
No. of living children						
Region						
Visited health facility						
Fertility preference						

Table 6.10: Major predictors of unmet need for spacing and limiting among women and men in Zambia

	Spacing		Limiting	
Variable	**Women**	**Men**	**Women**	**Men**
Age				
Marital Status				
No. of living children				
Highest education				
Wealth				
Region				
Exposure to family planning message in media				
Visited health facility				
Fertility preference				

6.5 SUMMARY

The chapter addresses factors underlying unmet need for contraception among men and women in Zambia. Using binary and multinomial logistic regression analysis, the chapter examines the effect of individual, community, programme access and intermediate factors on unmet need for contraception. The interpretation of findings was informed by fixed effects which measure associations (odds ratios or relative risk ratios and p-values).

The final model (Model 6) shows that marital status and number of living children were the most important determinants of all types of unmet need among adolescent females. On the other hand, marital status, visiting a health facility and fertility preference were the major determinants of unmet need for limiting and spacing among adult women whereas, in addition to these three, region of residence is included for total unmet need. When it comes to all women, age, marital status, number of living children, region of residence, visiting a health facility and fertility preference were the major predictors of unmet need for limiting and total unmet need. As for unmet need for spacing all of these five were major determinants except for age. With regard to men, the important predictors of unmet need for spacing were number of living children, educational attainment, region of residence and exposure to family planning messages in media. On the other hand, only region of residence was the main determinant of unmet need for limiting.

Considering total unmet need, number of living children, educational attainment, region of residence and exposure to family planning messages in media came out as the major predictors.
Therefore, results show some variations in the factors underlying unmet need among the adolescents and adult females. Marital status was the common major determinant of unmet need for spacing and limiting among adolescent and adult females (see Tables 6.9). According to Tables 6.10, number of living children was the common major predictor of unmet need for spacing among women and men in Zambia whereas region was the common major determinant of unmet need for limiting among women and men in Zambia.

Results also show that men belonging to the Mambwe/Tumbuka and women belonging to the Nyanja and Mambwe/Tumbuka ethnic groups had lower unmet need for contraception than those belonging to the Bemba ethnic group. Moreover, men residing in urban areas were less likely to have unmet need compared to their rural counterparts. Furthermore, unmet need was significantly lower among women who were engaged in professional/clerical jobs and sales/service compared to their unemployed counterparts.

CHAPTER SEVEN

MULTILEVEL MODELING OF CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG WOMEN IN ZAMBIA

7.0 INTRODUCTION

This chapter examines the extent to which the various factors contribute to the variation in unmet need for contraception among women in Zambia. Multilevel modeling was used to examine the distributions of individual, community, programme access and intermediate factors in order to find the extent to which each of the factors contributed to the variations in unmet need for contraception among women in Zambia. This helped in handling the first hypothesis which states that 'community factors account for the largest portion of unmet need for contraception in Zambia'. It was not possible to use multilevel modelling to examine the factors underlying unmet need for contraception among men in Zambia because convergence could not be achieved for most of the models.

The use of multilevel models enables one to consider variations in both individual and community levels simultaneously. Doing so is important in that individuals are nested in communities. Unlike the binary and multinomial logistic regressions which just give fixed effects, multilevel modelling provides both fixed and random effects. Random effects are measures of variation. These were used to model variances in unmet need for contraception across communities. These included intra-class correlation coefficient (ICC) or variance partition coefficient (VPC) and proportional change in variance (PCV) by the new model. The ICC measured the extent to which individuals in a given community are related to another in terms of the dependent variable which is unmet need for contraception in this case (Merlo 2003). The VPC was used to determine the community unmet need for contraception variance in the empty model which was attributed to factors in a given model (Merlo et al. 2005b). In addition, the standard error (SE) of the covariates, Akaike Information Criteria (AIC) and Bayesian Information Criteria were used. The SE of the independent variables was used as a random effects precision measure whereas the AIC and BIC latter were used as model selection criteria.

The AIC was developed by Hirotugu Akaike as a model selection approach in 1971 and proposed as measure of relative goodness of fit in 1974. Four years after the AIC was proposed as measure of relative goodness of fit, Gideon Schwarz introduced the BIC as a competitor to the AIC (Cavanaugh 2012). The aim of the AIC is to determine "the best approximating model to the unknown data generating process" whereas the BIC aims at "identifying the true model" (Acquah 2009:1). In both model selection criteria, the model with the minimum value is considered as the best (Kitagawa 2008; Boco 2010; Cavanaugh 2012).

Eleven models were fitted for all the three components of unmet need for contraception. Model 1 (empty or null model) did not include any explanatory variable as it is designed to partition the total variance into individual and community components. Additionally, running the empty model helped to determine if the clustering in unmet need for contraception within communities was so significant that it justified assessing random effects at that level (Adedini 2013; Babalola & Fatusi 2009). Models 2, 3 and 4 consisted of individual factors, individual and intermediate factors; and individual and programme access factors respectively. Moreover, Model 5 contained community variables whereas Model 6 comprised community and intermediate factors. Additionally, Model 7 consisted of community and individual factors. Besides, Model 8 comprised programme access factors whereas Model 9 contained programme access and intermediate factors. Furthermore, Model 10 consisted of programme access and community factors whereas Model 11 included all the factors: individual, community, programme access and intermediate.

The chapter has eleven sections. Sections 7.1 to 7.3 present findings on the effects of individual factors on unmet need for contraception (unmet need for spacing, limiting and total unmet need) among women in Zambia. This is followed by sections 7.4 to 7.6 which focus on the influence of community factors on unmet need for contraception. The next three sections (7.7 - 7.9) cover the effects of programme access factors on unmet need for contraception. Section 7.10 deals with the testing of hypotheses. To conclude, a summary of the chapter is provided.

7.1 INFLUENCE OF INDIVIDUAL FACTORS ON UNMET NEED FOR SPACING AMONG WOMEN IN ZAMBIA

Table 7.1 presents the multilevel logistic regression estimates of odds ratios showing the effect of individual factors on unmet need for spacing. Results for Model 1 (empty) show that the variation in the likelihood of having unmet need for spacing was significant ($\tau = 0.545$, $p = 0.000$). The across communities variance (expressed as VPC) in unmet need for spacing was 14.1%.

Model 2, which includes individual variables only, indicates that married women were 2.7 times more likely to have unmet need for spacing than their unmarried counterparts. Unmet need for spacing was inversely related to the number of living children a woman had. In other words, unmet need for spacing births declined with the increase in the number of living children. Additionally, the likelihood of having unmet need for spacing was significantly lower among women from Nyanja and Mambwe/Tumbuka ethnic groups compared to Bemba women. Women in professional/clerical and service/sales jobs were less likely to have unmet need for spacing than the unemployed women. Women belonging to rich households were 57% less likely to have unmet need for spacing than those from poor households. The variation in unmet need for spacing across communities was still significant ($\tau = 0.239$, $p = 0.027$). The VPC for Model 2 (6.8%) was lower than that of Model 1. The proportional change in variance (PCV) was 56.1%. In other words, individual factors explained 56.1% of the variance associated with unmet need for spacing across communities.

Results from Model 3 which added an intermediate factor (fertility preference) reveal that all the individual factors which had a significant association with unmet need for spacing ceased being significant. However, women who did not want any more children were 97% less likely to have unmet need for spacing than those who wanted another child. The variation in unmet need for spacing was still significant ($\tau = 0.758$, $p = 0.0085$) and the VPC (18.7%) was higher than that for the empty model. Moreover, findings indicate that individual and intermediate factors accounted for 39.1% of the variance associated with unmet need for spacing across communities.

Table 7.1: Odds ratios from multilevel logistic regressions predicting effects of individual factors on unmet need for spacing among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 2 Individual Variables Odds ratio (95% CI)	Model 3 Individual & Intermediate Variables Odds ratios (95% CI)	Model 4 Individual & Programme Access Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20		1.00	1.00	1.00
25-49		0.57 (0.31 - 1.01)	0.54 (0.18 - 1.62)	0.58 (0.32 - 1.05)
Marital status				
Unmarried		1.00	1.00	1.00
Married		2.74***(1.82 - 4.11)	1.73 (0.74 - 4.05)	2.88*** (1.90 - 4.35)
No. of living Children				
0		1.00	1.00	1.00
1-2		0.24***(0.13 - 0.45)	0.29 (0.07 - 1.26)	0.24*** (0.13 - 0.46
3-4		0.11***(0.06 - 0.22)	0.21 (0.04 - 1.17)	0.12*** (0.06 - 0.24)
5 & above		0.05***(0.02 - 0.09)	0.14 (0.02 - 1.06)	0.05*** (0.02 - 0.10)
Ethnicity				
Bemba		1.00	1.00	1.00

Tonga		0.75 (0.51 - 1.10)	0.81 (0.41 - 1.61)	0.72 (0.49 - 1.07)
Lunda, Luvale and Kaonde		0.87 (0.59 - 1.28)	0.68 (0.32 - 1.45)	0.84 (0.57 - 1.25)
Barotse		0.63 (0.38 - 1.02)	0.40 (0.13 - 1.28)	0.62 (0.38 - 1.02)
Nyanja		0.47*** (0.33 - 0.67)	0.36 (0.12 - 1.04)	0.48*** (0.33 - 0.69)
Mambwe/Tumbuka		0.50** (0.33 - 0.75)	0.31 (0.09 - 1.06)	0.50** (0.33 - 0.75)
Others		0.86 (0.42 - 1.76)	0.37 (0.09 - 1.59)	0.79 (0.39 - 1.61)
Education				
No education		1.00	1.00	1.00
Primary		0.99 (0.68 - 1.45)	0.83 (0.42 - 1.65)	1.03 (0.70 - 1.50)
Secondary/Higher		0.70 (0.45 - 1.09)	0.61 (0.25 - 1.48)	0.79 (0.50 - 1.24)
Occupation				
Not working		1.00	1.00	1.00
Professional/clerical		0.22*** 0.11 - 0.45)	0.15 (0.02 - 1.17)	0.23*** (0.11 - 0.47)
Sales/service		0.69* (0.50 - 0.94)	0.58 (0.28 - 1.19)	0.71* (0.51 - 0.97)
Agriculture		0 .95 (0.70 - 1.27)	0.72 (0.40 - 1.30)	0.95 (0.70 - 1.28)
Manual		0.59 (0.34 - 1.03)	0.40 (0.12 - 1.37)	0.60 (0.35 - 1.05)
Wealth index				
Poor		1.00	1.00	1.00
Middle		0.86 (0.62 - 1.18)	0.70 (0.38 - 1.30)	0.89 (0.64 - 1.22)
Rich		0.43*** (0.31 - 0.60)	0.53 (0.24 - 1.17)	0.48*** (0.34 - 0.68)
Programme Access Characteristics				

Exposure to family planning on media				
No				1.00
Yes				0.68** (0.53 - 0.87)
Visited by family planning worker				
No				1.00
Yes				0.66 (0.43 - 1.02)
Visited health facility				
No				1.00
Yes				0.83 (0.65 - 1.06)
Intermediate Characteristic				
Fertility preference				
Want another			1.00	
Undecided			3.52 (0.90 - 13.79)	
No more			0.03* (0.00 - 0.68)	
Random effects	Empty	Individual	Individual & Intermediate	Individual &Programme Access
Community level variance (SE)	0.545*** (0.137)	0.239* (0.110)	0.758*(726)	0.252*(0.114)
VPC (%)	14.1	6.8	18.7	7.1
PCV (%)	Reference	56.1	39.1	53.8

Log-likelihood	-1125.8	-964.0	-776.75	-953.68
Model fit statistics				
AIC	2255.6	1972.0	1601.50	1957.37
BIC	2266.4	2090.9	1729.75	2092.47

Model 4 consisted of individual and programme access factors. Results of the model show that married women were about three times more likely to have unmet need for spacing compared to their unmarried counterparts. Additionally, there was an inverse relationship between number of living children and unmet need for spacing. Moreover, women belonging to Nyanja and Mambwe/Tumbuka ethnic groups had lower odds of having unmet need for spacing than those belonging to the Bemba group. Besides, women in professional/clerical and sales/service jobs were less likely to have unmet need for spacing than their unemployed counterparts. In addition, the odds of women from rich households having unmet need for spacing were lower than those for women belonging to poor households.

Furthermore, being exposed to family planning messages in media was negatively associated with unmet need for spacing. As in the previous model, the variation in unmet need for spacing was significant ($\tau = 0.252$, p = 0. 0.0210). Individual and programme access factors explained 53.8% of the variance associated with unmet need for spacing across communities. Model 3 has the lowest AIC and BIC values indicating best model fit among all the four models.

7.2 INFLUENCE OF INDIVIDUAL FACTORS ON UNMET NEED FOR LIMITING AMONG WOMEN IN ZAMBIA

Multilevel logistic regression estimates of odds ratios for selected characteristics on unmet need for limiting are presented in Table 7.2. As shown in Model 1 (empty), there was a significant variation in unmet need for limiting across communities ($\tau = 0.318$, $p = 0.0005$). The between communities variance in unmet need for limiting was 8.9%.

Results of Model 2 which included individual variables only show women aged 25-49 were 0.4 times less likely to have unmet need for limiting than those aged 15-20. The likelihood of having unmet need for limiting was almost twice higher among married women compared to their unmarried counterparts. Moreover, the odds of having unmet need for limiting were 0.5 times lower among women with secondary/higher education relative to those with no education. Women from Nyanja and Mambwe/Tumbuka ethnic groups were less likely to have unmet need for limiting than Bemba women. Furthermore, women in professional/clerical jobs were 48% less likely to have unmet need for limiting than those who were not working.

Table 7.2: Odds ratios from multilevel logistic regressions predicting effects of individual factors on unmet need for limiting among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 2 Individual Variables Odds ratio (95% CI)	Model 3 Individual & Intermediate Variables Odds ratios (95% CI)	Model 4 Individual & Programme Access Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20		1.00	1.00	1.00
25-49		0.37** (0.20 - 0.71)	0.30*** (0.15 - 0.58)	0.34** 0.18 - 0 .66)
Marital status				
Unmarried		1.00	1.00	1.00
Married		1.79** 1.20 - 2.66)	2.16 *** (1.41 - 3.31)	1.95** (1.29 - 2.93)
No. of living Children				
0		1.00	1.00	1.00
1-2		0.69 (0.32 - 1.48)	0.66 (0.29 - 1.52)	0.80 (0.37 - 1.75)
3-4		0.62 (0.28 - 1.38)	0.52 (0.22 - 1.24)	0.75 (0.33 - 1.68)
5 & above		1.08 (0.49 - 2.36)	0.81 (0.34 - 1.94)	1.30 (0.58 - 2.89)
Ethnicity				

Bemba		1.00	1.00	1.00
Tonga		1.05 (0.73 - 1.50)	0.88 (0.60 - 1.28)	0.99 (0.68 - 1.44)
Lunda, Luvale and Kaonde		0.93 (0.63 - 1.36)	1.06 (0.71 - 1.58)	0.90 (0.61 - 1.34)
Barotse		0.82 (0.51 - 1.33)	0.72 (0.44 - 1.17)	0.77 (0.47 - 1.26)
Nyanja		0.71*(0.51 - 0 .99)	0.58** (0.41 - 0.82)	0.70* (0.50 - 0.98)
Mambwe/Tumbuka		0.63*(0.42 - 0.94)	0.56** (0.37 - 0.85)	0.62* (0.41 - 0.93)
Others		0.59 (0.26 - 1.33)	0.54 (0.24 - 1.25)	0.49 (0.21 - 1.12)
Education				
No education		1.00	1.00	1.00
Primary		0.90 (0.63 - 1.27)	0.88 (0.61 - 1.28)	0.92 (0.64 - 1.32)
Secondary/Higher		0.46** (0.30 - 0.71)	0.44*** (0.28 - 0.70)	0.50** (0.32 - 0.79)
Occupation				
Not working		1.00	1.00	1.00
Professional/clerical		0.52* (0.27 - 0.99)	0.54 (0.27 - 1.06)	0.54 (0.28 - 1.05)
Sales/service		0.76 (0.56 - 1.04)	0.76 (0.55 - 1.04)	0.78 (0.57 - 1.06)
Agriculture		0.86 (0.64 - 1.17)	0.96 (0.69 - 1.32)	0.87 (0.64 - 1.18)
Manual		0.59 (0.35 - 1.00)	0.59 (0.34 - 1.01)	0.57* (0.33 - 0.97)
Wealth index				
Poor		1.00	1.00	1.00
Middle		1.14 (0.83 - 1.58)	1.11 (0.79 - 1.56)	1.10 (0.79 - 1.54)
Rich		0.83 (0.61 - 1.13)	0.76 (0.55 - 1.05)	0.80 (0.58 - 1.11)
Programme Access				

Characteristics *Exposure to family planning on media*				
No				1.00
Yes				0.98 (0.76 - 1.26)
Visited by family planning worker				
No				1.00
Yes				0.71 (0.46 - 1.10)
Visited health facility				
No				1.00
Yes				0.56*** (0.44 - 0.72)
Intermediate Characteristic				
Fertility preference				
Want another			1.00	
Undecided			4.57*** (2.15 - 9.76)	
No more			3.35*** (2.29 - 4.91)	
Random effects	Empty	Individual	Individual & Intermediate	Individual &Programme Access
Community level variance (SE)	0.318** (0.128)	0.047 (0.092)	$4.48e^{-17}(3.68e^{-09})$	0.066(.098)
VPC (%)	8.9	14.3	$1.36e^{-15}$	2.0

PCV (%)	Reference	85.2	100	79.2
Log-likelihood	-954.0	-892.9	-814.80	-877.03
Model fit statistics				
AIC	1912.0	1829.9	1677.61	1804.05
BIC	1922.5	1945.5	1801.95	1935.41

Unlike in Model 1, the variation in unmet need for limiting across communities was not significant. The VPC (14.3%) was higher than that for Model 1 and individual factors explained 85.2% of the variance associated with unmet need for limiting across communities.

When the intermediate factor was added in Model 3, the pattern showing the association between individual factors and unmet need for limiting was similar to that in Model 2. The only difference is that the association between occupation (professional/clerical) and unmet need for limiting was no longer significant. The added variable (fertility preference) was significantly associated with unmet need for limiting. Women who were not decided about their fertility preference and those who did not want any more children were 4.6 and 3.4 times each more likely to have unmet need for limiting than women who wanted another child. The variation in unmet need for limiting across communities was not significant and the VPC was lower than in Model 1 and 2. The VPC was estimated at 100%.

Results in Model 4 which comprised individual and programme access factors reveal that the pattern showing the association between individual factors and unmet need for limiting was the same except that women who were engaged in manual jobs had lower odds (0.6) of having unmet need for limiting than those who were not working. Only one of the programme access factors was significantly related to unmet need for limiting. Women who visited a health facility were 44% less likely to have unmet need for limiting than those who did not. The variation in unmet need for limiting across communities was also not significant ($\tau = 0.066$, $p = 0.7685$). The estimated VPC figure of 79.2% suggests that 79.2% of the variance associated with unmet need for limiting across communities was explained by individual and programme access factors. The model fit statistics suggest that Model 3 has the best model fit among all the four models. This is because it has the lowest values of all the models.

7.3 INFLUENCE OF INDIVIDUAL FACTORS ON TOTAL UNMET NEED AMONG WOMEN IN ZAMBIA

Table 7.3 shows the multilevel logistic regression estimates of odds ratios for selected characteristics on total unmet need. Results for Model 1 (empty) indicate that the community level variance is significant and 12.7% of the total individual differences in total unmet need occurred at this level. Therefore, results obtained from this empty model as well as the empty models for unmet need for spacing and limiting justify the use of multilevel modelling.

As shown in Model 2 which included individual variables only, married women were 2.3 times more likely to have total unmet need than those who were unmarried. Number of living children was inversely associated with total unmet need. The odds of having total unmet need were significantly lower among women from Nyanja (OR = 0.58) and Mambwe/Tumbuka (OR = 0.62) ethnic groups compared to the Bemba one. The odds of having total unmet need were significantly lower among all occupations except the agriculture one. Women from rich households were 39% less likely to have total unmet need than those from poor households. Furthermore, the likelihood of having total unmet need was 0.6 times lower among women with secondary/higher education compared to their uneducated counterparts. The variation in unmet need for limiting was still significant ($\tau = 0.210$, $p = 0.007$). The VPC estimate indicated that 6.0% of the total variances in total unmet need were due to between community differences. The PCV was 56.2% meaning that 56.2% of the community total unmet need differences were attributable to individual factors.

Model 3 added an intermediate factor to individual factors. Findings indicate that all the individual factors which were significant in the previous model were no longer significant. This suggests that the intermediate factor had moderating effects on the individual factors. Findings also reveal that even the added variable (fertility preference) was not significantly associated with total unmet need. Contrary to Models 1 and 2, the variation in total unmet need between communities was not significant ($\tau = 0.324$, $p = 0.059$). The VPC as indicated by the estimated intercept component variance is 9%. Therefore, the variation in total unmet need across communities attributed to individual and intermediate factors was 9%.

In Model 4 which consisted of individual and programme factors, all the individual factors which were significant in Model 1 (individual factors only) regained their significance whereas the association between age and total unmet need became significant. Adult women had lower odds (0.5) of having total unmet need than adolescents. Moreover, married women were twice as likely to have total unmet need compared to their unmarried counterparts.

Table 7.3: Odds ratios from multilevel logistic regressions predicting effects of individual factors on total unmet need among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 2 Individual Variables Odds ratio (95% CI)	Model 3 Individual & Intermediate Variables Odds ratios (95% CI)	Model 4 Individual & Programme Access Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20		1.00	1.00	1.00
25-49		0. 51 (0.30 - 0.88)	0.53 (0.16 - 1.72)	0.52* (0.30 - 0.90)
Marital status				
Unmarried		1.00	1.00	1.00
Married		2.25***(1.61 - 3.13)	2.06 (0.68 - 6.20)	2.44*** (1.74 - 3.43)
No. of living Children				
0		1.00	1.00	1.00
1-2		0.33***(0.18 - 0.60)	0.36 (0.07 - 1.83)	0.35** (0.19 - 0.64)
3-4		0.19***(0.10 - 0.36)	0.24 (0.03 - 2.03)	0.21*** (0.11 - 0.39)
5 & above		0.17***(0.09 - 0.31)	0.31 (0.05 - 1.89)	0.18*** (0.09 - 0.34)
Ethnicity				

Bemba		1.00	1.00	1.00
Tonga		0. 91 (0.66 - 1.27)	0.91 (0.57 - 1.46)	0.89 (0.64 - 1.23)
Lunda, Luvale and Kaonde		0.92 (0.66 -1.28)	0.95 (0.58 - 1.54)	0.90 (0.64 - 1.27)
Barotse		0.73 (0.48 - 1.10)	0.59 (0.22 - 1.55)	0.70 (0.46 - 1.07)
Nyanja		0.58***(0.44 - 0.79)	0.52 (0.18 - 1.46)	0.59** (0.44 - 0.80)
Mambwe/Tumbuka		0.62**(0.44 - 0.88)	0.49 (0.16 - 1.52)	0.61** (0.43 - 0.87)
Others		0.77 (0.41 - 1.43)	0.51 (0.14 - 1.88)	0.68 (0.36 - 1.28)
Education				
No education		1.00	1.00	1.00
Primary		0.91 (0.67 - 1.25)	0.81 (0.47 - 1.40)	0.94 (0.69 - 1.30)
Secondary/Higher		0.54** (0.38 - 0.79)	0.44 (0.12 - 1.61)	0.61* (0.42 - 0.89)
Occupation				
Not working		1.00	1.00	1.00
Professional/clerical		0.31***(0.18 - 0.54)	0.29 (0.04 - 2.14)	0.33*** (0.19 - 0.57)
Sales/service		0.74* (0.57 - 0.96)	0.67 (0.33 - 1.35)	0.76* (0.59 - 0.99)
Agriculture		0.93 (0.72 - 1.22)	0.85 (0.17 - 1.65)	0.94 (0.72 - 1.23)
Manual		0.60* (0.39 - 0.94)	0.52 (0.17 - 1.65)	0.61* (0.39 - 0.95)
Wealth index				
Poor		1.00	1.00	1.00
Middle		0.99 (0.75 - 1.30)	1.00 (0.68 - 1.47)	0.99 (0.75 - 1.32)
Rich		0.61***(0.46 - 0.80)	0.70 (0.36 - 1.35)	0.64** (0.48 - 0.85)
Programme Access				

Characteristics *Exposure to family planning on media*				
No				1.00
Yes				0.78* (0.63 - 0.96)
Visited by family planning worker				
No				1.00
Yes				0.70 (0.49 - 1.01)
Visited health facility				
No				1.00
Yes				0.70*** (0.57 - 0.85)
Intermediate Characteristic				
Fertility preference				
Want another			1.00	
Undecided			2.84 (0.59 - 13.74)	
No more			0.28 (0.04 - 1.81)	
Random effects	Empty	Individual	Individual & Intermediate	Individual &Programme Access
Community level variance (SE)	0.480 *** (0.109)	0.210** (0.084)	0.324(0.520)	0.233** (0.088)
VPC (%)	12.7	6.0	9.0	6.6

PCV (%)	Reference	56.2	32.5	51.5
Log-likelihood	-1455.6	-1344.5	-1215.41	-1329.2
Model fit statistics AIC BIC	 2915.2 2926.6	 2733.0 2858.5	 2480.83 2622.24	 2708.4 2850.9

Besides, number of living children was inversely related to total unmet need. Women belonging to Nyanja and Mambwe/Tumbuka ethnic groups had lower odds of having total unmet need than Bemba women. Employed women except for those engaged in agriculture related jobs were less likely to have total unmet need than their unemployed counterparts. Additionally, the odds of women from rich households having total unmet need were lower than those belonging to poor households. Two out of the three programme access factors were significantly associated with total unmet need. Being exposed to a family planning message in media and visiting a health facility were negatively related to total unmet need.

