BIRTH SPACING AMONG WOMEN USING CONTRACEPTIVES IN ZAMBIA: ANALYSIS OF DEMOGRAPHIC AND HEALTH SURVEY DATA 2013/14

By

NOEL MIZINGA J.B.M.

2016145179

A Thesis submitted to the University of Zambia in partial fulfilment of the requirement of the Degree of Master of Arts in Population Studies.

The University of Zambia

Lusaka

2019

DECLARATION

I, Noel Mizinga J.B.M. hereby declare that this dissertation represents my work and has not been formerly submitted for a degree at this or any other University.

Signed: _____

Date   : _____

COPYRIGHT

APPROVAL

The dissertation of Noel Mizinga J.B.M. is approved as fulfilling part of the requirement for the award of the degree of Master of Arts in Population Studies by the University of Zambia.

Examiner 1: _____   Signature: _____   Date: _____

Examiner 2: _____   Signature: _____   Date: _____

Examiner 3: _____   Signature: _____   Date: _____

Chairperson Board of
Examiners: _____   Signature: _____   Date: _____

Supervisor: _____   Signature: _