Unlike in the previous model (Model 2), the variation in total unmet need across communities was significant ($\tau = 0.233$, $p = 0.0030$). The VPC was higher than in the previous model with 51.5% of the variance associated with total unmet need across communities being explained by individual and programme access factors. Model 3 had the lowest AIC and BIC values. Therefore, it had the best model fit among the four models.

7.4 INFLUENCE OF COMMUNITY FACTORS ON UNMET NEED FOR SPACING AMONG WOMEN IN ZAMBIA

Results for the multilevel logistic regression estimates of odds ratios showing the effect of community factors on unmet need for spacing are presented in Table 7.4. Model 5, which shows the independent effects of community factors on unmet need for spacing, indicates that none of the community variables were significantly associated with unmet need for spacing. The variation in unmet need for spacing was insignificant ($\tau = 0.193$, $p = 0.265$) and the VPC was 5.5%. The estimated PCV indicated that community factors explained 64.6% of the variance associated with unmet need for spacing across communities.

After adding an intermediate variable to the community variables in Model 6, women residing in Northern, North western and Southern regions were less likely to have unmet need for spacing compared to those residing in Luapula. Moreover, women who resided in communities with medium and high proportions of educated women were significantly less likely to have unmet need for spacing than those who lived in communities with a low proportion of educated women.

Table 7.4: Odds ratios from multilevel logistic regressions predicting effects of community factors on unmet need for spacing among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 5 Community Variables Odds ratio (95% CI)	Model 6 Community & Intermediate Variables Odds ratios (95% CI)	Model 7 Community & Individual Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20				1.00
25-49				0.59 (0.33 - 1.06)
Marital status				
Unmarried				1.00
Married				2.66*** (1.77 - 3.98)
No. of living Children				
0				1.00
1-2				0.23*** (0.13 - 0.44)
3-4				0.11*** (0.06 - 0.22)
5 & above				0.04*** (0.02 - 0.09)
Ethnicity				

Bemba				1.00
Tonga				1.16 (0.71 - 1.89)
Lunda, Luvale and Kaonde				1.10 (0.63 - 1.93)
Barotse				0.88 (0.46 - 1.67)
Nyanja				0.83 (0.53 - 1.30)
Mambwe/Tumbuka				0.88 (0.56 - 1.38)
Others				1.18 (0.57 - 2.46)
Education				
No education				1.00
Primary				0.95 (0.65 - 1.39)
Secondary/Higher				0.69 (0.43 - 1.08)
Occupation				
Not working				1.00
Professional/clerical				0.22*** (0.11 - 0.45)
Sales/service				0.72* (0.53 - 0.99)
Agriculture				1.10 (0.81 - 1.49)
Manual				0.69 (0.40 - 1.18)
Wealth index				
Poor				1.00
Middle				0.85 (0.61 - 1.17)
Rich				0.45** (0.29 - 0.70)

Community Characteristics *Residence*				
Rural		1.00	1.00	1.00
Urban		0.83 (0.49 - 1.42)	0.94 (0.66 - 1.36)	1.18 (0.78 - 1.78)
Region				
Luapula		1.00	1.00	1.00
Copperbelt		0.35 (0.08 - 1.56)	0.53 (0.26 - 1.06)	0.52* (0.28 - 0.95)
Eastern		0.20 (0.02 - 1.75)	0.60 (0.27 - 1.30)	0.31** (0.15 - 0.63)
Central		0.57 (0.20 - 1.59)	0.84 (0.41 - 1.72)	0.75 (0.40 - 1.41)
Lusaka		0.50 (0.16 - 1.60)	0.57 (0.27 - 1.20)	0.59 (0.30 - 1.14)
Northern		0.23 (0.03 - 1.63)	0.24*** (0.12 - 0.47)	0.24*** (0.14 - 0.44)
North Western		0.41 (0.11 - 1.56)	0.44* (0.22 - 0.92)	0.40* (0.18 - 0.87)
Southern		0.22 (0.03 - 1.65)	0.33** (0.16 - 0.68)	0.27*** (0.13 - 0.54)
Western		0.47 (0.13 - 1.68)	0.52 (0.24 - 1.15)	0.47 (0.21 - 1.05)
Community women's education				
Low		1.00	1.00	1.00
Medium		0.61 (0.27 - 1.39)	0.63* (0.40 - 0.99)	0.75 (0.50 - 1.12)
High		0.47 (0.14 - 1.59)	0.48* (0.24 - 0.93)	0.61 (0.33 - 1.11)
Community media saturation				
Low		1.00	1.00	1.00
Medium		0.61 (0.27 - 1.40)	0.77 (0.48 - 1.22)	0.70 (0.47 - 1.06)
High		0.66 (0.25 - 1.73)	1.24 (0.63 - 2.45)	0.69 (0.38 - 1.28)

Ethnic diversity				
Low		1.00	1.00	1.00
Medium		0.56 (0.23 - 1.34)	0.57* (0.37 - 0.90)	0.66* (0.44 - 0.99)
High		0.44 (0.13 - 1.44)	0.37*** (0.21 - 0.63)	0.53* (0.32 - 0.88)
Prevalence of large family norm				
Low		1.00	1.00	1.00
Medium		3.20 (0.69 - 14.80)	2.38*** (1.48 - 3.81)	2.48*** (1.63 - 3.76)
High		4.88 (0.61 - 39.03)	2.48** (1.35 - 4.56)	3.15*** (1.81 - 5.48)
Programme Access Characteristics *Exposure to family planning on media*				
No				
Yes				
Visited by family planning worker				
No				
Yes				
Visited health facility				
No				
Yes				
Intermediate Characteristic				
Fertility preference				

Want another			1.00	
Undecided			2.08* (1.16 - 3.74)	
No more			0.08*** (0.06 - 0.10)	
Random effects	Empty	Community	Community & Intermediate	Community & Individual
Community level variance (SE)	0.545*** (0.137)	0.193 (0.281)	0.094(0.109)	0.030(0.084)
VPC (%)	14.1	5.5	2.8	0.9
PCV (%)	Reference	64.6	82.8	94.5
Log-likelihood	-1125.8	-1062.6	-775.77	-927.59
Model fit statistics AIC BIC	 2255.6 2266.4	 2169.2 2288.2	 1595.55 1713.19	 1933.19 2144.00

Living in communities with medium and high ethnic diversity lowered the odds (0.6 and 0.4 times, respectively) of having unmet need for spacing. In addition, residing in communities with medium and high prevalence of a large family norm increased the odds of having unmet need for spacing. Therefore, the intermediate factor moderated the effect of community factors on unmet need for spacing. Furthermore, women who were undecided about their fertility preference were 108% more likely to have unmet need for spacing whereas those who did not want any more children were 92 % less likely to.

The variation in the odds of having unmet need for spacing between communities was not significant ($\tau = 0.094$, $p = 0.647$). The VPC (2.8%) was lower than that for Model 2. The PVC indicated that community and intermediate factors explain 82.8% of the variation in unmet need for spacing across communities.

In Model 7 which comprised community and individual factors, the odds of having unmet need for spacing among married women were about 3 times higher compared to their unmarried counterparts. Results also reveal that number of living children was inversely associated with unmet need for spacing. Besides, women in professional/clerical and sales/service jobs had reduced odds of having unmet need for spacing. In addition, women from rich households were 55% less likely to have unmet need for spacing. Moreover, women living in all regions except Central, Lusaka and Western had lower odds of having unmet need for spacing than those from Luapula. Women residing in communities with medium and high ethnic diversity were at a lower risk of having unmet need for spacing whereas those residing in communities with medium and high prevalence of a large family norm had a higher risk of having unmet need for spacing.

The variation in unmet need for spacing across communities was insignificant ($\tau = 0.030$, $p = 0.934$). The model had the lowest VPC (0.9%). The PVC estimate suggests that community and individual variables accounted for 94.5% of unmet need for spacing. Model 6 had the lowest AIC and BIC values. Hence, it is considered as having the best model fit among all the four models.

7.5 INFLUENCE OF COMMUNITY FACTORS ON UNMET NEED FOR LIMITING AMONG WOMEN IN ZAMBIA

Table 7.5 presents multilevel logistic regression estimates of odds ratios showing the influence of community factors on unmet need for limiting. Results of Model 5, which consists of community factors only, indicate that none of the community factors was significantly related to unmet need for limiting. Contrary to Model 1, the variation in unmet need for limiting was not significant. The VPC (2.9%) was lower than that for Model 1 and the PCV estimate indicated that 69.5% of the variance associated with unmet need for limiting was attributed to community factors.

Model 6 added an intermediate factor to the community factors. Findings show that all the community variables were still not significantly associated with unmet need for limiting. The intermediate factor was also not significantly related to unmet need for limiting. The VPC was lower than that for Model 5. The PCV estimate suggests that community and individual factors accounted for 100% of the variation in unmet need for limiting.

Model 7 contained community and individual factors. Results reveal that adults were 0.4 times less likely to have unmet need for limiting than adolescents. Additionally, the odds of having unmet need for limiting among married women were 1.7% higher than among the unmarried ones. Moreover, women with secondary/higher education were at lower risks (0.5 times) of having unmet need for limiting compared to those with no education. Results also indicate that residing in the Northern and Southern regions lowered the odds of having unmet need for limiting than residing in Luapula. Besides, women living in communities with high ethnic diversity had reduced the odds of having unmet need for limiting. Furthermore, women residing in communities with medium and high prevalence of large family norm were more likely to have unmet need for limiting.

Therefore, results suggest that individual variables have a moderating effect on some of the community variables. The VPC was estimated at $1.15805e^{-11}$ and it was smaller than that for Model 1. Overall, Model 6 had the best model fit suggested by its having the lowest AIC and BIC values.

Table 7.5: Odds ratios from multilevel logistic regressions predicting effects of community factors on unmet need for limiting among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 5 Community Variables Odds ratio (95% CI)	Model 6 Community & Intermediate Variables Odds ratios (95% CI)	Model 7 Community & Individual Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20				1.00
25-49				0.37** (0.19 - 0.70)
Marital status				
Unmarried				1.00
Married				1.75** (1.17 - 2.62)
No. of living Children				
0				1.00
1-2				0.71 (0.33 - 1.53)
3-4				0.65 (0. 9 - 1.44)
5 & above				1.04 (0.47 - 2.30)
Ethnicity				

Bemba				1.00
Tonga				1.43 (0.87 - 2.37)
Lunda, Luvale and Kaonde				1.04 (0.60 - 1.83)
Barotse				0.82 (0.42 - 1.62)
Nyanja				0.82 (0.52 - 1.30)
Mambwe/Tumbuka				0.97 (0.61- 1.55)
Others				0.77 (0.33 - 1.81)
Education				
No education				1.00
Primary				0.97 (0.67 - 1.40)
Secondary/Higher				0.50** (0.32 - 0.78)
Occupation				
Not working				1.00
Professional/clerical				0.52 (0.27 - 1.00)
Sales/service				0.80 (0.58 - 1.10)
Agriculture				0.97 (0.71 - 1.33)
Manual				0.62 (0.37 - 1.06)
Wealth index				
Poor				1.00
Middle				1.14 (0.81-1.61)
Rich				0.83 (0.53-1.29)
Community Characteristics				

Residence				
Rural		1.00	1.00	1.00
Urban		1.16 (0.67 - 2.01)	0.78 (0.43 - 1.41)	1.36 (0.91 - 2.05)
Region				
Luapula		1.00	1.00	1.00
Copperbelt		0.47 (0.11 - 2.09)	0.48 (0.11 - 2.16)	0.65 (0.35 - 1.21)
Eastern		0.62 (0.19 - 2.05)	0.54 (0.14 - 2.12)	0.87 (0.41 - 1.81)
Central		0.70 (0.26 - 1.92)	0.57 (0.16 - 2.00)	0.90 (0.47 - 1.71)
Lusaka		0.60 (0.18 - 2.00)	0.46 (0.90 - 2.35)	0.73 (0.36 - 1.48)
Northern		0.25 (0.02 - 2.86)	0.28 (0.03 - 3.15)	0.35** (0.18 - 0.66)
North Western		0.51 (0.13 - 2.05)	0.69 (0.24 - 1.98)	0.56 (0.25 - 1.26)
Southern		0.44 (0.09 - 2.14)	0.34 (0.04 - 2.77)	0.47* (0.22 - 0.98)
Western		0.63 (0.19 - 2.06)	0.60 (0.43 - 1.41)	0.94 (0.40 - 2.19)
Community women's education				
Low		1.00	1.00	1.00
Medium		0.73 (0.33 - 1.61)	0.59 (0.20 - 1.80)	0.77 (0.51 - 1.17)
High		0.56 (0.15 - 2.04)	0.39 (0.06 - 2.55)	0.63 (0.34 - 1.17)
Community media saturation				
Low		1.00	1.00	1.00
Medium		0.71 (0.32- 1.56)	0.56 (0.18 - 1.80)	0.70 (0.45 - 1.07)
High		0.80 (0.33 - 1.99)	0.55 (0.15 - 2.07)	0.74 (0.39 - 1.39)
Ethnic diversity				

Low		1.00	1.00	1.00
Medium		0.58 (0.21 - 1.64)	0.59 (0.20 - 1.76)	0.68 (0.45 - 1.02)
High		0.37 (0.06 - 2.20)	0.34 (0.04 - 2.71)	0.50** (0.30 - 0.84)
Prevalence of large family norm				
Low		1.00	1.00	1.00
Medium		3.18 (0.44 - 23.14)	2.92 (0.38 - 22.19)	1.98** (1.29 - 3.02)
High		6.26 (0.27 - 15.15)	5.99 (0.21 - 168.8)	2.85*** (1.64 - 4.96)
Programme Access Characteristics *Exposure to family planning on media*				
No				
Yes				
Visited by family planning worker				
No				
Yes				
Visited health facility				
No				
Yes				
Intermediate Characteristic				
Fertility preference				
Want another			1.00	

Undecided			7.27 (0.18 - 298.2)	
No more			3.71 (0.34 - 40.5)	
Random effects	Empty	Community	Community & Intermediate	Community & Individual
Community level variance (SE)	0.318** (0.128)	0.097 (0.215)	$4.41e^{-13}(6.13e^{-07})$	$3.81e^{-13}(2.82e^{-07})$
VPC (%)	8.9	2.9	$1.34043e^{-11}$	$1.15805e^{-11}$
PCV (%)	Reference	69.5	100	100
Log-likelihood	-954.0	-914.7	-837.66	-870.39
Model fit statistics AIC BIC	 1912.0 1922.5	 1873.4 1989.1	 1719.32 1833.36	 1818.78 2023.78

7.6 INFLUENCE OF COMMUNITY FACTORS ON TOTAL UNMET NEED AMONG WOMEN IN ZAMBIA

Results of multilevel logistic regression estimates of odds ratios showing the influence of community factors on total unmet need are shown in Table 7.6. Model 5 which contained community variables only shows that the odds of having total unmet need were lower among women living in Northern and Southern regions. Moreover, living in communities with a high prevalence of a large family norm was associated with higher odds of having total unmet need. The variation in total unmet need was significant ($\tau = 0.291$, $p = 0.019$). The VPC (8.1%) was lower than that of Model 1. The PCV value indicates that 39.4% of community total unmet need variance was due to community factors.

The adding of an intermediate factor to the community factors in Model 6 shows that the variables which were significant in Model 5 continued being so and some of the variables which were not significant became significant. Residing in the Northern and Southern regions reduced the odds of having total unmet need whereas living in communities with a high prevalence of a large family norm increased the odds of having total unmet need. In addition, women residing in communities with a high proportion of educated women were 69% less likely to have total unmet need compared to their counterparts in communities with a low proportion of educated women.

Moreover, the odds of having total unmet need were about three times lower among women living in communities with high ethnic diversity than those living in communities with low ethnic diversity. Compared to Model 5, the variation in the odds of having total unmet need was not significant. The VPC (4.7%) was lower than that in Model 5. The PCV estimate indicates that community and intermediate factors explain 66% of the variation in total unmet need across communities.

Model 7 consisted of community and individual factors. Findings show that all the community variables which were significant in the previous models became insignificant. Additionally, none of the individual factors were significantly associated with total unmet need. This suggests that the adding of individual factors has moderated the effect of community factors on total unmet need. The variation in total unmet need across communities was not significant.

Table 7.6: Odds ratios from multilevel logistic regressions predicting effects of community factors on total unmet need among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 2 Community Variables Odds ratio (95% CI)	Model 3 Community & Intermediate Variables Odds ratios (95% CI)	Model 4 Community & Individual Variables Odds ratios (95% CI)
Individual Characteristics *Age*				
15-20				1.00
25-49				0.43 (0.13 - 1.47)
Marital status				
Unmarried				1.00
Married				2.72 (0.79 - 9.33)
No. of living Children				
0				1.00
1-2				0.24 (0.05 - 1.30)
3-4				0.12 (0.01 - 1.35)
5 & above				0.09 (0.01 - 1.41)
Ethnicity				

Bemba				1.00
Tonga				1.49 (0.71 - 3.12)
Lunda, Luvale and Kaonde				1.21 (0.63 - 2.34)
Barotse				0.86 (0.40 - 1.83)
Nyanja				0.81 (0.46 - 1.43)
Mambwe/Tumbuka				0.96 (0.58 - 1.60)
Others				0.99 (0.42 - 2.32)
Education				
No education				1.00
Primary				0.92 (0.60 - 1.41)
Secondary/Higher				0.48 (0.18 - 1.27)
Occupation				
Not working				1.00
Professional/clerical				0.23 (0.03 - 1.52)
Sales/service				0.70 (0.40 - 1.23)
Agriculture				1.05 (0.73 - 1.49)
Manual				0.56 (0.22 - 1.39)
Wealth index				
Poor				1.00
Middle				0.98 (0.67 - 1.43)
Rich				0.57 (0.25 - 1.31)
Community Characteristics				

Residence				
Rural		1.00	1.00	1.00
Urban		0.95 (0.59 - 1.52)	0.89 (0.58 - 1.37)	1.28 (0.73 - 2.23)
Region				
Luapula		1.00	1.00	1.00
Copperbelt		0.38 (0.13 - 1.10)	0.39 (0.14 - 1.10)	0.48 (0.16 - 1.43)
Eastern		0.31 (0.09 - 1.11)	0.50 (0.18 - 1.38)	0.41 (0.11 - 1.54)
Central		0.62 (0.26 - 1.44)	0.59 (0.24 - 1.46)	0.76 (0.34 - 1.68)
Lusaka		0.53 (0.21 - 1.34)	0.42 (0.14 - 1.21)	0.56 (0.20 - 1.56)
Northern		0.22*(0.06 - 0.91)	0.15* (0.03 - 0.70)	0.22 (0.03 - 1.46)
North Western		0.43(0.16 - 0.18)	0.41 (0.14 - 1.18)	0.34 (0.07 - 1.60)
Southern		0.28*(0.08 - 0.98)	0.24* (0.07 - 0.87)	0.25 (0.04 - 1.52)
Western		0.52 (0.19 - 1.41)	0.49 (0.17 - 1.40)	0.56 (0.18 - 1.80)
Community women's education				
Low		1.00	1.00	1.00
Medium		0.63 (0.32 - 1.23)	0.54 (0.28 - 1.05)	0.69 (0.36 - 1.31)
High		0.45 (0.16 - 1.27)	0.31* (0.10 - 0.94)	0.50 (0.17 - 1.47)
Community media saturation				
Low		1.00	1.00	1.00
Medium		0.61 (0.31 - 1.20)	0.58 (0.30 - 1.13)	0.60 (0.27 - 1.31)
High		0.67 (0.29 - 1.57)	0.80 (0.35 - 1.80)	0.65 (0.27 - 1.58)
Ethnic diversity				

Low		1.00	1.00	1.00
Medium		0.54 (0.27 - 1.09)	0.53 (0.27 - 1.04)	0.58 (0.27 - 1.25)
High		0.37 (0.14 - 1.03)	0.28* (0.09 - 0.82)	0.40 (0.12 - 1.34)
Prevalence of large family norm				
Low		1.00	1.00	1.00
Medium		3.50* (1.13 - 10.87)	3.45* (1.26 - 9.42)	2.89 (0.75 - 11.20)
High		6.39* (1.24 - 33.01)	5.82* (1.45 - 23.34)	4.24 (0.68 - 26.63)
Programme Access Characteristics *Exposure to family planning on media*				
No				
Yes				
Visited by family planning worker				
No				
Yes				
Visited health facility				
No				
Yes				
Intermediate Characteristic				
Fertility preference				
Want another			1.00	

Undecided			3.17* (1.08 - 9.31)	
No more			0.19** (0.06 - 0.63)	
Random effects	Empty	Community	Community & Intermediate	Community & Individual
Community level variance (SE)	0.480 *** (0.109)	0.291* (0.277)	0.163 (0.189)	0.146(0.217)
VPC (%)	12.7	8.1	4.7	4.2
PCV (%)	Reference	39.4	66.0	69.6
Log-likelihood	-1455.6	-1395.0	-1230.12	-1309.87
Model fit statistics				
AIC	2915.2	2834.0	2504.24	2697.74
BIC	2926.6	2959.6	2628.76	2920.20

The estimated VPC (4.2%) was slightly lower than that of the previous Model 6. The PCV was 69.6%. Hence, community and individual factors explained 69.6% of the variance associated with total unmet need across communities. Among all four models, Model 6 (community and intermediate factors) was the best approximating model in that it has the lowest AIC and BIC values.

7.7 EFFECT OF PROGRAMME ACCESS FACTORS ON UNMET NEED FOR SPACING AMONG WOMEN IN ZAMBIA

Table 7.7 shows multilevel logistic regression estimates of odds ratios showing the influence of programme access factors on unmet need for spacing. Model 8 included programme access variables only. Though women with exposure to family planning in media were 0.4 times less likely to have unmet need for spacing than those who did not, the association was not significant. Similar to Model 1, the variation in unmet need for spacing was significant ($\tau = 0.695$, $p = 0.000$). The VPC of 17.5% was higher than that in Model 1. The PCV estimate (27.5%) indicates that 27.5% of the variation in unmet need for spacing was attributed to programme access variables.

An intermediate factor was added to the programme access factors in Model 9. This resulted in all the programme access factors being significantly associated with unmet need for spacing. Being exposed to a family planning message in media, being visited by a health worker and visiting a health facility were negatively associated with unmet need for spacing. In addition, women who were not decided about their fertility preferences were twice as likely to have unmet need for spacing whereas those who did not want any more children were 93% less likely to have unmet need for spacing. The variation in unmet need for spacing across communities was still significant ($\tau = 0.490$, $p = 0.0001$). The VPC (13%) was lower than that for both Model 1 and 8. Programme and intermediate factors explained 10.1% of the variance associated with unmet need for spacing across communities.

Table 7.7: Odds ratios from multilevel logistic regressions predicting effects of programme access factors on unmet need for spacing among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 8 Programme Variables Odds ratio (95% CI)	Model 9 Programme & Intermediate Variables Odds ratios (95% CI)	Model 10 Programme & Community Variables Odds ratios (95% CI)	Model 11 Programme, Individual, Intermediate & Community Variables Odds ratios (95%CI)
Individual Characteristics *Age*					
15-20					1.00
25-49					0.69 (0.37 - 1.30)
Marital status					
Unmarried					1.00
Married					1.48 (0.93 - 2.45)
No. of living Children					
0					1.00
1-2					0.49 * (0.24 - 0.98)
3-4					0.40* (0.19 - 0.84)

5 & above					0.28** (0.13 - 0.62)
Ethnicity					
Bemba					1.00
Tonga					1.24 (0.71 - 2.18)
Lunda, Luvale and Kaonde					1.18 (0.63 - 2.22)
Barotse					0.80 (0.37 - 1.61)
Nyanja					0.63 (0.37 - 1.05)
Mambwe/Tumbuka					0.69 (0.41 - 1.15)
Others					0.66 (0.29 - 1.49)
Education					
No education					1.00
Primary					0.84 (0.54 - 1.30)
Secondary/Higher					0.71 (0.42 - 1.21)
Occupation					
Not working					1.00
Professional/clerical					0.28** (0.13 - 0.63)
Sales/service					0.71 (0.50 - 1.03)
Agriculture					0.98 (0.69 - 1.40)
Manual					0.61 (0.32 - 1.14)
Wealth index					

Poor					1.00
Middle					0.79 (0.54 - 1.16)
Rich					0.61 (0.36 - 1.04)
Community Characteristics *Residence*					
Rural				1.00	1.00
Urban				0.70 (0.41 - 1.19)	1.40 (0.88 - 2.22)
Region					
Luapula				1.00	1.00
Copperbelt				0.42 (0.14 - 1.24)	0.64 (0.31 - 1.29)
Eastern				0.22 (0.05 - 1.04)	0.62 (0.27 - 1.41)
Central				0.63 (0.25 - 1.56)	0.84 (0.41 - 1.73)
Lusaka				0.54 (0.20 - 1.47)	0.65 (0.30 – 1.40)
Northern				0.22* (0.05 - 0.98)	0.20*** (0.10 – 0.40)
North Western				0.34 (0.10 - 1.16)	0.32* (0.13 – 0.79)
Southern				0.23 (0.05 - 0.99)	0.26 ** (0.11 – 0.59)
Western				0.46 (0.15 - 1.42)	0.43 (0.17 – 1.09)
Community women's education					
Low				1.00	1.00
Medium				0.62 (0.32 - 1.21)	0.63* (0.40 - 1.00)

High				0.34 (0.10 - 1.13)	0.55 (0.28 – 1.08)
Community media saturation					
Low				1.00	1.00
Medium				0.62 (0.31 - 1.24)	0.78 (0.49 - 1.25)
High				0.74 (0.31 - 1.75)	1.31 (0.65 - 2.64)
Ethnic diversity					
Low				1.00	1.00
Medium				0.49 (0.22 - 1.09)	0.63* (0.40 – 0.99)
High				0.34 (0.11 - 1.03)	0.44** (0.25 – 0.78)
Prevalence of large family norm					
Low				1.00	1.00
Medium				3.23* (1.05 - 9.96)	2.31*** (1.43 – 3.74)
High				4.61* (1.06 - 20.02)	2.08* (1.10 - 3.92)
Programme Access Characteristics *Exposure to family planning on media*					
No		1.00	1.00	1.00	1.00
Yes		0.36 (0.07 - 1.80)	0.70* (0.54 - 0.92)	0.41* (0.18 - 0.92)	0.80 (0.60 - 1.07)

Visited by family planning worker					
No		1.00	1.00	1.00	1.00
Yes		0.58 (0.22 - 1.56)	0.60* (0.36 - 0.99)	0.53 (0.25 - 1.16)	0.55* (0.34 - 0.91)
Visited health facility					
No		1.00	1.00	1.00	1.00
Yes		0.71 (0.39 - 1.30)	0.72* (0.55 - 0.94)	0.71 (0.47 - 1.09)	0.74* (0.56 - 0.97)
Intermediate Characteristic					
Fertility preference					
Want another			1.00		1.00
Undecided			2.10* (1.14 - 3.85)		2.52** (1.36 - 4.67)
No more			0.07*** (0.05 - 0.10)		0.11*** (0.08 - 0.15)
Random effects	Empty	Programme	Programme & Intermediate	Programme & Community	Programme, Individual, Intermediate & Community
Community level variance (SE)	0.545*** (0.137)	0.695*** (1.123)	0.490**(0.158)	0.211(0.241)	0.003 (0.104)
VPC (%)	14.1	17.5	13.0	6.0	1.2
PCV (%)	Reference	27.5	10.1	61.3	99.4
Log-likelihood	-1125.8	-1093.4	-801.04	-1042.43	-734.26
Model fit statistics					

AIC	2255.6	2198.7	1618.08	2130.87	1556.52
BIC	2266.4	2231.2	1660.85	2255.26	1791.58

Model 10 consisted of programme and community factors. Findings show that only exposure to a family planning message in media maintained its significance. Among the added variables, residing in the Northern region lowered a woman's odds of having unmet need for spacing. Moreover, women living in communities with medium and high prevalence of a large family norm were more likely to have unmet need for spacing. The variation in unmet need for spacing across communities ceased being significant in this model ($\tau = 0.211$, $p = 0.261$). The VPC was lower than that for the previous model. The estimated PCV suggests that programme access and community factors accounted for 61.3% of the variation in unmet need for spacing across communities.

Model 11 (full model) included all the variables (individual, community, programme access and intermediate). Results show that unmet need for spacing declined with an increase in the number of living children. Women in professional/clerical jobs were almost 0.3 times less likely to have unmet need for spacing than the unemployed women. Unmet need for spacing was significantly lower among women who lived in Northern, North Western and Southern regions than among their counterparts in Luapula region. In addition, unmet need for spacing decreased with an increase in ethnic diversity. Moreover, women who lived in communities with medium and high prevalence of a large family norm were twice each more likely to have unmet need for spacing than those who lived in communities with a low prevalence. The likelihood of having unmet need for spacing was significantly lower among women who were visited by a family planning worker (OR = 0.55) and those who visited a health facility (OR = 0.74) compared to those who did not. Furthermore, the odds of having unmet need for spacing among women who were not decided about their fertility preference were 2.5 times higher than for those who wanted another child whereas they were 0.1 times lower for those who did not want any more children.

Similar to the previous model, the variation in unmet need across communities was not significant ($\tau = 0.003$, $p = 0.999$). The estimated PCV suggests that 99.4% of the variance associated with unmet need for spacing across communities could be attributed to individual, community, programme access and intermediate factors. Model 11 (full model) had the minimum AIC value among the five models in Table 7.7. Moreover, it had the lowest AIC value among all the 11 models on the association between the selected factors and unmet need for spacing. Therefore, based on the AIC model selection approach, it was the best approximating model. Conversely, Model 9 (programme and intermediate factors) had the lowest BIC among the models presented in Table 7.7. Hence, it seems to be the true model according to the BIC model selection approach.

7.8 EFFECT OF PROGRAMME ACCESS FACTORS ON UNMET NEED FOR LIMITING AMONG WOMEN IN ZAMBIA

Findings of multilevel logistic regression estimates of odds ratios showing the effect of programme factors on unmet need for limiting are presented in Table 7.8. Model 8 included programme access variables only in order to show the independent effect of programme factors on unmet need for limiting. Findings indicate that the likelihood of having unmet need for limiting was 0.7 times lower among women with exposure to family planning in media than those who did not have this exposure. In addition, women who visited a health facility were 44% less likely to have unmet need for limiting compared to those who did not. The variation in unmet need for limiting was significant ($\tau = 0.310$, $p = 0.006$). The VPC (8.6%) was slightly lower than that for Model 1 and the PCV estimate indicated that programme access factors explained 2.5% of the variance associated with unmet need for limiting across communities.

In Model 9 which added an intermediate factor to the programme access factors, both the programme access factors that were significant in Model 8 ceased being so. In addition, the added factor (fertility preference) was not significantly associated with unmet need for limiting. Unlike in Model 8, the variation in unmet need for limiting across communities was not significant. The VPC was higher than that for Model 1 and 8. The estimated PCV indicates that programme and intermediate factors explained 25.2 % of the variation in unmet need for limiting across communities.

Model 10 contained programme and community variables. As in Model 9, none of the programme access factors was significantly related to unmet need for limiting. Similarly, none of the community factors were significant. As in Model 9, the variation in the odds of having unmet need for limiting between communities was insignificant. The VPC (4%) was lower than that for Model 9. The PCV was 57.2% meaning that the variation in unmet need for limiting across communities was attributed to programme and community access factors.

Table 7.8: Odds ratios from multilevel logistic regressions predicting effects of programme access factors on unmet need for limiting among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 8 Programme Variables Odds ratio	Model 9 Programme & Intermediate Variables Odds ratios (95% CI)	Model 10 Programme & Community Variables Odds ratios (95% CI)	Model 11 Programme, Individual, Intermediate & Community Variables Odds ratios (95%CI)
Individual Characteristics *Age*					
15-20					1.00
25-49					0.28*** (0.14 - 0.56)
Marital status					
Unmarried					1.00
Married					2.23*** (1.43 - 3.49)
No. of living Children					
0					1.00

1-2					0.84 (0.35 - 2.01)
3-4					0.70 (0.28 - 1.75)
5 & above					1.05 (0.42 - 2.63)
Ethnicity					
Bemba					1.00
Tonga					1.31 (0.76 - 2.26)
Lunda, Luvale and Kaonde					1.02 (0.56 - 1.86)
Barotse					0.71 (0.35 – 1.46)
Nyanja					0.77 (0.48 - 1.24
Mambwe/Tumbuka					0.91 (0.55 – 1.49)
Others					0.57 (0.23 - 1.41)
Education					
No education					1.00
Primary					0.97 (0.65 – 1.46)
Secondary/Higher					0.54* (0.33 - 0.89)
Occupation					
Not working					1.00
Professional/clerical					0.58 (0.28 - 1.17)
Sales/service					0.82 (0.59 - 1.15)
Agriculture					1.03 (0.73 - 1.46)
Manual					0.60 (0.34 - 1.06)
Wealth index					

Poor					1.00
Middle					1.06 (0.73 - 1.53)
Rich					0.81 (0.50 - 1.31)
Community Characteristics *Residence*					
Rural				1.00	1.00
Urban				0.90 (0.56 - 1.44)	1.15 (0.75 - 1.77)
Region					
Luapula				1.00	1.00
Copperbelt				0.57 (0.12 - 2.66)	0.64 (0.32 - 1.27)
Eastern				0.63 (0.15 - 2.62)	0.54 (0.24 – 1.22)
Central				0.70 (0.22 - 2.26)	0.65 (0.32 – 1.30)
Lusaka				0.57 (0.12 - 2.80)	0.59 (0.28 - 1.28)
Northern				0.23 (0.01 - 7.89)	0.29** (0.14 - 0.59)
North Western				0.44 (0.05 - 3.63)	0.59 (0.25 – 1.44)
Southern				0.42 (0.05-3.73)	0.34* (0.15 - .77)
Western				0.60 (0.13 - 2.77)	0.73 (0.29 - 1.82)
Community women's education					
Low				1.00	1.00
Medium				0.61 (0.17 - 2.22)	0.71 (0.46 - 1.11)
High				0.35 (0.03 - 4.82)	0.53 (0.27 - 1.02)

Community media saturation					
Low				1.00	1.00
Medium				0.67 (0.24 - 1.92)	0.70 (0.44 - 1.10)
High				0.76 (0.28 - 2.08)	0.78 (0.39 – 1.54)
Ethnic diversity					
Low				1.00	1.00
Medium				0.57 (0.14 - 2.29)	0.74 (0.47 - 1.16)
High				0.37 (0.03 - 4.16)	0.58 (0.33 – 1.01)
Prevalence of large family norm					
Low				1.00	1.00
Medium				2.88 (0.23 - 36.77)	1.79* (1.14 – 2.82)
High				5.06 (0.10 - 249.75)	2.51** (1.38 - 4.56)
Programme Access Characteristics *Exposure to family planning on media*					
No		1.00	1.00	1.00	1.00
Yes		0.72** (0.57 - 0.91)	0.61 (0.29 - 1.28)	0.80 (0.45 - 1.42)	0.98 (0.75 - 1.29)
Visited by family planning worker					
No		1.00	1.00	1.00	1.00
Yes		0.76 (0.49 - 1.17)	0.71 (0.33 - 1.52)	0.72 (0.28 - 1.82)	0.78 (0.49 - 1.25)

Visited health facility					
No		1.00	1.00	1.00	1.00
Yes		0.56***(0.44 - 0.71)	0.43 (0.13 - 1.44)	0.47 (0.08 - 2.85)	0.49*** (0.38 - 0.63)
Intermediate Characteristic					
Fertility preference					
Want another			1.00		1.00
Undecided			6.33 (0.42 - 96.30)		4.50*** (2.03 - 9.99)
No more			3.37 (0.61 - 18.80)		3.11*** (2.07 - 4.67)
Random effects	Empty	Programme	Programme & Intermediate	Programme & Community	Programme, Individual, Intermediate & Community
Community level variance (SE)	0.318** (0.128)	0.310* (0.128)	0 .398(0.602)	0.136(0.352)	$1.53e^{-17}$ ($1.39e^{-09}$)
VPC (%)	8.9	8.6	10.8	4.0	$4.65046e^{-16}$
PCV (%)	Reference	2.5	25.2	57.2	100.0
Log-likelihood	-954.0	-933.7	-859.27	-898.04	-776.78
Model fit statistics AIC BIC	 1912.0 1922.5	 1879.5 1911.0	 1734.53 1775.98	 1842.07 1963.00	 1641.57 1869.43

Results from model 11 (full model) which contained all the variables show that the odds of having unmet need for limiting were lower among adults compared to adolescents. Moreover, married women were twice as likely to have unmet need for limiting than those who were unmarried. The likelihood of having unmet need for limiting was 46% lower among women with secondary/higher education compared to their uneducated counterparts. The odds of having unmet need for limiting were lower for women living in Northern and Southern regions. Residing in communities with a high prevalence of a large family norm was significantly associated with a higher likelihood of having unmet need for limiting. Besides, women who visited a health facility were about half as likely to have unmet need for limiting than those who did not. The odds of having unmet need for limiting were higher for women with undecided fertility preference and those who did not want any more children compared to those who wanted another child. As in Model 10, the variation in unmet need for limiting across communities was not significant. The VPC ($4.65046e^{-16}$) was lower than in the previous model. The PCV estimate indicated that 100% of the variance associated with unmet need for limiting across communities was explained by individual, community, programme access and intermediate factors.

7.9 EFFECT OF PROGRAMME ACCESS FACTORS ON TOTAL UNMET NEED AMONG WOMEN IN ZAMBIA

Table 7.9 shows multilevel logistic regression estimates of odds ratios showing the effect of programme access factors on total unmet need, as shown in Model 8 which included programme access variables only. Results indicate that women who had exposure to family planning in media were 0.5 times less likely to have total unmet need. Compared to Model 1, the variation in the likelihood of having total unmet need was still significant ($\tau^2 = 0.774$, $p = 0.0000$). The VPC (19.0%) was twice higher than that for Model 1. Programme access factors accounted for 61.3% of the across communities variations in total unmet need.

When an intermediate factor was added to the programme access factors in Model 9, the odds of women with exposure having total unmet need became 0.6 times lower than for those who had no exposure. Moreover, women who visited a health facility had a reduced risk of having total unmet need. Furthermore, women who were undecided about their fertility preference were three times more likely to have total unmet need whereas those who did not want any more children were 83% less likely to have total unmet need. As in Model 8, the variation in the odds of having total unmet need across communities was significant. The VPC (19.6%) was higher than that for the previous model as well as Model 1. Programme and intermediate factors explained 66.9% of the variance related to total unmet need.

Model 10 contained programme and community factors. Results show that exposure to family messages in media and visiting a health facility were still negatively associated with total unmet need. Among the community factors, residing in Northern and Southern region reduced the odds of having total unmet need. In addition, living in communities with a high proportion of educated women and high ethnic diversity lowered the risk of having total unmet need.

Moreover, women living in communities with a medium and high prevalence of a large family norm were more likely to have total unmet need. The variation in total unmet need across communities was still significant ($\tau^2 = 0.335$, $p = 0.009$). The VPC (9.2%) was lower than for the previous model (Model 9).

Model 11 (full model) comprised all the variables. Results show that all the variables that were significant in the previous models ceased being significant. The variation in unmet need for limiting across communities was also not significant. The VPC decreased to 1.9%. In other words, there was 1.9% variation in total unmet need across communities. The PCV estimate indicated that individual, community, programme access and intermediate factors explained 86.9% of the community total unmet need variance.

Of all the models in Table 7.9, Model 11 which contained the individual, community, programme access and intermediate factors had the lowest AIC value indicating an improvement over all the preceding models. On the other hand, Model 9 had the lowest BIC value. This is also the case when all the models showing the relationship between the various factors and total unmet need are considered. Therefore, based on the AIC model selection approach, Model 11 was the best approximating model. Conversely, Model 9 appears to be the true model according to the BIC model selection approach.

Table 7.9: Odds ratios from multilevel logistic regressions predicting effects of programme access factors on total unmet need among women aged 15–49, Zambia DHS 2007

Selected characteristics	Mode 1 (Empty)	Model 8 Programme Variables Odds ratio (95% CI)	Model 9 Programme & Intermediate Variables Odds ratios (95% CI)	Model 10 Programme & Community Variables Odds ratios (95% CI)	Model 11 Programme, Individual, Intermediate & Community Variables Odds ratios (95%CI)
Individual Characteristics *Age*					
15-20					1.00
25-49					0.50 (0.16 - 1.57)
Marital status					
Unmarried					1.00
Married					2.20 (0.82 - 5.92)
No. of living Children					
0					1.00
1-2					0.40 (0.12 - 1.38)
3-4					0.28 (0.06 - 1.32)

5 & above					0.35 (0.09 - 1.38)
Ethnicity					
Bemba					1.00
Tonga					1.52 (0.68 - 3.36)
Lunda, Luvale and Kaonde					1.28 (0.61 - 2.69)
Barotse					0.72 (0.30 - 1.74)
Nyanja					0.68 (0.34 - 1.38)
Mambwe/Tumbuka					0.86 (0.48 - 1.54)
Others					0.61 (0.21 - 1.79)
Education					
No education					1.00
Primary					0.81 (0.47 - 1.38)
Secondary/Higher					0.47 (0.17 - 1.29)
Occupation					
Not working					1.00
Professional/clerical					0.31 (0.07 - 1.48)
Sales/service					0.74 (0.44 - 1.25)
Agriculture					1.03 (0.69 - 1.52)
Manual					0.54 (0.21 - 1.39)
Wealth index					
Poor					1.00
Middle					0.96 (0.63 - 1.45)

Rich					0.70 (0.35 - 1.41)
Community Characteristics *Residence*					
Rural				1.00	1.00
Urban				0.76 (0.48 - 1.21)	1.42 (0.75 - 2.70)
Region					
Luapula				1.00	1.00
Copperbelt				0.49 (0.19 - 1.22)	0.51 (0.17 - 1.51)
Eastern				0.35 (0.11 - 1.09)	0.48 (0.14 - 1.650
Central				0.67 (0.29 - 1.56)	0.62 (0.24 - 1.61)
Lusaka				0.55 (0.22 - 1.39)	0.51 (0.16 - 1.620
Northern				0.22* (0.06 - 0.83)	0.14 (0 .01 - 1.45)
North Western				0.38 (0.13 - 1.08)	0.29 (0.05 - 1.65)
Southern				0.29* (0.09 - 0.93)	0.20 (0.02 - 1.57)
Western				0.51 (0.19 - 1.38)	0.48 (0 .12 - 1.87)
Community women's education					
Low				1.00	1.00
Medium				0.59 (0.31 - 1.12)	0.61 (0.29 - 1.28)
High				0.31* (0.10 - 0.98)	0.43 (0.13 - 1.42)
Community media saturation					
Low				1.00	1.00
Medium				0.61 (0.32 - 1.16)	0.65 (0.32 - 1.33)

High				0.71 (0.31 - 1.60)	0.98 (0.45 - 2.13)
Ethnic diversity					
Low				1.00	1.00
Medium				0.50 (0.25 - 1.02)	0.61 (0.30 - 1.26)
High				0.32* (0.12 - 0.91)	0.39 (0.12 - 1.31)
Prevalence of large family norm					
Low				1.00	1.00
Medium				3.30* (1.20 - 9.06)	2.51 (0.78 - 8.10)
High				5.54* (1.36 - 22.61)	3.09 (0.72 - 13.30)
Programme Access Characteristics *Exposure to family planning on media*					
No		1.00	1.00	1.00	1.00
Yes		0.45* (0.21 - 0.99)	0.57* (0.36 - 0.94)	0.53* (0.31 - 0.91)	0.84 (0.58 - 1.21)
Visited by family planning worker					
No		1.00	1.00	1.00	1.00
Yes		0.61 (0.31 - 1.20)	0.61 (0.31 - 1.18)	0.59 (0.31 - 1.11)	0.64 (0.31 - 1.34)
Visited health facility					
No		1.00	1.00	1.00	1.00
Yes		0.58 (0.33 - 1.03)	0.46* (0.25 - 0.85)	0.56* (0.34 - 0.92)	0.48 (0.20 - 1.14)

Intermediate Characteristic					
Fertility preference					
Want another			1.00		1.00
Undecided			2.95* (1.02 - 8.48)		3.12 (0.77 - 12.66)
No more			0.17** (0.01 - 0.59)		0.26 (0.05 - 1.27)
Random effects	Empty	Programme	Programme & Intermediate	Programme & Community	Programme, Individual, Intermediate & Community
Community level variance (SE)	0.480 *** (0.109)	0.774*** (0.766)	0.801***(0.599)	0.335*(286)	0. 063(0.160)
VPC (%)	12.7	19.0	19.6	9.2	1.9
PCV (%)	Reference	61.3	66.9	30.2	86.9
Log-likelihood	-1455.6	-1423.0	-1253.77	-1372.28	-1166.92
Model fit statistics AIC BIC	 2915.2 2926.6	 2857.9 2892.2	 2523.54 2568.81	 2790.57 2921.83	 2421.84 2670.65

7.10 TESTING OF STUDY HYPOTHESES

This study had five hypotheses and each of them is restated in this section. The discussion that follows thereafter shows whether each of them has been proved or not.

7.10.1 Hypothesis one

H_o: Community factors do not account for the largest portion of unmet need for contraception in Zambia.

H_1: Community factors account for the largest portion of unmet need for contraception in Zambia.

The first hypothesis assumes that community factors have a significant influence on unmet need for contraception. This was based on literature that shows that an individual's response to health programmes can be influenced by the kind of community he or she lives in. In this hypothesis, living in communities with a high proportion of women with high education, living in communities with high media saturation and living in communities with high ethnic diversity are expected to be negatively associated with unmet need for contraception whereas living in a community with a high prevalence of large family norm is expected to be positively associated with unmet need for contraception. The first three factors are more likely to encourage women to use contraceptives compared to the last one which has a tendency of discouraging the use of contraceptives. For instance, individuals living in a community with high media saturation are more likely to be exposed to family planning messages which will encourage them to use contraceptives as they will be able to make informed choices.

The hypothesis was tested by the use of multilevel modeling. Factors at different levels were considered separately in the multilevel analysis. The VPC and PCV values were used to find out which of the factors contributed the highest to unmet need for contraception. Results of the study indicate that programme access factors had the highest VPC for total unmet need (19.0%) and unmet need for spacing (17.5%) whereas individual factors had the highest VPC (14.3%) for unmet need for limiting. Therefore, programme access factors had the highest average VPC for all components of unmet need for contraceptives. As regards PCV, community factors had the highest for unmet need for spacing (64.6%) whereas individual and programme access factors had the highest for unmet need for limiting (85.2%) and total unmet need (61.3%), respectively. Hence, the results do not confirm the first hypothesis.

7.10.2 Hypothesis two

H_o: Ethnicity is not a significant determinant of unmet need for contraception in Zambia.

H_1: Ethnicity is a significant determinant of unmet need for contraception in Zambia.

The second hypothesis examined the association between ethnicity and unmet need for contraception. Existing studies have established that ethnicity is an important factor that influences an individual's daily life in sub-Saharan Africa. This being the case, it was assumed that ethnicity also plays an important role in shaping an individual's contraceptive behaviour. Moreover, studies have also revealed the existence of variations in fertility among different ethnic groups in Zambia (CSO 1975; Ohadike & Tesfaghiorghis 1975). A recent study by Wotela and Moultrie (2008) which provides further evidence of the existence of regional variations in fertility due to ethnic differentials, indicates that most of the ethnic groups in Zambia belong to clusters with high fertility. High unmet need for contraception is associated with high fertility and low contraceptive use and this is what prevails in Zambia.

To test this hypothesis, binary and multinomial regressions were used. The examination of the p-value associated with the estimated odds and relative risk ratios was set at 95% significance level (α=0.05). Though at the bivariate level, ethnicity was significantly associated with unmet need for contraception, findings of the study revealed that after adjusting for other factors, ethnicity ceased being significantly associated with unmet need for contraception. A possible explanation for the contrary findings in this study could be that cultural values and behaviour regarding contraception do not directly influence unmet need for contraception in Zambia. Therefore, the second hypothesis could not be confirmed.

7.10.3 Hypothesis three

H_o: Being visited by a family planning worker is not negatively associated with unmet need for contraception in Zambia.

H_1: Being visited by a family planning worker is negatively associated with unmet need for contraception in Zambia.

The third hypothesis examines the relationship between being visited by a family planning worker and unmet need for contraception. The assumption is that a visit by a family planning worker enables one to learn more about contraceptives in that he or she can ask questions and raise concerns to the family planning worker. Individuals who have had their questions and concerns addressed are more likely to adopt family planning.

This hypothesis was tested by conducting binary and multinomial regressions and examining p-value associated with the estimated odds and relative risk ratios at 95% significance level (α=0.05). The findings of the bivariate analysis indicate that a visit by a family planning worker was significantly negatively associated with unmet need for contraception. However, the multivariate analysis in chapter six show that though a visit by a family planning worker was negatively associated with unmet need for contraception, the association was not statistically significant. Despite the insignificant association, the result is consistent with the proposed hypothesis.

7.10.4 Hypothesis four

H_o: Number of living children does not significantly influence unmet need for contraception in Zambia.

H_1: Number of living children does significantly influence unmet need for contraception in Zambia.

Hypothesis 4 examines the association between the number of living children one has and unmet need for contraception. This was based on existing literature which indicates that the number of living children one has is negatively associated with unmet need for spacing and positively associated with unmet need for limiting. The explanation for this is that individuals with few children are more likely to have a desire for an additional child or children whereas though with more children would have reached their desired fertility.

This hypothesis was also tested by conducting binary and multinomial regressions and examining the corresponding p-value at 95% significance level (α=0.05). According to the results of the study, number of living children was negatively associated with unmet need for spacing among women. Moreover, women with 1-2 and 3-4 living children were less likely to have unmet need for limiting whereas those with 5 and more children were more likely to have unmet need for limiting. However, the relationship between number of living children and unmet need for limiting was not statistically significant. Considering total unmet need, women with 1-2, 3-4 and 5 and more living children were less likely to have unmet need for limiting than those with no children. Nevertheless, the relationship between number of living children and total unmet need was not statistically significant. In the case of men, unmet need for spacing significantly reduced with an increase in the number of living children. With respect to unmet need for limiting, men with 1-2 and 3-4 living children were less likely to have unmet need for limiting whereas those with 5 and more children were more likely to have unmet need for limiting than those with no children. However, the association was not statistically significant. On the other hand, total unmet need was significantly associated with the number of living children a man had. Considering that the relationship between number of living children and unmet need for contraception was not significant in some cases, the hypothesis could not be conclusively proven.

7.10.5 Hypothesis five

H_o: Satisfying unmet need for contraception does not significantly lower fertility.

H_1: Satisfying unmet need for contraception significantly lowers fertility.

The fifth hypothesis tests the significance of satisfying unmet need in lowering fertility. This is based on the premise that satisfying unmet need for contraception translates into an increase in the contraceptive prevalence rate. An increase in the contraceptive prevalence rate means a reduction in fertility in that many women are able to postpone or limit child bearing.

The testing of this hypothesis involved developing a regression equation ($TFR_i = 6.3374 - 0.0552 (CPR_i) + e_i$) to use in estimating new TFRs. Results in figure 8.3 reveal that TFR would reduce from 6.2 to 2.6 children per woman, 6.2 to 3.0 children per woman and 6.2 to 2.8 children per woman according to Models 1, 2 and 3, respectively. Therefore the percent reduction would be 58%, 51.6% and 54.0%, respectively. Furthermore, the reduction in TFR would bring Zambia 19.2%, 30.0% and 25.0%, respectively, close to the replacement-level fertility for developed countries. This clearly indicates that the level of unmet need for contraception in Zambia is so high that satisfying it would have a significant effect on fertility even when the most conservative model is used. Therefore, the hypothesis is confirmed.

7.11 SUMMARY

The chapter addresses factors underlying unmet need for contraception among women in Zambia and testing of hypothesis. Using multilevel logistic regression analysis, the chapter examines the extent to which various factors (individual, community, programme access and intermediate) contribute to the variations in unmet need for contraception among women in Zambia. The interpretation of findings was informed by fixed effects which measure associations (odds ratios or relative risk ratios and p-values) and random effects which measure variations across entities (Intra class coefficient/variance partition coefficient and proportional change in variance).

Results from the null model show that there is a significant variation in all components of unmet need across communities. This suggests that the different compositions of the communities in which women reside significantly account for the variations in unmet need for contraception among the women in Zambia (Merlo et al. 2005a). Moreover, the VPC (variation in unmet need for contraception among women between communities) for unmet need for spacing was the largest followed by that for total unmet need. The least was that for unmet need for limiting. Therefore, it could be said that intra-community variations associated with the risk of having unmet need for spacing was higher than that for unmet need for limiting.

Results also reveal that among all the factors, programme access factors had the highest VPC for unmet need for spacing and total unmet. Meanwhile, the highest VPC for unmet need for limiting was that for individual factors. This suggests that programme access factors significantly contributed to variations in unmet need for spacing across communities whereas individual factors significantly contributed to variations in unmet need for limiting across communities.

In addition, findings reveal that though all the community factors are not significantly associated with unmet need for spacing when they are independent, combining them with individual factors results in two of them being significant. Women residing in communities with medium and high ethnic diversity have lowered odds of having unmet need for spacing whereas residing in communities with medium and high prevalence of a large family norm increases the odds of having unmet need for spacing.

Findings also show that some of the individual variables which were significantly associated with unmet need for limiting ceased being significant when individual and community factors were combined. Women belonging to the Nyanja and Mambwe/Tumbuka ethnic groups no longer had significantly reduced odds of having unmet need for limiting compared to Bemba women. Additionally, the odds of having unmet need for limiting were no longer significantly lower among women engaged in professional/clerical jobs. On other hand, living in the Northern and Southern regions significantly lowered the odds of having unmet need for limiting. Moreover, residing in communities with high ethnic diversity significantly reduced the risk of having unmet need for limiting whereas residing in communities with medium and high prevalence of a large family norm significantly increased the risk of having unmet need for limiting.

Results from the full model show that number of living children, ethnic diversity, prevalence of a large family norm, being visited by a family planning worker, visiting a health facility and fertility preference were the main predictors of unmet need for spacing whereas age, marital status, prevalence of a large family norm, visiting a health facility and fertility preference were the major determinants of unmet need for spacing. These factors are among the identified main factors underlying unmet need for contraception in the previous chapter though some of those which were significant in the binary and multinomial analysis (wealth and region) ceased being significant in the multilevel analysis.

This study had five hypotheses. Results indicate that programme access factors had the highest VPC for total unmet need and unmet need for spacing whereas individual factors had the highest VPC for unmet need for limiting. Therefore, hypothesis 1 could not be confirmed. The findings showed that ethnicity was not significantly associated with unmet need for contraception. Hence, hypothesis 2 could not be confirmed. Results of this study were consistent with hypothesis 3 which stated that being visited by a family planning worker is negatively associated with unmet need for contraception. Thus the hypothesis was confirmed. This study established that number of living children was significantly inversely associated with unmet need for spacing among men and women. However the relationship between unmet need for limiting among men and women was not significantly associated with number of living children. As such hypothesis 4: ‘the number of living children one has significantly influences unmet need for contraception’ could not be confirmed. Finally, this study's findings confirmed hypothesis 5 which stated that satisfying unmet need significant lowers fertility. To conclude, hypotheses one, two and four could not be confirmed whereas hypotheses three and five were confirmed.

CHAPTER EIGHT

CONSEQUENCES OF UNMET NEED FOR CONTRACEPTION IN ZAMBIA

8.0 INTRODUCTION

Unmet need for contraception is associated with reproductive health problems which pose a serious public health concern in women. This chapter discusses some of the reproductive health problems (infant and child mortality, short birth interval, termination of pregnancy and high parity) that are associated with unmet need for contraception. Pearson chi-square test of goodness of fit and binary logistic regression were employed to determine the association between unmet need for contraception and the selected reproductive health issues.

The chapter is divided into six sections. The first section discusses the distribution of selected reproductive health problems among women with unmet need for contraception. This is followed by the second which discusses the association between unmet need for contraception and infant and child mortality. The third section is on the association between unmet need for contraception and short birth interval. The fourth and fifth sections deal with unmet need for contraception and terminated pregnancy and unmet need for contraception and high parity, respectively. The chapter concludes with a section that gives a summary of the chapter.

8.1 DISTRIBUTION OF SELECTED REPRODUCTIVE HEALTH PROBLEMS AMONG WOMEN WITH UNMET NEED FOR CONTRACEPTION

Results in Figure 8.1 reveal that women with unmet need for spacing (32.5%) had more babies dying in infancy than those who had unmet need for limiting (25.9%). Hence 58.4% of the women who had unmet need had their babies dying in infancy compared to 41.6% of those who had no need.

According to Figure 8.2, the proportion of women with unmet need for limiting (33.9%) who had children dying between ages 1 and 5 was slightly higher than that for those with unmet need for spacing (33.5%). Therefore, there were twice as many women with unmet need than those with no need.

Figure 8.1: Distribution of women whose infants died before 1 year of age according to their unmet need status

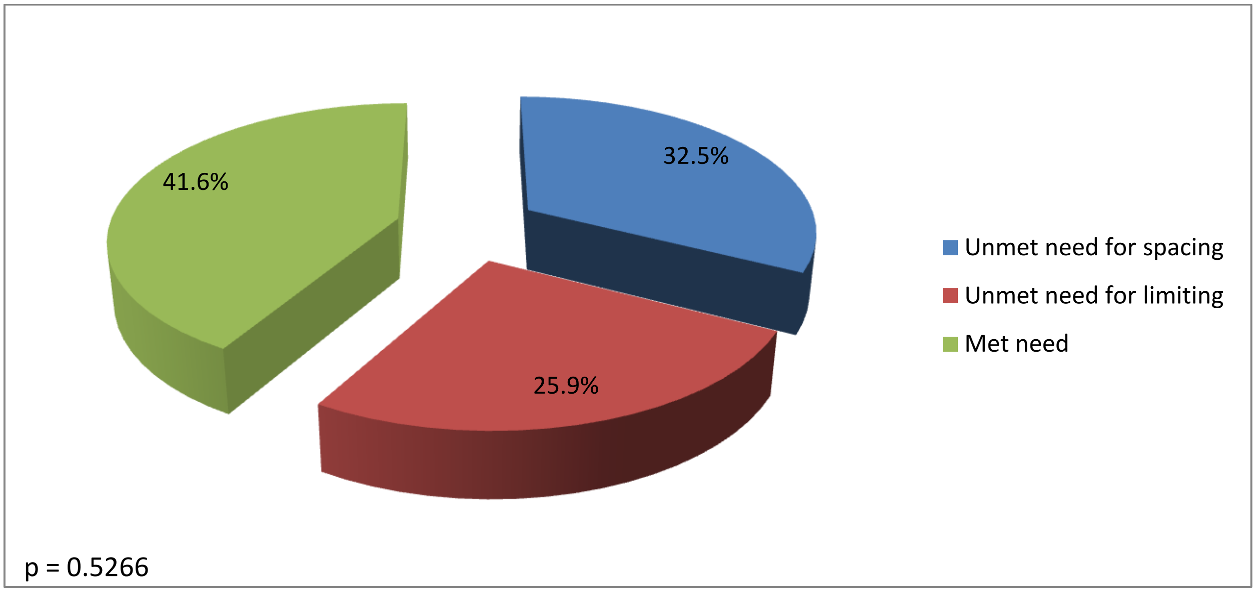
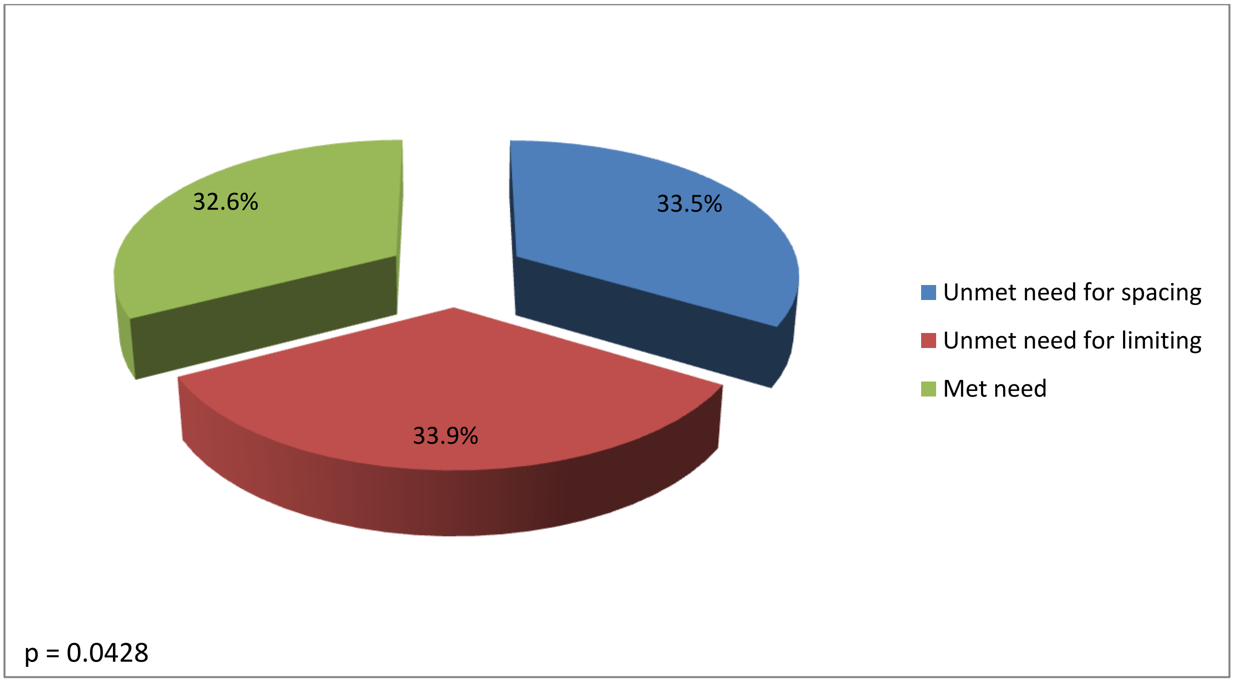


Figure 8.2: Distribution of women whose children died between ages 1 and 5 according to their unmet need status



The distribution of women with short birth intervals who had unmet need is shown in Figure 8.3. There were slightly more women with short birth intervals who had unmet need for limiting (31%) compared to those with unmet need for spacing (30%). Moreover, women with short birth intervals who had unmet need (60.5%) were more than those who had no need (39.5%).

Figure 8.4 presents the distribution of women with a terminated pregnancy who had unmet need for contraception. A quarter (25%) of the women with terminated pregnancy had unmet need for spacing whereas close to one third of them had unmet need for limiting (32.5%). Therefore, there were more women with terminated pregnancy who had unmet need (57.5%) compared to those who had no need (42.5%).

Figure 8.3: Distribution of women with short birth interval according to their unmet need status

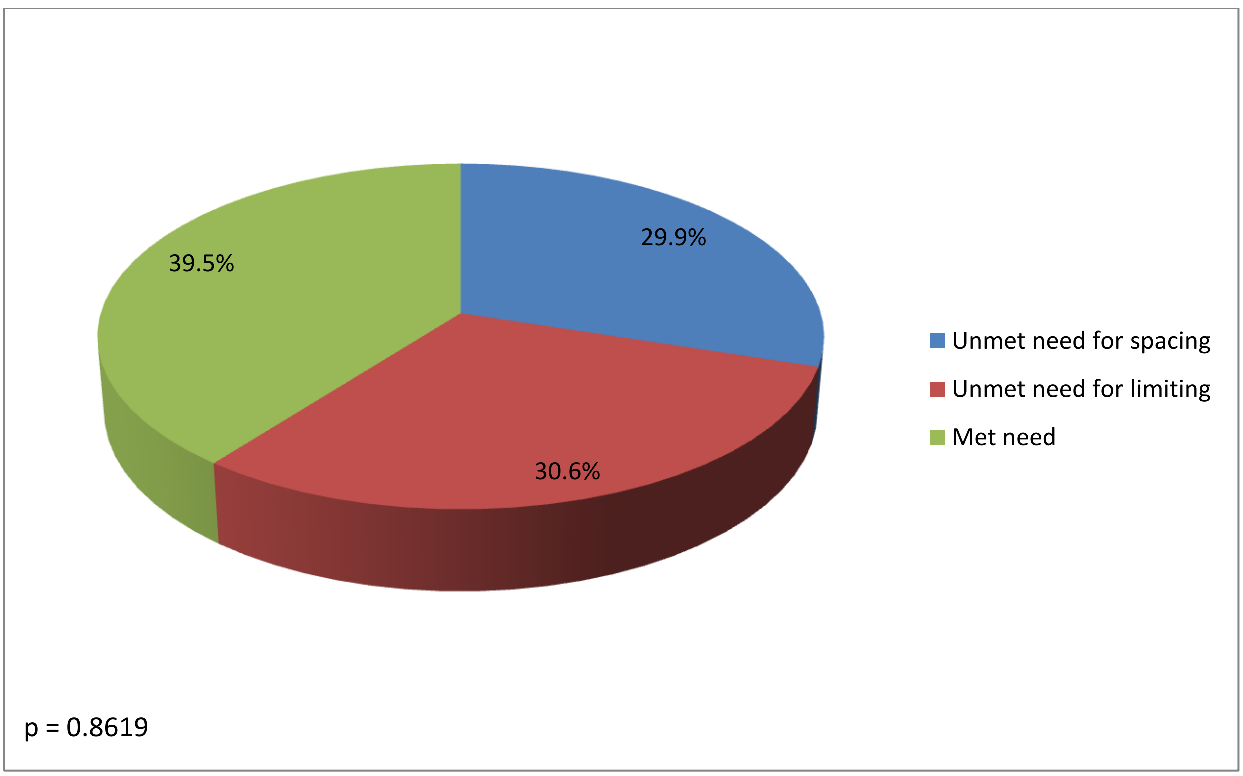
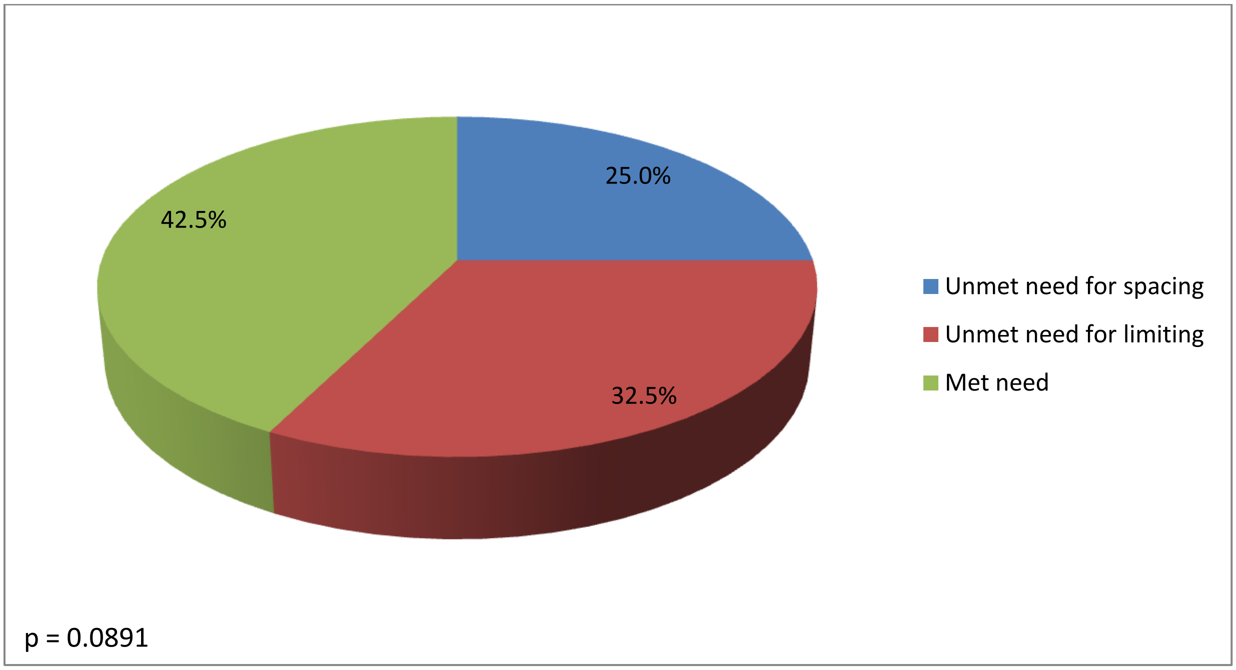
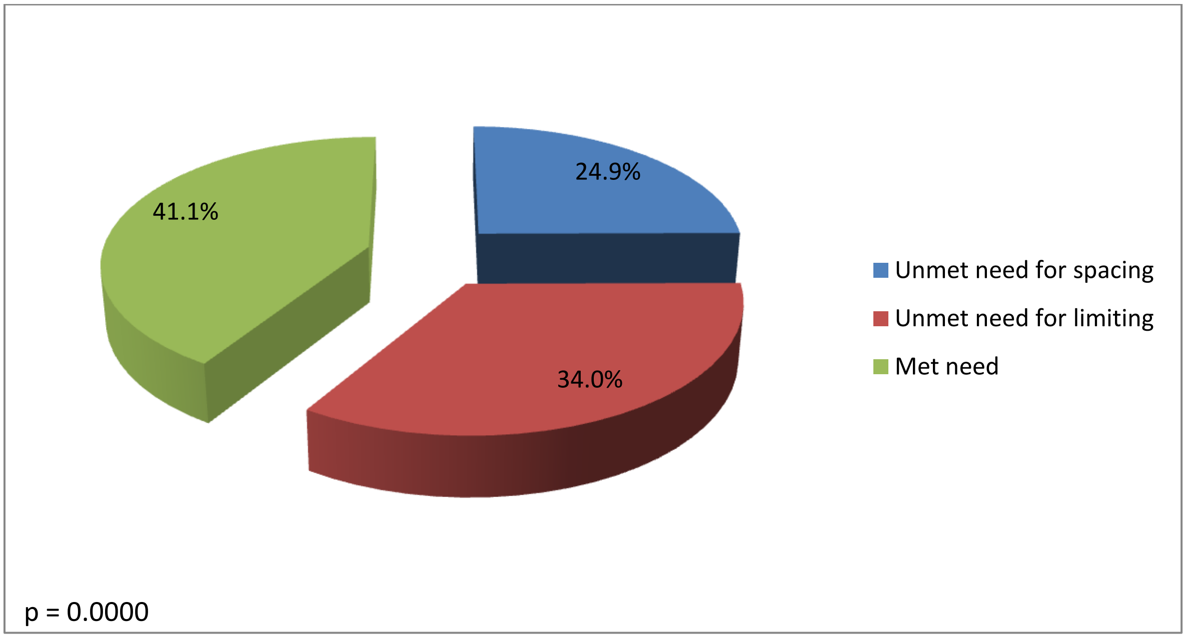


Figure 8.4: Distribution of women who had a terminated pregnancy according to their unmet need status



Results in figure 8.5 show that high parity women who had unmet need for spacing (24.9%) were fewer than those with unmet need for limiting (34%). Additionally, there were more women (58.9%) with unmet need than those with no need (41.1%).

Figure 8.5: Distribution of high parity women according to their unmet need status



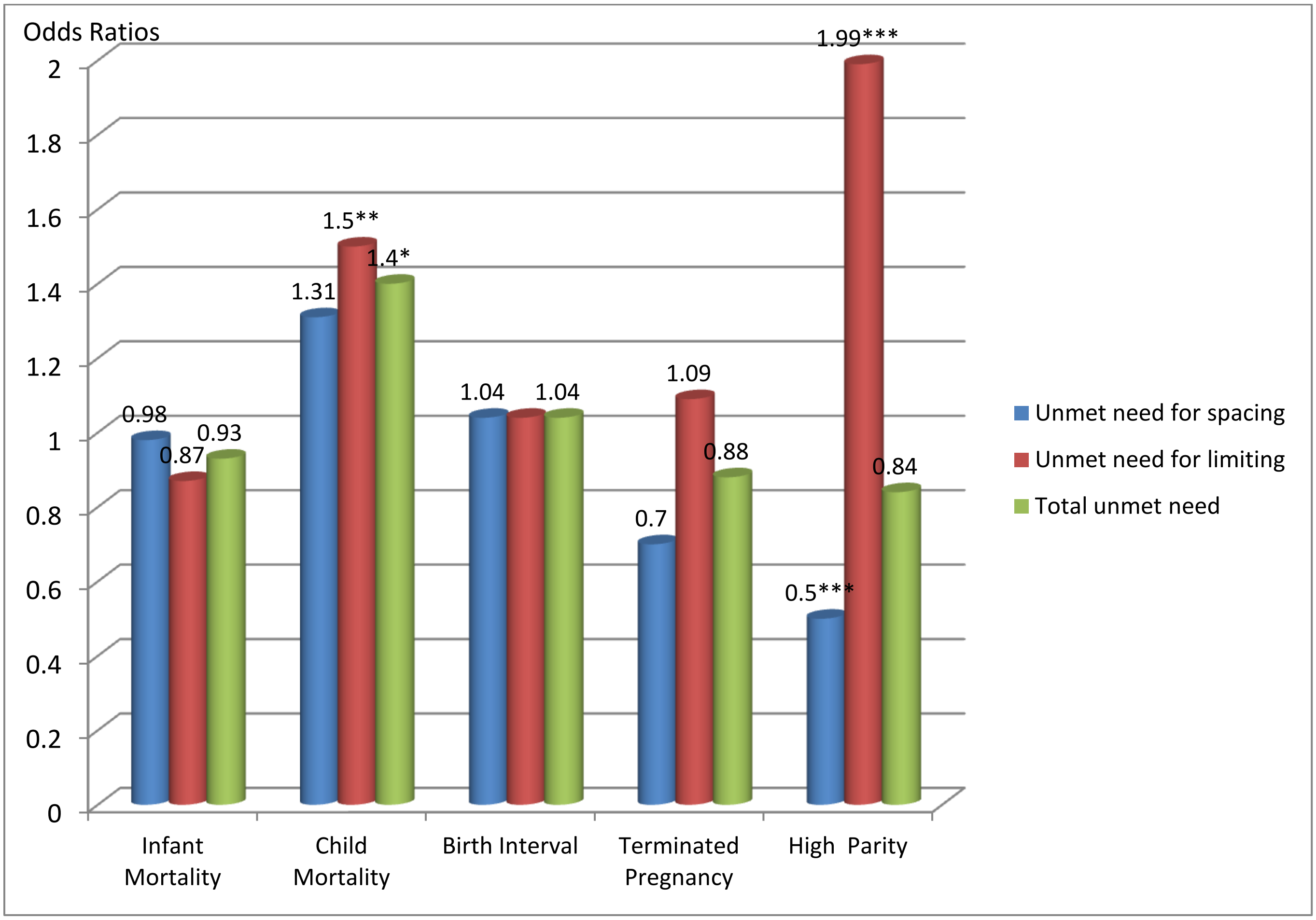
8.2 INFANT AND CHILD MORTALITY

According to figure 8.6, findings indicate that though women with all components of unmet need were less likely to have their babies die in infancy, the relationship was not significant. On the other hand, the odds of women with unmet need for limiting and total unmet need to have their children dying between ages 1 and 5 were 1.5 and 1.4, respectively.

8.3 SHORT BIRTH INTERVAL

Women who had unmet need for spacing and limiting and total unmet need were 4% each more likely to have short birth interval compared to those with no unmet need. The association was insignificant.

Figure 8.6: Unadjusted odds ratios from binary and multinomial regressions showing the association between unmet need and selected reproductive health problems



*= p<0.05, **=p<0.01, ***=p<0.001

8.4 TERMINATED PREGNANCY

Though the likelihood of having a terminated pregnancy was lower among women who had unmet need for spacing (0.7 times) and higher among those with unmet need for limiting (1.1 times) compared to those who had no unmet need, the association was not significant. The relationship between terminated pregnancy and total unmet need was also not significant.

8.5 HIGH PARITY

Results show a significant relationship between unmet need and high parity. Women with unmet need for spacing were 50% less likely to have high parity than those with no unmet need. Conversely, the likelihood of having high parity among women with unmet need for limiting was 2 times higher compared to their counterparts with no unmet need.

8.6 SUMMARY

The focus of this chapter was to examine the association between unmet need and selected reproductive health problems. This objective was achieved by using the Pearson chi-square test of goodness of fit and logistic regressions. Results show that women with unmet need for spacing had more of their infants dying compared to those who had unmet need for limiting. On the contrary, women with unmet need for limiting had slightly more children dying before reaching their fifth birthday than those who had unmet need for spacing. This suggests that women with unmet need for spacing may be having pregnancies too soon before the preceding baby is old enough to be weaned and thus more likely to die as a result of being under nourished. Results also indicate the level of unmet need for limiting was slightly higher than that for spacing among women with short birth intervals. In addition, the proportion of women with unmet need for limiting was higher than that for those with unmet need for spacing among women who had a terminated pregnancy. Furthermore, there were more women with unmet need for limiting compared to spacing among women with high parity.

Findings from the logistic regression analysis reveal that women with unmet need for limiting were 50% more likely to have their children dying before age five than those with met need. Moreover, the odds of women with unmet need for spacing having high parity were lower (0.5) compared to those with met need whereas the odds for those with unmet need for limiting were higher (2.0).

CHAPTER NINE

POTENTIAL DEMOGRAPHIC IMPACT OF SATISFYING UNMET NEED FOR CONTRACEPTION IN ZAMBIA

9.0 INTRODUCTION

As mentioned earlier in chapter five, estimating the level of unmet need is of great significance because the figures can be used to establish the potential impact of satisfying unmet need for contraception on the fertility rate. This chapter shows the fertility implications of satisfying unmet by using the regression equation obtained after running a regression analysis of TFR and CPR figures of 84 countries as given in recent DHS data sets. The simple regression equation used to estimate TFR from predicted new CPRs (potential total demand for contraception) was:

$$TFR_i = 6.3374 – 0.0552 (CPR_i) + e_i$$

Three models were used to estimate TFRs if unmet need for contraception among women in Zambia was to be satisfied. The first model which provides the maximum effect of satisfying unmet need for contraception assumes that all unmet need can be satisfied. The second model assumes that women with unmet need for contraception who reported having no intention to use any contraception in future will truly not use any method. Hence, this model provides the minimum effect of satisfying unmet need for contraception on TFR. The third model which provides the most realistic effect of satisfying unmet need on TFR has three assumptions. The first being that one fifth of the women with unmet need for spacing and one tenth of women with unmet need for limiting who have intentions to use contraceptives in future will not use any method. The second assumption is that women with unmet need for contraception who have no intentions to use contraceptives in future because they consider themselves at low risk of pregnancy will not use any method. The third one is that 50% of the remaining women with unmet need for contraception who intend to use contraceptives in future will not use any method.

9.1 CURRENT CPR AND ESTIMATED RATES WITH ASSOCIATED TFRs AND PERCENTAGE DECREASE IN TFR

Figure 9.1 presents the increase in CPRs based on the three models. According to Model 1, if unmet need were to be satisfied, the CPR would be 67.6%. Model 2 indicates that it would increase to 60.9% whereas it would be 63.2% in the case of Model 3.

The percent increase in the CPRs is shown in figure 9.2. Model 1 indicates that the CPR would increase by 39.6%. Moreover, according to Model 2, the increase would be by 33.0% whereas it would be by 35.4% in Model 3.

Figure 9.1: Current CPR and estimated rates based on the three Assumptions

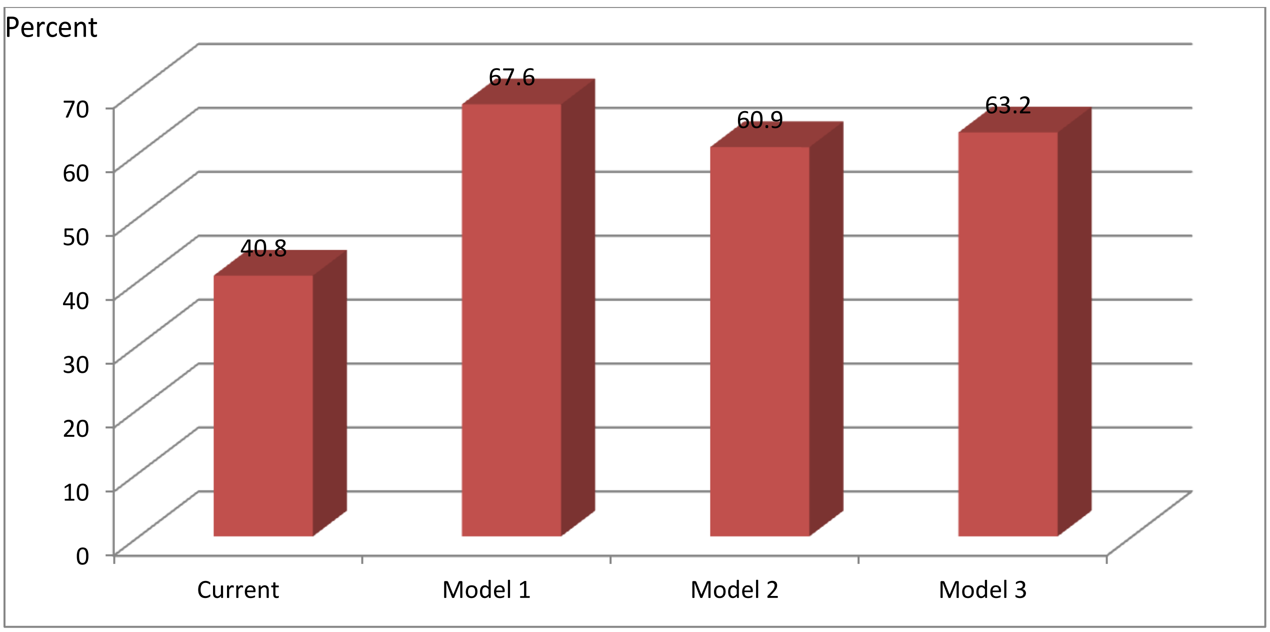
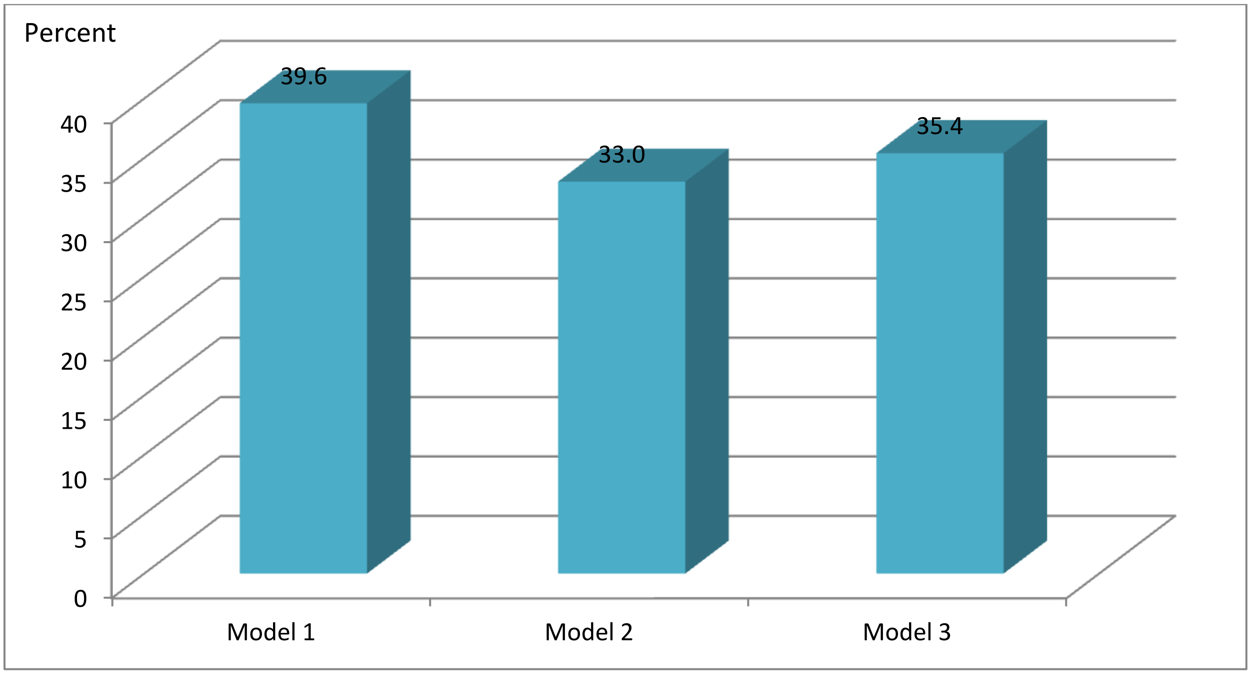


Figure 9.2: Percent Increase in CPR based on the three models



Results presented in figure 9.3 show that based on Model 1 Zambia's TFR would be 2.6 children per woman if unmet need were to be satisfied. Furthermore, Model 2 gives an estimated TFR of 3.0 whereas Model 3 estimates it at 2.8 children per woman.

According to Model 1, Zambia's current TFR of 6.2 would reduce by 58.1% if unmet need were to be satisfied (see figure 9.4). The reductions in Models 2 and 3 would be 51.6% and 54.0%, respectively.

9.2 EFFECT OF SATISFYING UNMET NEED FOR CONTRACEPTION ON FERTILITY

The effect of satisfying unmet need on contraception for fertility can be viewed in two ways: percent reduction in TFR and reduction in the distance to replacement level. A TFR of 2.1 children per woman is considered to be the replacement level for developed countries whereas it is 2.6 children per woman for developing countries. The difference between the two is that developing countries have higher infant mortality rates compared to developed ones (Cunningham undated). Results reveal that satisfying unmet need for contraception will result in significant reduction of fertility even when the model which gives the minimum effect of satisfying unmet need on TFR is used.

According to Model 1 which assumed the satisfaction of all unmet need for contraception, the effect of satisfying unmet need for contraception is so significant that Zambia's TFR would reduce from 6.2 to 2.6. This would result in the TFR being 19.2% closer to replacement level fertility for developed countries and considered to have reached the replacement-level fertility for developing countries (see figure 9.5). Based on Model 2 which provides the minimum estimates, satisfying unmet need would reduce TFR from 6.2 to 3.0 thus bringing the TFR 30.0% and 15.4% near to the replacement-level fertility for developed and developing countries, respectively.

Furthermore, satisfying unmet need based on Model 3 which is the most realistic yields a TFR of 2.8 would result into the TFR being 25% and 7.7% close to the replacement-level fertility for developed and developing countries, respectively.

Figure 9.3: **Current TFR and estimated rates based on the three models**

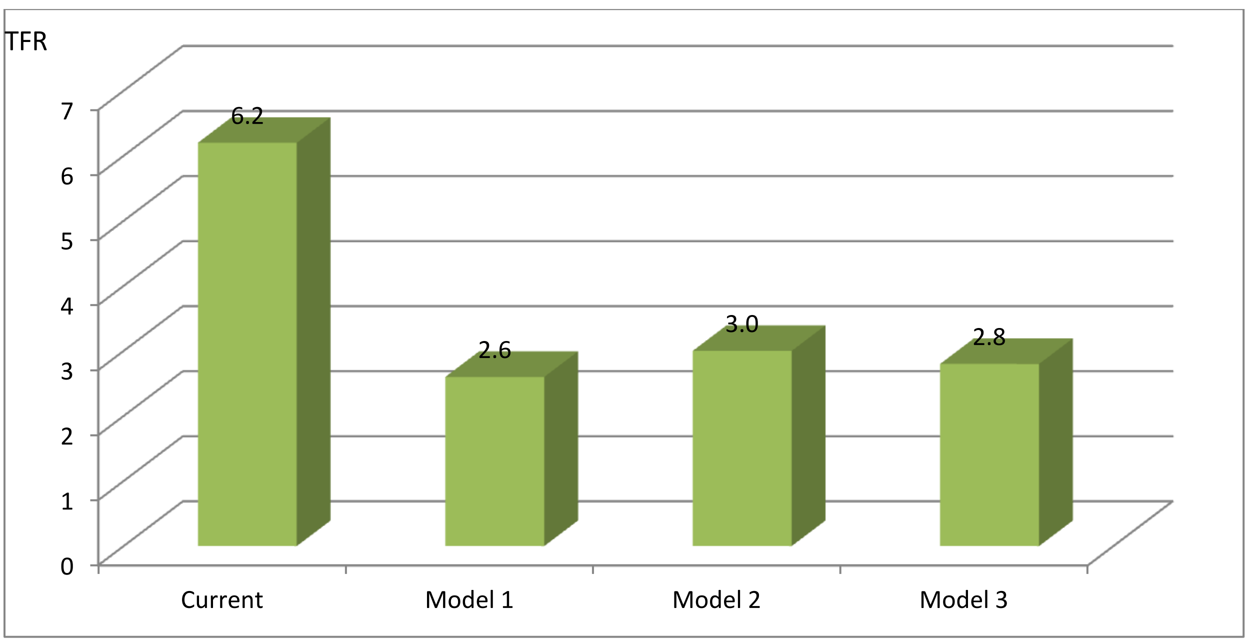


Figure 9.4: **Percent reductions in TFR based on the three models**

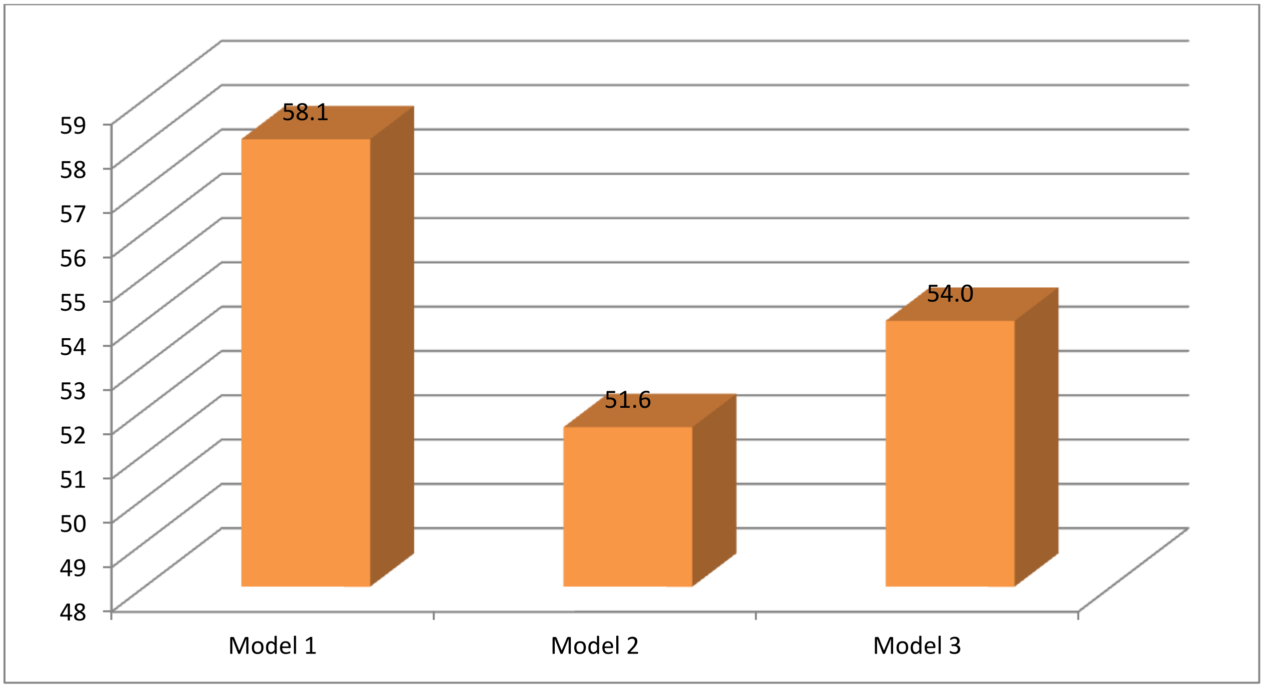
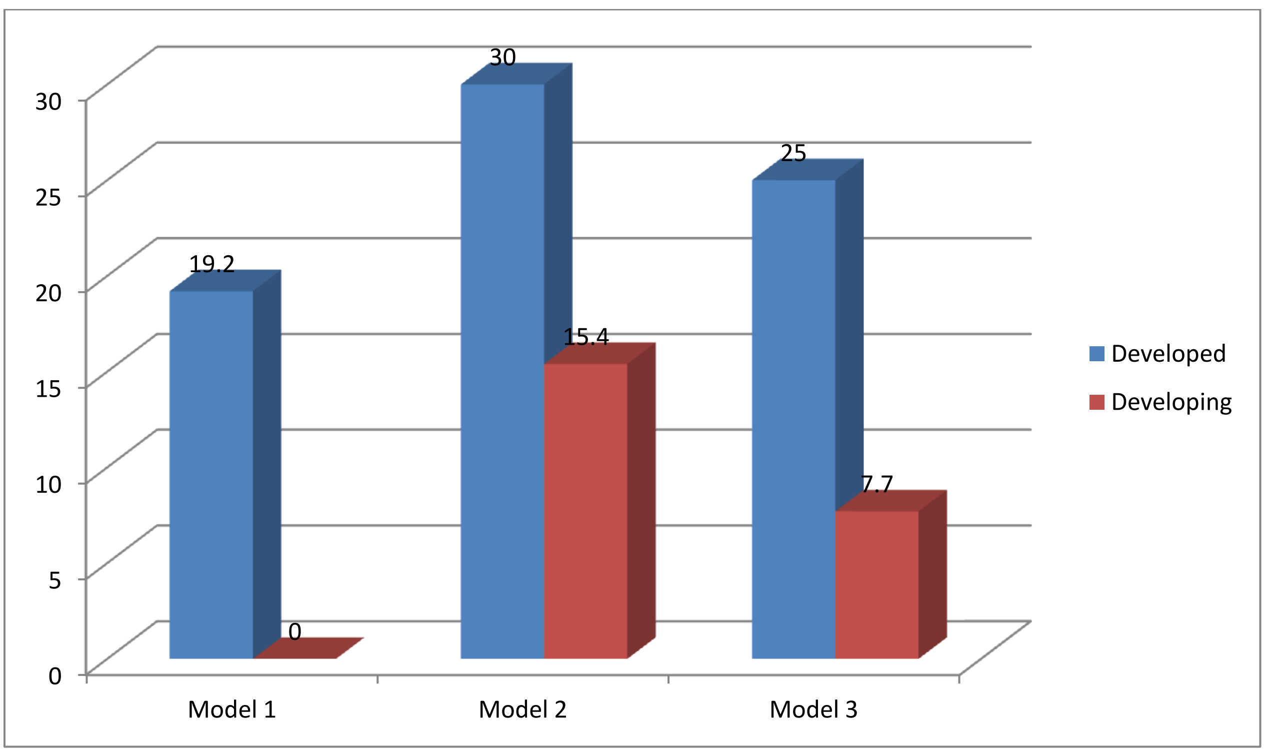


Figure 9.5: **Percent distance close to replacement-level fertility for developed and developing countries based on the three models**



9.3 SUMMARY

This chapter discusses the effect of satisfying unmet need for contraception on fertility in Zambia. A simple regression $\{TFR_i = 6.3374 – 0.0552 (CPR_i) + e_i\}$ obtained from CPR and TFR estimates from national surveys for 84 countries was used to estimate the new TFRs based on three models. Results indicate that estimates of all the models yield TFRs that are substantially lower than the current one. Using Model 1 which assumed the satisfaction of all unmet need for contraception, the CPR would increase by 39.6% (from 40.8% to 67.6%). The estimated TFR would be 2.6 children per woman.

Model 2 indicates that CPR would rise from 40.8% to 60.9% thus resulting in an increase of 33.0%. This would yield a TFR of 3.0 children per woman. Model 3 which is the most realistic of the three, yields an estimated CPR of 63.2%. The increase would be by 35.4%. This gives an estimated TFR of 2.8 children per woman.

According to Model 1, Zambia's current TFR of 6.2 would reduce by 58.1% if unmet need were to be satisfied (see figure 9.4). The reductions in Models 2 and 3 would be 51.6% and 54.0%, respectively.

Having calculated the TFR using the potential total demand for contraception estimates, it is clear that the level of unmet need for contraception in Zambia is so high that satisfying it would have a significant impact on fertility. This is not just the case with Model 1 which assumed the elimination of all unmet need but also for Model 2 which is the most conservative of the three models.

This conforms to findings of existing studies (Westoff & Bankole 1996; Chaudhury 2001). Both studies used the simple regression model $(TFR_i = 7.178 – 0.0682 (CPR_i) + e_i)$ developed after regressing TFR and CPR figures of 86 countries as given in the early 1990s DHS data sets to calculate new TFRs. Westoff and Bankole's (1996) estimated fertility rates for 27 developing countries indicated that if unmet need was satisfied, fertility would decline by 17% on average for the 14 sub-Saharan countries included in the analysis whereas it would do so by 18% for the countries from other regions. Additionally, the reduction in fertility would result in the former countries covering 30% of the distance to replacement fertility level while the latter would cover above 50%.

Chaudhury (2001) concluded that if all unmet need for contraception among women in four South Asian countries was eliminated, there would be a significant reduction in fertility in all the countries except for India where the reduction was marginal. Satisfying all unmet need for contraception in Bangladesh would result in the CPR rising from 53.8% to 69.1% thus yielding a TFR of 2.5 children per woman. As for Nepal, CPR would rise from 28.5% to 59.9% thereby giving an estimated TFR of 3.1 children per woman. Moreover, Pakistan's TFR would reduce from 5.3 to 3.0 children per woman. The reductions in the TFRs would bring the countries between 15 to 30 per cent closer to replacement-level fertility for developed countries.

CHAPTER TEN

DISCUSSION

10.0 INTRODUCTION

Building on theoretical and empirical research on the levels and correlates of unmet need for contraception, this study determined the levels of unmet need for contraception and identified its determinants and consequences among adolescents and adults in Zambia. The study specifically determined the full measure of unmet need for contraception among the adolescents and adults (married and unmarried) in Zambia. It also identified the individual, household, community and programme access factors underlying unmet need for contraception among the females and males in Zambia. Additionally, it examined the association between unmet need for contraception and selected reproductive health problems (termination of pregnancy, short birth interval, infant and child mortality and high parity) in Zambia. Finally, it determined the potential demographic impact of satisfying unmet need for contraception in Zambia.

This chapter discusses the key findings of the study. It does so by putting together the key findings of each of the study's four objectives. The discussion of the key findings of the study is presented in four sub-sections based on each objective. The first section presents the discussion on the levels of unmet need for contraception among the adolescents and adults (males and females) in Zambia. This is followed by the discussion on correlates of unmet need for contraception among the males and females in Zambia. The third section presents the discussion on the association between unmet need for contraception and selected reproductive health problems whereas the fourth one addresses the potential demographic impact of satisfying unmet need for contraception in Zambia. The final section of the chapter presents the study's contribution to knowledge.

10.1. LEVELS OF UNMET NEED FOR CONTRACEPTION AMONG ADOLESCENTS AND ADULTS IN ZAMBIA

One of the key findings of the study relates to the overall level of unmet need for contraception among males and females making up the study population. Precisely, the findings clearly indicate that the level of unmet need for contraception among females and males in Zambia is high. The level of total unmet need for contraception among currently married adolescent females is 22.1% (15.0% unmet need for spacing and 7.1% for limiting) whereas it is 27.7% for currently married adult females (15.2% for spacing and 12.5% for limiting). An earlier study based on the 1996 ZDHS estimated the level of unmet need among currently married women at 27% (Ikamari & Lwaanga 2000). Moreover, other studies have established that the levels of unmet need among currently married women in sub-Saharan countries are 20% or higher (Govindasamy & Boadi 2000; Khan, Bradley, Fishel & Mishra 2008; Nyangara, Hart, Speizer & Moreland 2007; Ojakaa 2008).

Though total unmet among both married adolescent and adult females was high, the level for adults was higher than that for adolescents. This could be because most of the adolescents have not yet attained their desired number of children and, as such, still want to have children. Consequently, they have no need for spacing or limiting their births unlike the older women whose case is the opposite. However, both adolescents and adults had higher levels of unmet need for spacing compared to unmet need for limiting. This is expected in that it has been established that the need for currently married women in sub-Saharan Africa's is more for spacing than limiting (Ashford 2003; World Bank 2010).

Contraceptive use among married females was also higher (26.8% for adolescents and 40.3% for adults) than among unmarried ones (5.7% and 17.9% for adolescents and adults, respectively). The higher levels among the married compared to the unmarried are expected; it can be assumed that the former's use of contraceptives is higher than that of the latter because they are more exposed to sexual activities.

With respect to the unmarried females, the level of unmet need for contraception among adolescents is 9.5% (4.3% for spacing and 5.2% for limiting) and that for adults is 11.1% (6.3% for spacing and 4.8% for limiting). As is the case among the married, the level for adults is higher than that for adolescents. Findings also indicate that married adolescents have a higher level of unmet need for contraception compared to their unmarried counterparts. Existing studies have established the existence of high levels of unmet need for contraception among married adolescents in sub-Saharan countries. For instance, Obare et al (2011) estimated the level of total unmet need for contraception among currently married adolescent females in Kenya at

28.8% in 2008/2009. Similarly, Gebreselassie and Govindasamy's (2013) study found that the level of total unmet need for contraception among married adolescents in Ethiopia was 32.7% (30.3% for spacing and 2.4% for limiting). However, the level of total unmet need for contraception among married adult females (26% - 14% for spacing and 12 for limiting) was lower than that for adolescents.

Considering currently married males, the level for adolescents is 41.8% with all of it being for spacing whereas the level for adults is 34.9% (21.4% for spacing and 13.5% for limiting). Contrary to the situation among females, currently married adolescents have a higher level of total unmet need than adults. In addition, adolescents have no unmet need for limiting. The fact that adolescents have only unmet need for spacing and adults have more unmet need for spacing than limiting indicates that, as is the case with females, unmet need for spacing is predominant among males. This suggests males' great desire for more children. Most African societies place a high value on children and promote large family sizes. Moreover, the number of children a man has is considered as a sign of his manliness and status (Isiugo-Abanihe 1994; Odimegwu & Adedini 2013; Kabagenyi et al. 2014).

The average total unmet need for married females is 24.9% and that for the unmarried is 10.3%. The average total unmet need for currently married males is 38.4%. This high level of unmet need for contraception among married males is consistent with findings in other studies (Ngom 1997; Odumosi et al. 2003). Ngom (1997) further noted that the levels of unmet need for contraception among men in Ghana and Kenya were slightly lower than those for women. On the contrary, the level of unmet need among currently married men in Zambia is higher than the 27% for currently married women. This is may be attributed to the fact that there are fewer male based modern contraceptive choices (condoms and vasectomy) compared to female based ones. Benefo's (2010) study revealed that the prevalence of condom use in Zambia is low (only 32% of the sexual partnerships in the survey used the condom in the past twelve months) and it is coupled with inconsistency in that only 8% of the partnerships consistently used the condom. The reason for this could be men's refusal to wear condoms due to the perception that condoms prevent men from having the sexual pleasure that is derived from the direct penile-vaginal contact (Carpenter 2010; Khan et al. 2004). This is reflected by the expression which likens wearing a condom during sexual intercourse to "taking a shower in a raincoat" (Flood 2003;

Severy & Spieler 2000). Furthermore, condom use is uncommon in the marital encounters as it is associated with unfaithfulness. Adetunji (2000); Bankole and Singh (2001); Ali (2004); Maharaj and Cleland (2005); Farrar (2013) cite the perceived association between condom use and extra-marital relationships as one of the reasons why men do not use condoms within marriage. Another study has established that condom use is seen as an intruder within the marriage relationship (Chimbiri 2007).

Though vasectomy is a safe and effective male-based permanent contraceptive method, it is not popular. In addition, it is the least known or used among all the contraceptive methods. The prevalence rate is less than 0.1% in sub-Saharan Africa (Jacobstein & Pile 2007; Tsai 2011). Some men feel that undergoing this medical procedure may negatively affect their sexual performance (Chirambo 1992). Besides, Dahal *et al.* (2008); Jacobstein and Pile (2007) observed that in many communities the procedure is perceived as equal to castration. Vasectomy is not only unpopular in developing countries but developed ones as well. For example, some American urologists have had to put concerted efforts in marketing vasectomy in order to increase the number of men opting to undergo the medical procedure. They have particularly taken advantage of the time around National Collegiate Athletic Association (NCAA) basketball tournament to attract more men to undergo sterilisation. This has been dubbed as "vasectomy madness" (Lion in oil 2009).

The average total unmet need for all males and females is 24.5%. It is lower than the disseminated level for currently married women in Zambia (27%) and the average for currently married women in sub-Saharan Africa (26%). Despite this, it is still high and as such, more interventions are needed to reduce the levels of unmet need for contraception in Zambia.

10.2 CORRELATES OF UNMET NEED FOR CONTRACEPTION AMONG MALES AND FEMALES IN ZAMBIA

The findings of the study indicate that there are some variations in the most important factors determining unmet need for contraception among the adolescents and adult females as well as among females and males. Variations also exist in the factors determining the two components of unmet need for contraception.

The major determinants of unmet need for spacing and limiting among the adolescent females are marital status and number of living children. As for adult females, the most important predictors of unmet need for spacing and limiting are marital status, visiting a health facility and fertility preference. The most important determinants of unmet need for spacing among all the women are marital status, number of living children, visiting a health facility and fertility preference whereas age, marital status, region of residence, visiting a health facility and fertility preference are the major predictors of unmet need for limiting. In the case of males, the major predictors of unmet need for spacing are number of living children, educational attainment, region of residence and exposure to family planning messages whereas only region of residence is the most important factors determining unmet need for limiting. Therefore, only marital status is the common predictor of unmet need for contraception among adolescent and adult females. Regarding males and females, number of living children is the only common predictor of unmet need for spacing whereas it is only region of residence in the case of unmet need for limiting.

Results show that married women were more likely to have unmet need for contraception than their unmarried counterparts. Considering that marriage is almost universal in Zambia and that culture favours marriage as the institution for childbearing, it is expected that married women have more unmet need for contraception than the unmarried ones. Besides, with the man as the head of the family, married women may find it difficult to use contraceptives if the husband is not in favour of their doing so. Studies elsewhere have established that men do influence women's contraceptive use (Casterline, Sathar & Haque 2001; Nagave et al. 2003; Dudgeon & Inhorn 2004).

Considering the significance of visiting a health facility in influencing unmet need for contraception, the findings of the study established lower risks of unmet need for spacing and limiting among women who visited a health facility. This finding emphasizes the important role that a visit to a health facility plays in exposing an individual to information about family planning. Such information helps men and women in making informed decisions concerning their contraceptive needs. Korra's (2002) study also established a negative association between visit to a health facility and unmet need for spacing and limiting.

The study also established that unmet need for contraception is negatively associated with exposure to family planning messages in media. The significance of exposure to family planning messages in media in influencing unmet need for contraception underscores the effectiveness of media in promoting contraceptive use. Individuals who are exposed to family planning messages in media are able to acquire knowledge about contraceptives and the acquired knowledge in turn helps to influence their attitude and behaviour in relation to contraceptive use (Kabir & Islam 2000; Society for Adolescent Medicine 2000). Existing studies such as Saluja et al (2009); Sharma, Pratap and Ghimire (2011) assert that exposure to family planning messages in media increases an individual's likelihood to use contraceptives.

With regard to region of residence, the study's findings indicate that residing in all the other regions reduced the odds of having unmet need for contraception among men and women in Zambia. This may be attributed to the fact that Luapula province is predominantly rural and as such, the provision and utilisation of family planning services there is low. Studies elsewhere have established regional variations in unmet need for contraception (Ojakaa 2008; Haque 2010). Results also indicated that number of living children is significantly associated with unmet need for contraception. Number of living children is inversely related to unmet need for spacing among men and women meaning that unmet need for spacing reduced with the increase in the number of living children one had. On the other hand, women and men with five or more living children are more likely to have unmet need for limiting compared to those with no children though the relationship was not statistically significant. This is as expected in that women who have fewer children need to space births whereas those who have more children need to stop childbearing.

As established elsewhere (Kekovole 1999: Bizuneh,Shiferaw & Melkamu 2008), results of this study show a significant association between educational attainment and unmet need for contraception. The odds of having unmet need for contraception decreased with an increase in educational attainment. This finding emphasizes the role of education in influencing individuals' attitude and behaviour. This is due to the fact that an educated man or woman is more likely to access information about contraceptives and the advantages or disadvantages of using them. Consequently, they will be able to make informed decisions about contraceptives. In addition education helps in shaping one’s world view. An educated person is more likely to have a positive attitude towards contraceptive use compared to an uneducated one.

Furthermore, findings of the study established a negative association between age and unmet need for limiting among women in Zambia. Adult women had lower risks of having unmet need for limiting than adolescents. Contrarily, findings from existing studies indicate that age is inversely related to unmet need for spacing and total unmet need whereas it is positively associated with unmet need for limiting. For example, Khan et al. (2008); Assefa and Haddis (2011); Woldermicael (2011); found that while the odds of having unmet need for spacing among older women were lower compared to their younger counterparts, they were more likely to have unmet need for limiting than the younger women. Moreover, Kumar and Singh (2013) observed that age was inversely associated with total unmet need. A possible explanation for the current results is that the women were divided into only two age groups (15-19 and 25-49) as the study was looking at differences between adolescents and adults. It is also possible that with time, older women have acquired more knowledge about contraceptives and they are thus in a better position to choose what suits them best.

As earlier indicated, fertility preference is one of the major predictors of unmet need for contraception among women in Zambia. Women who were not decided as to whether they wanted another child or not were more likely to have both unmet need for spacing and limiting than those who wanted another child. On the other hand, the risks of having unmet need for spacing among women who did not want any more were lower than for those who wanted another child but higher in the case of unmet need for limiting. It is expected that women who are not decided as to whether they want another child or not have a higher likelihood of having unmet need for spacing and limiting because when one is not decided on anything it is most likely that they will not do anything in connection with the issue. In this case, it is most likely that women who are not decided as to whether they want another child or not will not use any contraceptives to prevent pregnancy. In addition, the increased risk of having unmet need for limiting among women who do not want any more children may be due to the fact that such women would have reached their desired fertility and would like to stop child bearing.

Results from the section dealing with multilevel modelling of unmet need for contraception among women reveal that though community factors have no significant independent effect on unmet need for spacing and limiting, combining them with individual factors results in a significant decrease in unmet need for spacing and limiting among women living in communities with an increased ethnic diversity. In addition, there is a positive correlation between unmet need for spacing and prevalence of a large family norm. The same applies to unmet need for limiting. This suggests that individual factors have a moderating effect on community factors.

Moreover, findings obtained from multilevel modelling indicate that number of living children, ethnic diversity, being visited by a family planning worker, prevalence of a large family norm, visiting a health facility and fertility preference are the major predictors of unmet need for spacing among women whereas, besides the last three predictors, age and marital status are the major determinants of unmet need for limiting among women. This adds three more factors (being visited by a family planning worker, prevalence of a large family norm and ethnic diversity) to the major factors determining unmet need for contraception in Zambia.

Being visited by a family planning worker is negatively associated with unmet need for contraception. This is as expected in that as the family planning worker visits the man or woman who may not be using contraceptives, they will be able to learn more about contraceptives and thus be able to decide to use them. In the case where the individual being visited is already using contraceptives, such a one will be encouraged to continue using. If the individual or couple being visited had discontinued, they will be able to get information about other types of contraceptives which may be suitable for them.

Residing in communities with a high proportion of women from different ethnic groups reduced the likelihood of having unmet need for spacing. A possible explanation for this could be that women residing in communities which are ethnically heterogeneous are less likely to be influenced by negative cultural beliefs and customs concerning use of contraceptives. Conversely, women residing in communities with a high prevalence of a large family norm were more likely to have unmet need for spacing and limiting. This is expected in that women who have high fertility are more likely to have unmet need for contraception. Moreover, this is consistent with the fact that Zambia's total fertility rate (6.2 births per woman) is high. This is a typical sub-Sahara Africa's scenario: high fertility and high unmet need (Gribble & Haffey 2008).

Findings also show that belonging to a rich household decreased the odds of having unmet need for spacing. This is expected in that men and women from rich households are in a better position to source needed services than those who are not. This is because they have the means of paying for services if need arises or if they are not satisfied with what is offered freely. Studies elsewhere have established that higher household wealth is significantly negatively associated with unmet need for contraception (Ojaaka 2000; Magure et al. 2010; Barman 2013).
Furthermore, unmet need for spacing was significantly lower among women who were engaged in professional/clerical jobs. A possible reason for this is that women who are in such jobs are more likely to be highly educated and thus be more motivated to use contraceptives than those who are not working. Moreover, being engaged in such jobs is demanding and as such they use contraceptives to avoid having short birth intervals. Having short birth intervals would mean being nursing mothers too often and as a result fail to perform well at work due to the increased work load. To avoid this, such women opt to have smaller families and implement their fertility preference effectively (Kumar & Pujari 2014).

10.3 CONSEQUENCES OF UNMET NEED FOR CONTRACEPTION IN ZAMBIA

Findings of the study show that the proportion of women with unmet need for contraception is higher among women with short birth spacing compared to those who have met need. This suggests that most women do not use contraceptives soon after delivering. Such women may consider themselves to be at low risk due to the fact that they are breastfeeding even though the feeding may be sub-optimal (Kozuki et al 2013). Globally, postpartum women are reported to have the highest unmet need for contraception (USAID 2012). Contrary to expectations, the level of unmet need for limiting among these women was higher than that for unmet need for limiting. This could point to the fact that most of the women with short spacing between births have the desired number of children and would like to stop child bearing.

The study also found that there were more women with unmet need for contraception whose infants died before reaching their first birthday than those who had met need. Moreover, those with unmet need for spacing were more than that those with unmet need for limiting.

Furthermore, risk of dying before age five was significantly higher for children whose mothers had unmet need for limiting and total unmet need than those whose mothers had their needs met. The finding implies that unmet need for contraception does influence child survival. It could be due to that fact that women who do not use contraceptives are less likely to decide when to have their children as well as to determine how many children to have (Okech, Wawire & Mburu 2011). Consequently, such women are more likely to have births that are too close to each other. This may result in their children not being well nourished and thus increase their risks of dying. Moreover, it has been observed that contraceptive use has the capacity to reduce infant mortality and child mortality by 10% and 21%, respectively, so long the birth interval is at least two years (Cleland et al. 2012).

This study established a significant association between parity and unmet need for contraception. Women with unmet need for spacing were less likely to have five or more children than those with met need where as those with unmet need for limiting were more likely to have five or more children. A possible explanation for this is that women with high parity are more desirous to prevent pregnancy as they would have reached their desired number of children but are not able to use contraceptives due to various reasons. This perhaps explains why studies elsewhere allude to the fact that women with higher parity have higher odds of using contraceptives compared to those with lower parity (Shah et al. 2001; Ettarh 2011).

Contrary to expectations the association between having a terminated pregnancy and unmet need for contraception, was insignificant. There were more women with a terminated pregnancy who had unmet need for contraception compared to those with no need. In addition, the odds of having a terminated pregnancy were lower among women with unmet need for spacing but higher among those with unmet need for limiting. This could be attributed to the fact that the variable terminated pregnancy in the 2007 Zambia DHS includes women who have experienced either an induced or spontaneous abortion. Seeing that the Termination of Pregnancy Act in Zambia is restrictive in procedure and that induced abortion is looked down upon, there is a high likelihood that most of those who reported a terminated pregnancy had a spontaneous abortion which may not be related to non-use of contraceptives. Moreover, studies elsewhere document that termination of pregnancy, particularly induced abortion, is a consequence of unmet need for contraception (Delvaux et al. 2003; Cohen 2009; Todd et al. 2010).

10.4 POTENTIAL DEMOGRAPHIC IMPACT OF SATISFYING UNMET NEED FOR CONTRACEPTION

This study found that satisfying unmet need for contraception has significant potential demographic implications. Using a simple regression equation obtained from CPRs and TFRs of 84 countries to estimate new TFRs, this study found that all the three models yielded TFRs that were markedly lower than the current TFR. Model 1 which assumes the satisfaction of all unmet need for contraception, yielded a TFR of 2.6 children per woman. The TFR that was obtained in Model 2 is 3.0 children per woman. This model's assumption is that women with unmet need for contraception who reported having no intention to use any contraception in future will truly not use any method. Model 3 has three assumptions: one fifth of the women with unmet need for spacing and one tenth of women with unmet need for limiting who have intentions to use contraceptives in future will not use any method; women with unmet need for contraception who have no intentions to use contraceptives in future because they consider themselves at low risk of pregnancy will not use any method and 50% of the remaining women with unmet need for contraception who intend to use contraceptives in future will not use any method. This model gave an estimated TFR of 2.8 children per woman. Therefore, based on the three models, Zambia's current TFR of 6.2 would reduce by 58.1%, 51.6% and 54.0%, respectively, if unmet need for contraception were to be satisfied.

In addition, the potential impact of satisfying unmet need for contraception on fertility was demonstrated by the manner in which the reduction in fertility relates to replacement fertility level. In Model 1, the TFR would be 19.2% closer to replacement level fertility for developed countries and have reached the replacement-level fertility for developing countries. Based on Models 2 and 3 the TFR would be brought 30% and 25%, respectively, near to the replacement-level fertility for developed countries. It is worth noting that even the use of the most conservative of the three models (Model 2) shows that satisfying unmet need for contraception can have significant demographic implications.

As previously established in other studies (Westoff & Bankole 1996; Chaudhury 2001), the estimated TFRs clearly indicate that unmet need for contraception is so high that satisfying it would greatly reduce fertility. This of course would be due to the fact that contraceptive use would give women the opportunity to have children at the time they want to have them. This means that they would be able to space and limit births accordingly and as a result, have their desired number of children.

10.5 CONTRIBUTION TO KNOWLEDGE

This study was built on the foundation of four theoretical frameworks. Bhushan's (1997) model which is a modification of the conventional microeconomic model of fertility behaviour was designed to explain the reasons for unmet need for contraception whereas Casterline's (1997) framework was developed to explain the causes of unmet need for contraception. Thus, both are meant to enhance our understanding of unmet need for contraception. Both Kaushik (2000) and Shaikh (2010) came up with frameworks to analyse factors determining unmet need for contraception, While the former framework categorised the factors into background and intervening, the latter proposed that the analysis of factors influencing unmet need for contraception be done at various levels (individual, household, community, health system and state).

Therefore, this study identified the correlates of unmet need for contraception using a conceptual framework which combined the various aspects of the four frameworks. The comprehensive multi-factor conceptual framework included individual, household, community and programme access factors which were all categorised as underlying variables. In addition, the framework had a set of intermediate variables through which the underlying ones could operate to influence the outcome. This meant that the study did not only focus on individual factors (as most studies have done) but on other factors as well which can influence unmet need for contraception.

The use of multilevel modelling helped to identify that some community factors have a significant effect on unmet need for contraception. Residing in communities with high ethnic diversity increases the odds of having unmet need for contraception whereas living in communities with a high prevalence of a large family norm increases the odds of having unmet need for contraception. Studies on the association between community factors and unmet need for contraception are lacking.

In addition this study examined unmet need for contraception among various sections of the population thereby including adolescents, men and the unmarried who in most cases are left out.

This has resulted in a better understanding of unmet need for contraception in Zambia as the levels were disaggregated according to unmarried adolescent and adult females, married adolescent and adult females and married adolescent and adult males. Hence, the study established that the level of unmet for contraception among men is higher than among women. Moreover, this study identified the major predictors of unmet need among adolescent females, adult females, men and women.

The redefining of unmet need for contraception to include adolescents, unmarried women and men resulted in a lower estimated average level of unmet need for contraception in Zambia (24.5%) compared to the disseminated figure of 27% which only includes currently married women.

This study also developed a regression equation to use in estimating TFR if unmet need for contraception is satisfied by using TFRs and CPRs of 86 countries based on recent DHS data. This helped to come up with estimates that are more up to date than if the study was to use the available regression equation which was developed by using the 1990s DHS data.

CHAPTER ELEVEN

CONCLUSION AND RECOMMENDATIONS

11.0 INTRODUCTION

This chapter addresses the conclusion of the study. In addition, implications and recommendations for policy are presented. Furthermore, the strengths and limitations of the study are discussed as a way of putting its interpretations into perspective. The final section of the chapter provides possible directions for future research.

11.1 CONCLUSION

The main objective of this study was to measure the level of unmet need for contraception among men and women (adolescents and adults) in Zambia, identify its determinants and consequences. The study was directed by four questions: What is the level of unmet need for contraception in Zambia? What are the individual, community and programme factors responsible for unmet need for contraception among males and females in Zambia? Is there any association between unmet need for contraception and selected reproductive health problems (termination of pregnancy, short birth interval, infant and child mortality and high parity) in Zambia? Would satisfying unmet need for contraception in Zambia help to reduce fertility? Therefore, to answer these questions, four specific objectives (outlined in the beginning of this chapter) were addressed.

The study's findings denote that the average level of unmet need for contraception among men and women in Zambia is 24.5%. This is lower than the disseminated level for currently married women. A comparison of the levels reveals that levels of unmet need for contraception among adolescent females are lower than those for adults. Similarly, levels for the unmarried women are lower than those for their married counterparts. Moreover, the levels for males are higher than those for females In addition, the findings reveal some differences in the major predictors of unmet need for contraception among the adolescent and adult females as well as among men and women. Differences are also manifested in the major predictors of the two components of unmet need for contraception among all women. Marital status and number of living children are the major factors underlying unmet need for spacing and limiting among the adolescent females With regards to adult females, important factors underlying unmet need for spacing and limiting are marital status, visiting a health facility and fertility preference. The major factors underlying unmet need for spacing among women are marital status, number of living children, visiting a health facility and fertility preference whereas number of living children, educational attainment, region of residence and exposure to family planning messages in media were the most important factors determining unmet need for spacing among men. Considering unmet need for limiting, the important predictors in the case of women are age, marital status, region of residence, visiting a health facility and fertility preference whereas region of residence is only important predictor among men.

All in all, programme access factors contributed the most to unmet need for spacing and total unmet need whereas individual factors contributed the most to unmet need for limiting among women. This highlights the need for interventions that are aimed at enhancing access to services for individuals who need to space their births considering that those who need to space are more than those who need to limit. Moreover, results of this study established that the child mortality risks were higher among women with unmet need for limiting than those whose needs were met. Additionally, unmet need for spacing was negatively associated with high parity whereas unmet need for limiting was positively associated with high parity. Finally, satisfying unmet need for contraception has a significant effect on fertility. Estimates from all three models indicated that fertility would greatly reduce if unmet need for contraception were to be met.

11.2 POLICY IMPLICATIONS AND RECOMMENDATIONS

The policy implications and recommendations emanating from this study's findings are as follows: the levels of unmet need for contraception among men and women in Zambia are high. Seeing that unmet need for contraception is one of the four indicators used to measure progress made toward reaching target 2 (achieving universal access to reproductive health by 2015) of MDG5, Zambia will most likely not achieve this target. Achieving MDG5 can be made a reality if concerted efforts are put in to help satisfy men and women's unmet needs for contraception.

The need to have concerted efforts to satisfy unmet need for contraception is made even more urgent by the findings indicating that satisfying unmet need for contraception would significantly reduce fertility. One of the objectives of the 1989 National Population Policy was "to work towards the reduction of the total fertility rate from 7.2 to 4". Moreover, reducing the high level of fertility, particularly adolescent fertility is among the main objectives of the revised 2007 National Population Policy. However, according to the 2010 Census Report, Zambia's total fertility rate is estimated at 5.9. This shows that despite having such objectives, Zambia's TFR is still high even after more than 20 years of government adoption of the National Population Policy.

This study's findings also revealed that men have a higher level of unmet need for contraception compared to women. This suggests that men's demand for contraceptive use is not being fully met. This could be compounded by the limited modern contraceptive choices that they have. Therefore, programmes should, apart from addressing women's needs, specifically target men as contraceptive users.

The finding indicating the existence of variations in the important factors underlying unmet need for contraception among the adolescents and adults as well as females and males suggests the need to have interventions that specifically target each of these sections of the population. This will help meet their needs effectively.

The significant association between unmet need for contraception and some community factors suggests that the latter to some extent do influence the former. Therefore, there is need for interventions that should include community education programmes which will help people to learn about the importance of family planning and address cultural beliefs and customs which undermine the use of contraceptives.

The fact that results showed that education is inversely associated with unmet need for contraception underscores the role education plays in influencing men and women's reproductive behavior. As such, programmes aimed at enhancing men and women's educational attainment need to be intensified. This is because more access to education enables individuals to make informed decisions on contraceptive use.

There is an indication that exposure to family planning messages in media and visiting a health facility negatively influence unmet need for contraception. Therefore, there is need for government and service providers to intensify media campaigns that have specific messages targeted at specific groups of people. In addition, such messages should be aimed at redirecting attitudes instead of trying to change them (Mass media strategy brief). Moreover, health providers should take advantage of men and women's visits to health facilities by ensuring that they are provided with family planning information during such visits. Such information will help them in making decisions pertaining to contraceptive use.

Finally, results indicated that unmarried women also have unmet need for contraception. Seeing that Zambia was declared a Christian nation on 29 December 1991, there is need for policies to encourage churches to offer sexual and reproductive education which will help in addressing unmet need for contraception among the unmarried. Doing this will tie in with one of the major objectives of the revised 2007 National Population Policy which states "improve sexual and reproductive health (including family planning) so as to encourage a manageable family size".

11.3 STUDY LIMITATIONS AND STRENGTHS

First and foremost, the limitation of this study lies in the fact that it used data from the DHS. This data is cross-sectional and as such, cannot establish causal relationships. Considering that cross-sectional data is collected at a single point in time, it is not possible to take into account changes occurring in population characteristics over time. Despite this, the associations established are helpful in interpreting the results. Moreover, the fact that measures are collected on self–report may result in inconsistencies. This is reported to be more prominent among women than men (Gersovits 2005).

In addition, the DHS data does not have information on household income but uses the wealth index as a proxy indicator. To generate this index, information on the household assets is collected and then weight assigned to each of the indicators using principal component analysis. After coming up with standardized scores and factor coefficient score (FCS), the products of the indicator values and the FCS are summed. This sum, which is a standardized score with a mean of zero and standardized deviation of one, is the wealth index (Rutstein & Johnson, 2004). This being the case, the results obtained may not be the same as those that could be obtained if information on the actual household income was collected.

It is possible that the associations established in the results of the multilevel modelling could have been influenced by unmeasured individual and community level variables related to both the outcome and predictor variables fitted in the models (Babalola & Fatusi 2009). Despite the above limitations, the study contributes to a better understanding of the factors determining unmet need for contraception in Zambia as it uses more than one statistical analysis method and includes community factors as well.

Nevertheless, this study has some strengths. The first is that it is based on data from the DHS which is a nationally representative sample survey of men and women of reproductive age. Therefore, unlike findings of a study based on a small section of a given community, findings from such a large population based study can be generalized to the whole country. Moreover, results from this study are comparable at the country or regional levels. In addition, the use of the multistage stratified sampling method to choose clusters (an SEA or a segment of an SEA) and households gives room for multilevel analysis (Corsi et al 2012).

The second strength of this study is that it did not only include currently married women but unmarried women as well as men. In addition, the study also analysed unmet need among adolescents and adults separately. Hence, it was able to show the variations that existed in the determinants of unmet need for contraception among the various sections of the population.
The use of a number of analysis methods adds to the strength of this study. This study used binary and multinomial regressions as well as multilevel modeling to examine the factors underlying unmet need for contraception among men and women in Zambia. The use of multilevel modeling provided measures of association as well as measures of variation. This helped in identifying the factors which contributed most to variations in the components of unmet need for contraception across communities.

Therefore, results of this study provide a further step in the understanding of unmet need for contraception among men and women in Zambia. Additionally, the study's empirical findings are a further strength of the study. For instance the study established that exposure to family planning messages in media and visiting a health facility are each negatively associated with unmet need for contraception. Besides, educational attainment was inversely related to unmet need for contraception. Findings such as these have important policy and programme implications which, when addressed, may help in reducing the levels of unmet need among the various groups of the population.

11.4 FRONTIERS OF FUTURE RESEARCH

Having provided the results on the levels, correlates and effects of unmet need for contraception in Zambia, the following have been identified as areas of future research.

- Further research on unmet need for contraception among adolescents is needed. This is especially considering the fact that the numbers included in the DHS are low. Actually, the situation among men is worse.
- Further studies on unmet need for contraception using the mixed method approach (combining quantitative and qualitative methods) are needed. This is because the use of both quantitative and qualitative methods extends the depth and breadth of the study and makes it possible to capture aspects which could have been left out if only one method is used (Rocco et al. 2003; Burke 2007). Moreover, qualitative studies will help in identifying the barriers to the use of contraceptives among men and women with unmet need for contraception. Therefore, such studies will help determine the causes/reasons of unmet need for contraception which are likely to differ across and within communities. These studies can include issues such as family community norms and beliefs; and myths and misconceptions about family planning which are not captured in the DHS data.
- Region of residence was established as a significant factor underlying unmet need among men and women in Zambia. Therefore, there is need to have studies that will determine the extent to which factors at various levels affect the regional differences in unmet need for contraception.
- Seeing that the level of unmet need for contraception among currently married women in Zambia has been at 27% since 1996, there is need for further research to find the factors determining the stall in the reduction of unmet need for contraception.

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Appendix A

Policy Brief

April 2014

High levels of unmet need for contraception in Zambia: Cause for concern

Eunice N.S. Imasiku

Introduction

Though family planning programmes initially lacked government support in Zambia, the 1980s saw a change in government's attitude towards family planning. Notable activities indicating this change were the establishment of the Family Unit in the Ministry of Health, the introduction of family planning services in health institutions in 1981 and adoption of the National Population Policy in 1989 (Solo et al. 2005). These activities and others which followed in later years helped to increase contraceptive use among married women of reproductive age (15-49) from 15% in 1992 to 26% in 1996 to 34% in 2001-2002 and 41% in 2007 (Central Statistical Office (CSO), Ministry of Health (MOH), Tropical Disease Research Centre (TDRC), University of Zambia (UNZA), Macro International Inc. 2009). Despite government's efforts towards implementing family planning programmes and the increase in contraceptive use, unmet need for contraception[1] (unmet need) among currently married women in Zambia still remains high at 27%.

What are the causes of unmet need?

Lack of knowledge about contraception, spousal's disapproval of contraception, perceived low risk for pregnancy and health concerns and side effects have been established to be major causes of unmet need (Bhushan 1997; Short & Kiros 2002). Individuals may lack knowledge about contraceptives if contraceptives are not readily accessible and available. Moreover, lacking knowledge about contraceptives is indicative of low educational attainment. Educational attainment is inversely associated with unmet need. Most breast feeding and postpartum amenorrheic women perceive themselves to have a low risk for pregnancy. In addition, older women, especially those nearing menopause, and teenagers are more likely to think that they are not at risk and thus feel there is no need for them to use contraceptives.

What are the consequences of unmet need?

Unmet need is associated with unintended pregnancies which increase the risk of morbidity, mortality, and induced abortions (most likely unsafe abortions). Though these risks which pose a serious public health concern apply to all women in the reproductive ages, they are higher in young people (Haque 2010; MacDonald 2010). Zambia's Maternal Mortality Rate stands at 591 deaths per 100,000 live births. Induced abortion is ranked among the top five causes of maternal death, thus contributing close to one third (30%) of maternal deaths (Simms 1996; Chiwama 2009). Koster-Oyekan's study (1998) established that induced abortion accounted for approximately 120 deaths per 100,000 live births in four of the districts in Western Province between 1994 and 1995 with more than 50% of the victims being school girls. This suggests that young people tend to fall for induced abortion as a solution to unintended pregnancy. Moreover, women with unmet need are more likely to have more children compared to those whose needs are met (Ikamari & Lwaanga 2000).

[1]Unmet need for contraception refers to the condition of a fecund man or woman who expresses the desire not to want any more children or to want to postpone the birth of the next child, but is not using any contraceptives.

[2]MDG5 has two targets: to reduce maternal mortality ratio by three-quarters and to achieve universal access to reproductive health by 2015. Unmet need is the fourth indicator under target two.

What are the benefits of satisfying unmet need?

By adding unmet need to MDG 5[2] in 2006 as a way of tracking improvement on maternal health global leaders affirmed that family planning is the key to achieving MDGs. They contended that achieving MDGs is dependent on satisfying unmet need for contraception, in that family planning can, among other things, aid in ensuring that all children go to school, curb the AIDS pandemic, reduce infant mortality and promote gender equality. Family planning helps families have fewer children who they can afford to educate, unlike when they have more children (Cohen 2004). Additionally, the fewer the number of school going children, the more likely the government will be able to have enough investment in the education sector. Women who use contraceptives are more likely to space their births for at least 36 months apart thereby breastfeed the infant for a longer period (UNFPA and PATH 2008). This reduces the risks of early deaths. Women who do not use contraceptives risk having unintended pregnancies which can hinder their progress in education and employment thus reducing their chances of contributing to development (Cates Jr. 2010).

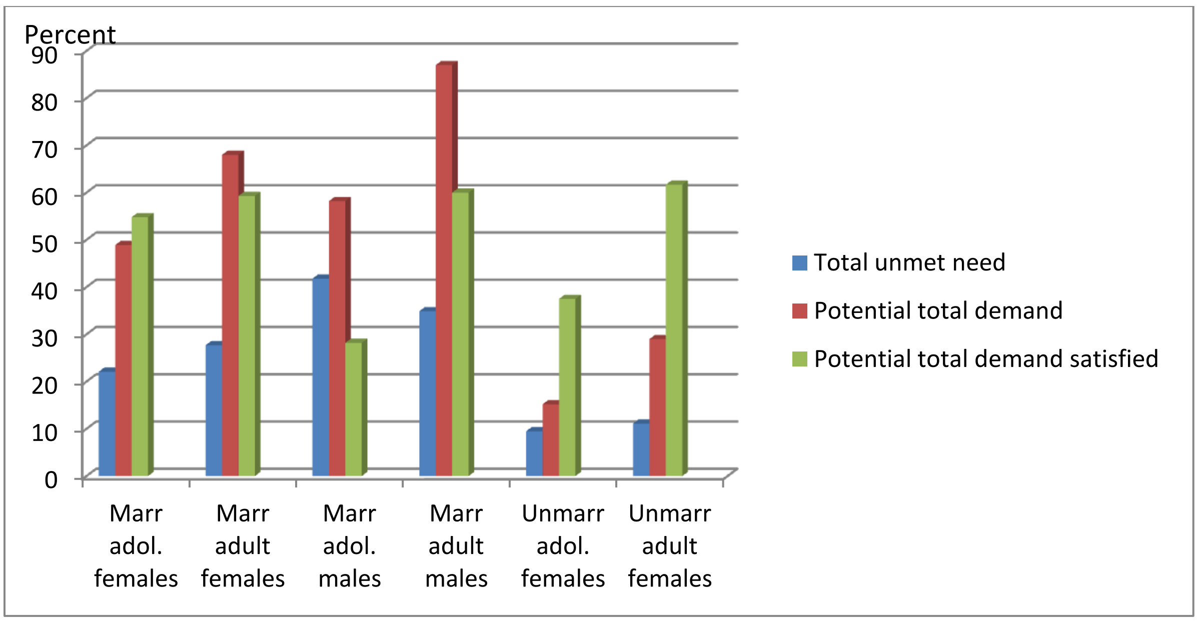
Given the above scenario, this study aimed at determining the levels of unmet need among the adolescents and adults (married and unmarried) in Zambia and identifying the factors underlying unmet need. The study was based on the 2007 Zambia Demographic and Health Survey data with a sample size of 7,146 women aged 15-49 and 6,500 men aged 15-59.

Findings

Findings of the study indicate that the level of unmet need for spacing among married adolescent females was 15.0% whereas unmet need for limiting was estimated at 7.1%. Hence the total unmet need was 22.1%. Regarding married adult females, the level of total unmet need was 27.7% (15.2% for spacing and 12.5% for limiting). Moreover, unmet need for spacing among unmarried adolescent females was 4.3% whereas unmet need for limiting was estimated at 5.2%. Therefore, total unmet need was 9.5%. Considering unmarried adult females, total unmet need stood at 11.1% of which 6.3% was for spacing and 4.8% for limiting. It was not possible to estimate the levels of unmet need for unmarried men. The level of unmet need for spacing among married adolescent males was 41.8%. They did not have unmet need for limiting thus the total unmet need was 41.8%. As for married adult males, total unmet need was estimated at 34.9% with 21.4% of it being for spacing and 13.5% for limiting.

Figure 1 presents the levels of unmet need and potential demand for family planning among females and males in Zambia. The potential demand for family planning among married adolescent females was 48.9% whereas it was 68.0% for married adult females. Moreover, the potential demand for family planning among married adolescent males was 58.2% whereas that for married adult males was estimated at 87.0%. Furthermore, the potential demand for family planning among unmarried adolescent females was15.2% whereas it was 29.0% for their unmarried counterparts.

Figure 1: unmet need and potential demand for family planning among females and males in Zambia, 2007 ZDHS



The findings also reveal that the major determinants of unmet need for spacing and limiting among the adolescent females were marital status and number of living children. As for adult females, the most important predictors of unmet need for spacing and limiting were marital status, visiting a health facility and fertility preference. Marital status, number of living children, visiting a health facility and fertility preference were the major predictors of unmet need for spacing among all women whereas age, marital status, region of residence, visiting a health facility and fertility preference were the major factors associated with unmet need for limiting. With regards to men, the important predictors of unmet need for spacing were number of living children, educational attainment, region of residence and exposure to family planning messages in media. On the other hand, only region of residence was the main determinant of unmet need for limiting.

Policy implications

The levels of unmet need for contraception among men and women in Zambia are high. Seeing that unmet need is one of the four indicators used to measure progress made toward reaching target 2 (achieving universal access to reproductive health by 2015) of MDG5, Zambia is most likely not to achieve this target. Achieving MDG5 can be made a reality if concerted efforts are put in to help satisfy men and women's unmet needs for contraception.

Moreover, men have a higher level of unmet need for contraception compared to women. This suggests that men's demand for contraceptive use is not being fully met. This could be compounded by the limited modern contraceptive choices that men have compared to women. Furthermore, there are variations in the important factors underlying unmet need for contraception among the adolescents and adults as well as females and males suggesting that the various sections of the population are affected differently by these factors. The fact that results showed that education is inversely associated with unmet need for contraception underscores the role education plays in influencing men and women's reproductive behavior. There is an indication that exposure to family planning messages in media and visiting a health facility negatively influence unmet need.

Recommendations

- Programmes should, apart from addressing women's needs, specifically target men as contraceptive users.
- There is need to have interventions that specifically target various sections of the population. This will help meet their needs effectively.
- Programmes aimed at enhancing men and women's (particularly women's) educational attainment need to be intensified. This is because more access to education enables individuals to make informed decisions on contraceptive use.

- There is need for government and service providers to intensify media campaigns that have specific messages targeted at specific groups of people. In addition, such messages should be aimed at redirecting attitudes instead of trying to change them.
- Health providers should take advantage of men and women's visits to health facilities by ensuring that they are provided with family planning information during such visits. Such information will help them in making decisions pertaining to contraceptive use.

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This Policy Brief is based on a doctoral thesis entitled 'the concept, correlates and consequences of unmet need for contraception in Zambia' submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, South Africa.

Appendix B

Turnit in report

The similarity index is 17% and a major portion of it (7%) is from my publication entitled 'Variations in unmet need for contraception in Zambia: does ethnicity play a role?' This was published in the Journal of Biosocial Science. The sources with the next highest percent are three and these have 1% each. The four sources are from measuredhs, zamstats and usaid. Most of such sources have dealt with unmet need for contraception (unmet need) and the concept was in this case highlighted. In addition, the questions that were asked to get various variables were highlighted among others. The rest of the sources had <1% each. Most of these highlighted unmet need and other demographic terms such as Infant and Child Mortality, Total fertility Rate etc.

Appendix C

Proofreader's Certificate

This serves to confirm that I have proofread Eunice Ntwala Samwinga Imasiku's PhD thesis, paying particular attention to typographical errors, grammar and contextual flow.

Jennifer Croll

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Appendix D

Tabular presentation of the reviewed journal articles

S/N	Title	Author(s) & year	Data Source	Data analysis	Level of Analysis	Findings	Gaps
1	Unmet need for family planning in Iran	Ahmadi & Iranmahboob (2005)	Iran DHS	Logistic regression	Individual level	Place of residence, age, work status, mass media, education, living standards, knowledge about contraceptives and children ever born were significantly related to unmet need	Analysis restricted to the individual level & only focused on married women. The consequences of unmet need were not considered.
2	Study of unmet need for family planning in the Immunisation Clinic of a	Anand, Singh & Mohi (2010)	A cross sectional study	Percentage distributions	Individual level	Maximum unmet need was after the birth of one child; more in	The study is not population based, but mainly hospital-based.

	Teaching Hospital at Patiala, India		conducted at a hospital			illiterate women, in those belonging to joint family and those residing in rural areas	Focused on women.
3	Desired fertility and fertility behaviour among the Yoruba of Nigeria: A study of couple preferences and subsequent fertility	Bankole (1995)	A two-round survey	Logistic regression models	Individual and household levels	Fertility desires of both marriage partners were important predictors of the couple's fertility	Analysis done at individual and household levels. Community level not included.
4	Couples' fertility and contraceptive decision making in developing countries: Hearing the man's voice	Bankole & Singh (1988)	DHS data for 18 developing countries, 1990 to 1996	Logistic regression analyses	Individual and Household levels	Husbands tend to want more children than their wives and to want the next child sooner	Analysis done at individual and household levels. Community level not included.
5	Prevalence and determinants of unmet need for family planning in a district of eastern region of Nepal	Bhandari et al. (2006)	A cross sectional study in Eastern Nepal	Multiple logistic regression analysis	Individual level	A strong association of gender preferences towards male child and unmet need	Level of analysis restricted to individual-level. Focused on women. Consequences of unmet need were not considered.

6	Couples and Reproductive Health: A Review of Couple Studies	Becker (1996)	Systematic review	....	....	Discordance between spouses on family planning approval and fertility intentions	The article only reviewed existing literature.
7	Measuring Unmet Need: Wives, Husbands or Couples?	Becker (1999)	Bangladesh, Dominican Republic and Zambia DHSs	Percentage distributions	Individual and Household levels	Differences between spouses in contraceptive and fertility intentions are substantial in all three countries. When unmet need calculated using wives' reports was compared with results using the minimum estimate, couples' unmet need was overestimated.	The study was concerned with issues pertaining to the definition and measurement of unmet need. Causes and consequences of unmet need were not considered.

8	Awareness and Determinants of family planning practice in Jimma, Ethiopia,	Beekle and McCabe (2006)	A descriptive survey conducted in Jimma University Hospital	Chi-squared tests	Individual level	A lack of formal education for women was a key factor in preventing change in the patterns of contraceptive knowledge and use.	The study is not population based, but mainly hospital-based. Focused on women.
9	The causes of unmet need for contraception and the social content of services	Bongaarts & Bruce (1995)	Survey data and related anthropological studies	Percentage distributions	Individual level	lack of knowledge of contraception, concerns about health and spouse (or partner's) objection were main causes of unmet need	Level of analysis restricted to individual-level. Focused on women. Consequences of unmet need were not considered.
10	Factors Underlying Unmet need in the Philippines	Casterline et al.(1997)	Mixed methods: structured and unstructured interviews conducted in	Logistic regression analyses	Individual level	Most important factors accounting for unmet need were strength of women's reproductive preferences, husbands'	Level of analysis restricted to individual level. Household and community levels not considered.

			two locales			fertility preferences, and perceived detrimental side effects.	
11	Unmet Need for Family Planning in Developing Countries and Implications for Population Policy	Casterline & Sinding (2000)	Systematic review	....	....	Health concern was a major cause of unmet need	The article only reviewed existing literature
12	Unmet Need and Unintended Fertility: Longitudinal Evidence from Upper Egypt	Casterline et al. (2003)	1995 Egypt DHS and 1996/1997 Egypt In-Depth Study	Percentage distributions	Individual level	Women with unmet need comprised half of those with mistimed and unwanted births	Analysis done at individual level. Household and Community levels not included. Focused on married women.
13	Unmet need for Contraception in South Asia: Levels, Trends and Determinants	Chaudhury (2001)	DHSs from 1990/1991 to 1999/2000.	Percentage distributions	Individual level	Most prominent co-variates of unmet need were age, number of living children, residence and	Level of analysis restricted to individual level. Household and community levels not considered. The study did not look at consequences of unmet

						education	need.
14	Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study	Chen et al. (2007)	1995–2000 US Nationally linked birth/infant death data set	Percentage distributions	Individual level	Teenagers were associated with increased risks for pre-term delivery, low birth weight and neonatal mortality	Level of analysis restricted to individual level. Household and community levels not considered.
15	Reducing maternal mortality: a global imperative	Coeytaux et al (2011)	Systematic review	....	....	About 200 million women and girls globally who want to use contraceptives do not have access to them	The article only reviewed existing literature.
16	A New Perspective on the Definition and Measurement of Unmet Need for Contraception	De Graff & de Silva (1996)	1987 Sri Lanka DHS	Percentage distributions	Individual level	Health-based methodology captured only 43-65% of preference- based unmet need in Sri Lanka.	The study was concerned with issues pertaining to the definition and measurement of unmet need. Focused on married women.

17	Stalking the Elusive 'Unmet Need' for Family Planning	Dixon-Mueller & Germain (1992).	Commentary	....	....	Concept of unmet need was broadened to include non-users at risk of an unplanned pregnancy and need some method of contraception; and users and non-users who need more comprehensive sexual and reproductive health services	The study did not go beyond issues pertaining to the measurement of unmet need.
18	A Couple Analysis of Micro-Level Supply/ Demand Factors in Fertility Regulation	Dodoo (1993)	1988 Ghana DHS	Percentage distributions	Individual and household levels	Spouses had different fertility motivations and contraceptive needs	Community level analysis was not included.
19	Men Matter: Additive and Interactive Gendered Preferences and Reproductive Behaviour in	Dodoo (1998)	1989 and 1993 Kenya DHS	Logistic regression analysis	Individual and household levels	Reproductive preferences for men were stronger than those for their wives	Analysis was at the individual and household levels. Community level was left out.

	Kenya						
20	Do Male Reproductive Preferences really Point to a need to refocus Fertility Policy?	Dodoo et al. (1997)	1994 study conducted in fourteen localities in Accra, Ghana	Percentage distributions	Individual and household levels	Level of unmet need was higher when only women's preferences were considered than when preferences for both spouses/partners were considered	Analysis was at the individual and household levels. Community level not included.
21	Men's Influences on Women's Reproductive Health: Medical Anthropological Perspectives	Dudgeon, & Inhorn (2004)	Summary of exemplary research on the topic	....	....	Men influence women's reproductive health	The article summarised existing literature which mostly focused on individual level.
22	Male knowledge, attitudes and family planning practices in Northern Nigeria	Duze & Mohammed (2006)	1998 study conducted among the Hausa of Nigeria	Path analysis	Individual level	Large family size was desired, use of contraceptives was low and a general display of unfavourable attitudes toward family	Level of analysis restricted to individual level. Household and community levels not considered.

						planning	
23	The Influence of Spouses over each Other's Contraceptive Attitudes in Ghana	Ezeh (1993)	1988 Ghana DHS and 1991focus-group discussions	Logistic regression analysis	Individual and household levels	Spousal influence, rather than being mutual or reciprocal, is an exclusive right exercised only by the husband	Analysis was at the individual and household levels. Community level not included.
24	Unmet need of family planning among rural women in Bangladesh	Ferdousi et al. (2010)	2009 Cross-sectional study in Sreepur upazila, Bangladesh	Chi-squared tests	Individual level	The main reason for unmet need was fear of side effects	Level of analysis restricted to individual level. Focused on married women.
25	Women's Education and Modern Contraceptive Use in Ethiopia	Gordon et al. (2011)	2008 survey conducted by Marie Stopes International	probit regression analysis	Individual level	Knowledge and access had the most considerable explanatory power of the influence of education on	Level of analysis restricted to individual level. Household and community levels not considered.

						contraceptive use.	
26	The Risks of Pregnancy and the Consequences among Young Unmarried Women Working in a Free Trade Zone in Sri Lanka	Hettiarachchy & Schensul (2001).	Mixed methods: conducted in a Free Trade Zone in Sri-Lanka	Percentage distributions	Individual level	Consequences of unwanted pregnancies among young unmarried women were abandonment and hazardous abortions.	Analysis done at individual level. Household and Community levels not included.
27	Catholics Using Contraceptives: Religion, Family Planning, and Interpretive Agency in Rural Mexico	Hirsch (2008)	Ethnographic research conducted in Degollado in Western Mexico	Percentage distributions	Individual level	Religion influences contraceptive use	Analysis done at individual level. Household and Community levels not included.
28	Socio-Economic Factors in Infant and Child Mortality: A Cross-National	Hobcraft et al (1985)	World Fertility Survey	Best fitting model	Individual and household	Infant and child mortality rates are higher for babies and	Analysis was at the individual and household levels. Community level not

	Comparison				levels	children born to mothers below 20 compared to those 20 and above.	included.
29	Prevalence and Determinants of Unmet need for Family Planning in Nnew, South-east Nigeria	Igwegbe et al. (2009)	A descriptive cross sectional study of 356 women attending antenatal clinic Nnamdi Azikiwe Hospital	Percentage distributions and Chi-squared tests	Individual level	Level of unmet need was 21.4%. Major causes f unmet need were husband's approval, fear of side effects and religious beliefs. Parity was significantly associated with unmet need.	It was hospital based and level of analysis was restricted to individual level. Consequences of unmet need were not considered.
30	The Magnitudes and Correlates of unintended Childbearing in Kenya: Implications for the Family Planning Programme	Ikamari (2000).	1993 Kenya DHS	Percentage distributions and logistic regression analysis	Individual level	Unintended child bearing was high. The most important predictors were birth interval, province of residence, approval of	Analysis done at individual level. Consequences of unintended childbearing were not included.

						contraception, number of living children, age at conception and religion	
31	Correlates of Unmet need for Contraception in Zambia	Ikamari & Lwanga (2000).	1996 Zambia DHS	Percentage distributions and logistic regression analysis	Individual level	Age, region of residence, number of living children and approval were significantly correlated with unmet need	Analysis done at individual level and focused on married women. Concentrated on correlates of unmet need.
32	Sexual initiation and contraceptive use among female adolescents in Kenya	Ikamari & Towett (2007).	2003 Kenya DHS	Regression models	Individual level	The majority of Kenyan adolescents were sexually active. Mean age at first sex was 16.2,	Level of analysis restricted to individual level. Consequences of unmet need were not considered.
33	Unintended Pregnancy among Unmarried Adolescents and Young Women in	Ilika & Igwegbe (2004)	Study conducted at Christian Hospital,	Percentage distributions	Individual level	More than half of those who had been pregnant before attempted to terminate	The study is not population based, but mainly hospital-based. Focused on female

	Anambra State, South East Nigeria		Ozubulu, Anambra State			the pregnancy.	adolescents.
34	Unmet need for family planning: a comparative analysis of Northern and Southern States of India based on NFHS data	Kaushik (1999)	1992-93 National Family Health Survey	Logistic regression analysis	Individual level	Husbands' approval was the most important factor influencing unmet need.	Analysis restricted to the individual level & only focused on married women. Consequences of unmet need were not considered.
35	Trends and Correlates of Unmet Need for Contraception in Kenya: Findings and Implications for Fertility Transition	Kekovole (1999).	1989 and 1993 Kenya DHS	Logistic regression analysis	Individual level	The most significant factors correlated with unmet need were type place of residence, education, religion, respondent's and husband's approval, desired family size, and parity.	Analysis restricted to the individual level & only focused on married women.
36	Religion and Reproduction:	Knodel et al. (1999)	1994 Survey of	Logistic regression	Individual level	Muslims were less likely to use	Analysis done at individual level. Household and

	Muslims in Buddhist Thailand		Knowledge, Attitude and Family Planning Practices	analysis		contraceptives than Buddhists.	Community levels not included. Focused on married women.
37	Are there Unmet Family Planning Needs in Europe?	Klijzing (2007)	Fertility and Family Surveys	Logistic regression analysis	Individual and household levels	Unmet need increased with family size and with age. There was a clear association between unmet need and abortion ratios	Analysis was at the individual and household levels. Community level not included.
38	Family planning practice and related factors of married women in Ethiopia	Ko et al (2010)	A cross sectional survey conducted in Hetosa Woreda, Ethiopia	Multiple logistic regression analysis	Individual and household levels	Contraceptive use was significantly associated with willingness to use long-term or permanent contraception methods in future and spousal discussion about	Focused on married women. Consequences of unmet need were not considered.

						contraceptives	
39	Why resort to illegal abortion in Zambia? Findings of a community-based study in Western Province	Koster-Oyekan (1998)	Community based survey.	Percentage distributions	Individual level	A high induced abortion mortality ratio of 120 induced abortion-related deaths per 100 000 live births. More than 50% of the deaths were of schoolgirls.	It did not systematically link unmet need with induced abortion.
40	Trends and Determinants of Contraceptive Use in Rakai District, Uganda	Lutalo et al. (2000)	1995 to 1998 prospective study conducted in rural Rakai District, Uganda	Chi-squared tests	Individual level	One-fourth of respondents stated that they wanted to delay their next pregnancy for more than two years, but only 15 percent of them were practicing family planning.	Analysis done at individual level. Household and Community level not included.
41	Family Planning Knowledge, Attitudes, and	Mbizvo & Adamchak	1988 Male Fertility	Percentage distributions	Individual	Men dominated in the decision-making	Analysis restricted to the individual level. Household

	Practices of Men in Zimbabwe	(1991).	Survey	and Chi-squared tests	level	process about using a family planning method, and on the number of children a couple should have. Child-spacing was by far the dominant reason offered for using contraceptives.	and community level not included.
42	Unplanned Pregnancies in Harare; What are the Social and Sexual Determinants?	Mbizvo et al. (1997)	1995 study conducted at Harare Maternity Hospital	Logistic regression analysis	Individual level	Early and late childbearing (below19 and above 35 years) and high parity (five and above) are risk factors for certain adverse pregnancy outcomes.	Analysis was restricted to the individual level. Household and community level not included.
43	Factors Related to Induced Abortion among Young Women in Edo State,	Murray et al. (2006)	2002 Survey conducted in Endo State,	Probit models	Individual level	Young unmarried women were significantly more	The study did not systematically link abortion to unmet need.

	Nigeria		Nigeria			likely than married one to have had an abortion.	
44	Socioeconomic Determinants of Infant Mortality in Kenya: Analysis of Kenya DHS 2003	Mustafa & Odimegwu (2008)	2003 Kenyan DHS	Logistic regression model	Individual and household levels	On overall, breastfeeding, ethnicity and sex of the child were significant factors of infant mortality while birth order and intervals were significant factors in the rural areas	Concentrated on the socioeconomic determinants of infant mortality.
45	Implications of Men's Unmet Need in Africa	Ngom (1997)	1988 , 1993 Ghana and 1989, 1993 Kenya DHSs	Percentage distributions	Individual and household levels	Married men had high levels of unmet need that were comparable to, although slightly lower than, those for women	The study concentrated on matters pertaining to definitions and measurements of unmet need, particularly men's unmet need.

46	Measuring the Unmet Need for Contraception to Space and Limit Births	Nortman (1982)	Contraceptive Prevalence Surveys	Percentage distributions	Individual level		The study concentrated on matters pertaining to definitions and measurements of unmet need. It focused on married women
47	Assessing the Prevalence and Determinants of Unwanted Pregnancy and Induced Abortion in Nigeria	Okonofua et al. (1999)	Population-based study conducted concurrently in the Ife Central and Jhos North local government areas, Nigeria	Percentage distributions and logistic regression model	Individual level	Nearly 20 percent of the women reported having had an unwanted pregnancy. Of these, 58 percent reported that they had successfully terminated the pregnancies.	The study did not systematically link abortion to unmet need.
48	Factors Influencing Couples' Unmet Need for Contraception in Kenya	Omwango & Khasakhala (2006)	1998 Kenya DHS	Logistic regression model	Individual and household levels	Couple's unmet need was lower than that for married women. Region of residence,	The study did not consider the consequences of unmet need.

						ethnicity, number of living children and couples' discussion of and other reproductive health issues, were the most significant predictors of couples' unmet need	
49	Determinants of Unmet Need for Family Planning in Squatter Settlements in Karachi, Pakistan	Pasha et al (2006)	Community based survey.	Percentage distributions and logistic regression model	Individual level	Woman's perception that her mother-in-law's goals for her fertility differed from her own, a lack of female autonomy, and a lack of communication with her spouse on sexual matters were the	The study only considered factors underlying unmet need. It did not include the consequences of unmet need.

						factors underlying unmet need	
50	Unmet Need for Reproductive Health in India	Ravindran & Mishra (2001)	1992-93 National Family Health Survey and reproductive histories of a cross-section of 70 women from rural Tamil Nadu	Percentage distributions and Chi-squared tests	Individual level	A significant proportion of the women did not achieve their preferred birth interval between the last two consecutive births. Women with unmet need for spacing resorted to induced abortion in order to prevent unwanted births.	Analysis was restricted to the individual level & only focused on married women.
51	Unmet Need for Contraception in the Developing World and the Former Soviet Union: An Updated Estimate	Ross & Winfrey (2002).	55 National Surveys (1990 to 1999)	Percentage distributions	Individual level	An estimated 113.6 million women in the developing world had unmet need	The study was concerned with matters pertaining measurement. Correlates and consequences of unmet were not included.

52	Unwanted Pregnancy and Associated Factors among Nigerian Women	Sedgh et al. (2006)	Community based survey	Percentage distributions and logistic regression analysis	Individual level	More than quarter (28%) reported ever having had an unwanted pregnancy. Half of them reported having attempted to terminate the pregnancy and 78% of these reported that they had not been using contraceptives when they conceived	The study did not address the causes of unmet need.
53	Unmet need for contraception in Kuwait: a developing country without a family planning program	Shah et el. (2003)	1999 Nationally representative household survey of Kuwaiti	Percentage distributions and logistic regression analysis	Individual level	Wife's perception of the husband's opinion about contraceptive use had the strongest association with unmet need.	Analysis was restricted to the individual level. The study did not address the consequences of unmet need.

54	Unmet need for Contraception in Kuwait: Issues for Health Care Providers	Shah et el. (2004)	1999 Nationally representative household survey of Kuwaiti	Percentage distributions and logistic regression analysis	Individual level	Those with unmet need were relatively older women with a significantly higher level of parity. Wife's perception of the husband's disapproval of contraceptive use had the strongest negative association with unmet need	Analysis was done at the individual level. The study did not address the consequences of unmet need.
55	Husbands, wives, sons, and daughters: Fertility preferences and the demand for contraception in Ethiopia	Short & Kiros (2002)	1990 National Family and Fertility Survey of Ethiopia	Percentage distributions and logistic regression analysis	Individual level	There were high levels of concurrence among husbands and wives on reproductive preferences. Lack of exposure and limited knowledge about contraception were the major reasons for	Analysis was restricted to the individual level & only focused on married women. The consequences of unmet need were not considered.

						unmet need.	
56	The unmet need for contraception among adolescents in Bangladesh: Implications for Family Planning programmes	Siddiqua & Kabir (2004)	1999/2000 Bangladesh DHS	Percentage distributions and logistic regression analysis	Individual level	Nearly a quarter (22%) of married adolescents had unmet need. Desire for more children, husband's approval, and ever use of contraceptives had a negatively significant effect on unmet need.	Analysis was restricted to the individual level. The study did not consider the consequences of unmet need.
57	Adolescent Childbearing in Developing Countries: A Global Review	Singh (1998)	1993 to 1998 DHSs of 43 developing countries	Percentage distributions	Individual level	Substantial declines in adolescent fertility have occurred in North Africa and Asia, but levels were still high in some countries. Declines began to occur in sub-Saharan Africa, but	Though the study briefly looked at the issue of abortion, it did not systematically link adolescent pregnancy to the former.

						the levels were still high in most countries	
58	The Incidence of Induced Abortion in Uganda	Singh et al. (2005)	A nationally representative survey of 313 health facilities	Percentage distributions and indirect estimation techniques	Individual level	An estimated 297,000 induced abortions were performed and nearly 85,000 women were treated for complications. 51% of married women aged 15-49 and 12% of their unmarried counterparts had an unmet need for effective contraceptives	The study did not consider factors underlying unmet need.
59	Explanations of Unmet Need for Contraception in Chitwan, Nepal	Stash (1999)	Qualitative reproductive histories complement-ed with			Spousal absence which was associated with women's perceived lower risk of pregnancy and	Analysis was restricted to the individual level. The study did not address the consequences of unmet need.

			fertility survey			waiting for a later time and better circumstances in which to have sterilization operations were associated with unmet need.	
60	Prevalence of unmet contraceptive need among Egyptian women: a community-based study	Sultan et al. (2010)	A cluster survey of 2340 women in Marg, Egypt	chi-squared tests and student t-test	Individual level	Women with unmet need had a significantly larger number of children, especially female children and abortions than those with met need. Health concerns were an important cause for unmet need.	Analysis was done at individual level and the focus was married women. Consequences of unmet need were not considered.
61	Care for adolescent	Treffersa et al.	Systematic	....	....	Adolescent pregnancies are an	The article only reviewed existing literature. It did not

	pregnancy and childbirth	(2001)	review			important health issue. Most of them are unplanned and are due to absent or inadequate contraceptive efforts	link adolescent pregnancy to unmet need in a systematic way.
62	Family Planning and the Burden of Unintended Pregnancies	Tsui et al. (2010)	Systematic review	....	....	Family planning was documented to contribute to birth spacing, lower infant mortality risk, and reduce the number of abortions, especially unsafe ones. It was also shown to significantly lower maternal mortality and maternal morbidity associated with unintended pregnancy.	The article just reviewed existing literature.

63	Levels, Patterns and Trends in Unmet Need for Family Planning in Kenya	Wafula & Ikamari (2007).	1998 and 2003 Kenya DHS	Percentage distributions and logistic regression analysis	Individual level	There was a marginal drop in the level of unmet need between 1998 and 2003. Number of living children, province of residence, education and husband approval were among the significant predictors of unmet need.	Focus was on married women. Consequences of unmet need were not considered.
64	Attitudes to 'Kaponya Mafumo': The terminators of pregnancy in urban Zambia	Webb (2000)	Mixed methods research conducted in five districts of Zambia	Percentage distributions	Individual level	The main reason school girls resorted to abortion was in order to continue schooling	Focus was on the individual level. Household and community levels not included

Appendix E

Dissemination of findings: Conferences

S/N	Proposed Conference	Dates	Title of paper	Action
1	13th World Congress on Public Health, Addis Ababa, Ethiopia	21 - 29 April, 2012	Unmet need for contraception in Zambia: young people tell their side of the story	Abstract was accepted but did not attend the conference
2	International Conference on population and Development, Paris, France	27 – 28 June, 2012	Unmet need for contraception in Zambia: young people tell their side of the story	Abstract was accepted but did not attend the conference
3	Population Association of America (PAA) Conference, New Orleans, USA	11 – 13 April, 2013	Unmet need for contraception among men in Zambia: Implication for family planning programmes	Attended the conference and made the presentation
4	International Union for the Scientific Study of Population (IUSSP) Conference	26 – 31 August, 2013	Unmet need for contraception among men in Zambia: Implication for family planning programmes; Correlates of unmet need for contraception in Zambia: A look at community-level determinants	Attended the conference and made the presentations

5	PAA Conference, Boston, USA	1 - 3 May, 2014	The magnitude and determinants of unmet need for contraception among young women in Zambia	Abstract was accepted but did not attend the conference
6	Population association of Southern Africa (PASA)	9 – 11 July, 2014	The levels and correlates of unmet need for contraception among young women in Zambia	Abstract was accepted but did not attend the conference

Appendix F

Dissemination of findings: Publications

S/N	Title	Date of Submission	Journal	Status of the paper
1	Unmet need for contraception in Zambia: Does ethnicity play a role?	November, 2012	Journal of Biosocial Science	Published, 46(3):294-315, DOI: 10.1017/S0021932013000357
2	Unmet need for contraception in Zambia: young people tell their side of the story	June, 2012	Journal of Population Research	Rejected, to be worked on and submitted elsewhere (Title to be changed as in 6)
3	Unmet need for contraception among men in Zambia: Implication for family planning programmes	December, 2013	International Perspectives on Sexual and Reproductive Health	Rejected, to be worked on and submitted elsewhere
4	Community Influences of unmet need for contraception in Zambia	December, 2013	Studies in Family Planning	Rejected, to be worked on and submitted elsewhere
5	Gender dimensions of unmet need for contraception in Zambia	December 2014	Gender and Behaviour Journal	Published, 12(4): 5881-5910
6	The levels and correlates of unmet need for	January, 2015	Health Care for Women	To be fine tuned

	contraception among young women in Zambia			
7	Unmet need for contraception among men in Zambia: Does the status of the woman really matter?	December**,** 2015	African Population Studies	To be drafted
8	The untapped potential of meeting contraception needs of women in Zambia	June, 2015	BMC Public Health	To be drafted

Appendix G

Stepwise Logistic Regressions

Table G.1: Relative risk ratios from stepwise logistic regression showing the predictors of unmet need for spacing and limiting among women aged 15-49, Zambia DHS 2007

Selected characteristics	Met Need		
Base Outcome			
Unmet need for Spacing			
	Relative Risk Ratio	P-value	95% CI
Age			
15-19 [R]			
20-59	0.19	0.520	0.395-0.781
Marital Status			
Unmarried			
Married	0.53	0.014	0.955-0.107
No. of living children			
0 [R]			
1-2	0.80	0.019	0.132-1.467
3-4	1.12	0.002	0.412-1.837
5 & above	1.37	0.000	0.630-2.106
Highest education			
No education [R]	0.11	0.570	-0.282-0.512
Primary	0.47	0.49	0.002-0.934
Secondary/Higher			

Occupation			
Not working [R]	1.00		
Professional/clerical	0.22	0.004	0.37-1.91
Sales/service	0.35	0.067	0.02-0.72
Agriculture	1.03	0.491	0.47-0.23
Manual	0.41	0.202	0.21-1.01
Wealth			
Poor			
Middle	0.21	0.205	-0.117-0.545
Rich	0.58	0.001	0.241-0.918
Region			
Luapula [R]			
Central	0.92	0.003	0.321-1.518
Copperbelt	1.41	0.000	0.838-1.989
Eastern	0.59	0.057	-0.017-1.207
Lusaka	1.05	0.001	0.436-1.670
Northern	1.90	0.000	1.331-2.476
North western	1.23	0.000	0.621-1.833
Southern	1.56	0.000	0.972-2.148
Western	1.32	0.000	0.697-1.942
Visited health facility			
No [R]			
Yes	0.36	0.005	0.111-0.613
Fertility preference			
Want another[R]			
Undecided	0.76	0.010	1.349-0.185
No more	2.10	0.000	1.812-2.396
Unmet need for limiting			
	Model 1		

Selected characteristics	RRR		
Age			
15-19 R			
20-59	-1.15	0.000	-0.175 - -0.544
Marital Status			
Unmarried			
Married	0.33	0.186	-0.162 - -0.831
No. of living children			
0 R			
1-2	0.58	0.121	-0.153 – 1.311
3-4	0.60	0.141	-0.199 – 1.395
5 & above	1.33	0.001	0.525 – 2.132
Highest education			
No education R			
Primary	-0.13	0.547	-.535-0.283
Secondary/Higher	-0.49	0.060	-.535-0.283
Occupation			
Not working R	1.00		
Professional/clerical	0.41	0.429	0.601-1.419
Sales/service	0.64	0.836	0.362-0.447
Agriculture	0.78	0.702	0.456-0.768
Manual	0.79	0.734	0.025-0.615
Wealth			
Poor			
Middle	0.28	0.115	-0.069 – 0.637
Rich	0.25	0.000	-0.124 – 0.617
Region			
Luapula R			
Central	0.13	0.672	-0.460 – 0.713

Copperbelt	0.15	0.597	-0.399 – 0.695
Eastern	-0.16	0.597	-0.744 – 0.428
Lusaka	0.001	0.998	-0.614 – 0.615
Northern	0.30	0.301	-0.272 – 0.880
North western	0.52	0.079	-0.060 – 1.102
Southern	0.35	0.226	-0.219 – 0.927
Western	0.46	0.132	-0.139 – 1.067
Visited health facility			
No [R]			
Yes	-0.36	0.010	-0.628 - -0.085
Fertility preference			
Want another[R]			
Undecided	0.76	0.007	0.209-1.308
No more	3.18	0.000	2.808-3.543

Table G.2: Odds ratios from stepwise logistic regression showing the predictors of total unmet need among women aged 15-49, Zambia DHS 2007

Selected characteristics			
	Odds Ratio	P-value	95% CI
Unmarried			
Married	1.80	0.001	1.273 – 2.541
No. of living children			
0 [R]			
1-2	0.41	0.004	0.229 – 0.753
3-4	0.29	0.000	0.159 – 0.544
5 & above	0.36	0.001	0.188 – 0.670
Highest education			
No education [R]			
Primary	0.81	0.198	0.581 – 1.119
Secondary/Higher	0.48	0.000	0.329 – 0.700
Occupation			
Not working [R]			
Professional/clerical	0.40	0.001	0.227 – 0.689
Sales/service	0.77	0.057	0.599 – 1.008
Agriculture	1.11	0.421	0.857 – 1.446
Manual	0.678	0.095	0.430 – 1.069
Ethnicity			
Bemba[R]			
Tonga	1.29	0.244	0.841 – 1.974
Lunda, Luvale and Kaonde	1.17	0.535	0.718 – 1.895
Barotse	0.70	0.213	0.398 – 1.228
Nyanja	0.69	0.056	0.472 – 1.009
Mambwe and	0.76	0.140	0.523 – 1.095

Tumbuka			
Other	0.64	0.187	0.337 – 1.237
Region			
Luapula [R]			
Central	0.40	0.000	0.236 – 0.662
Copperbelt	0.35	0.000	0.199 – 0.630
Eastern	0.51	0.015	0.292 – 0.877
Lusaka	035	0.000	0.203 – 0.614
Northern	0.19	0.000	0.112 – 0.318
North western	0.31	0.001	0.158 – 0.615
Southern	0.21	0.000	0.112 – 0.384
Western	0.38	0.006	0.194 – 0.762
Visited health facility			
No [R]			
Yes	0.58	0.000	0.472 – 0.715
Fertility preference			
Want another[R]			
Undecided	2.26	0.006	1.270 – 4.025
No more	0.36	0.000	0.282 – 0.467

Table G.3: Odds ratios from stepwise logistic regression showing the predictors of unmet need for spacing among men aged 15-59, Zambia DHS 2007

Selected characteristics			
	Odds Ratio	P-value	95% CI
No. of living children			
0 [R]			
1-2	0.19	0.000	0.105 – 0.357
3-4	0.15	0.000	0.082 – 0.283
5 & above	0.24	0.000	0.127 – 0.456
Highest education			
No education [R]			
Primary	0.49	0.006	0.295 – 0.812
Secondary/Higher	0.38	0.000	0.223 – 0.639
Wealth			
Poor			
Middle	1.08	0.610	0.801 - 1.458
Rich	0.54	0.000	0.401 – 0.718
Region			
Luapula [R]			
Central	0.22	0.000	0.121 – 0.402
Copperbelt	0.19	0.000	0.107 – 0.322
Eastern	0.23	0.000	0.131 – 0.419
Lusaka	0.14	0.000	0.078 – 0.256
Northern	0.37	0.001	0.211 – 0.650
North western	0.31	0.000	0.175 – 0. 559
Southern	0.19	0.000	0.108 – 0.338
Western	0.29	0.000	0.158 – 0.529
Exposure to family planning messages			

through media			
No [R]			
Yes	0.73	0.011	0.575 – 0.931

Table G.4: Odds ratios from stepwise logistic regression showing the predictors of unmet need for limiting among men aged 15-59, Zambia DHS 2007

Selected characteristics			
	Odds Ratio	P-value	95% CI
Highest education			
No education [R]			
Primary	1.25	0.479	0.673 – 2.326
Secondary/Higher	0.70	0.279	0.370 – 1.332
Wealth			
Poor			
Middle	0.61	0.014	0.413 - 0.906
Rich	0.45	0.000	0.314 – 0.658
Region			
Luapula [R]			
Central	0.39	0.002	0.217 – 0.710
Copperbelt	0.23	0.000	0.130 – 0.420
Eastern	0.45	0.020	0.232 – 0.884
Lusaka	0.32	0.000	0.177 – 0.573
Northern	0.31	0.000	0.167 – 0.587
North western	0.87	0.704	0.424 – 1.785
Southern	0.28	0.000	0.154 – 0.499
Western	0.24	0.000	0.116 – 0.480
Exposure to family planning messages through media			
No [R]			
Yes	0.73	0.048	0.539 – 0.997

Table G.5: Odds ratios from stepwise logistic regression showing the predictors of total unmet need among men aged 15-59, Zambia DHS 2007

Selected characteristics			
	Odds Ratio	P-value	95% CI
No. of living children			
0 [R]			
1-2	0.24	0.000	0.137 – 0.408
3-4	0.21	0.000	0.122 – 0.362
5 & above	0.30	0.000	0.180 – 0.530
Highest education			
No education [R]			
Primary	0.67	0.040	0.454 – 0.982
Secondary/Higher	0.47	0.000	0.313 – 0.699
Wealth			
Poor			
Middle	0.89	0.320	0.7 04 - 1.122
Rich	0.53	0.000	0.428 – 0.667
Region			
Luapula [R]			
Central	0.29	0.000	0.194 – 0.450
Copperbelt	0.21	0.000	0.143 – 0.316
Eastern	0.31	0.000	0.200 – 0.474
Lusaka	0.22	0.000	0.145 – 0.334
Northern	0.36	0.000	0.240 – 0.550
North western	0.44	0.000	0.284 – 0.681
Southern	0.23	0.000	0.155 – 0. 350
Western	0.28	0.000	0.180 – 0.444
Exposure to family planning messages			

through media			
No [R]			
Yes	0.73	0.001	0.603 – 0.878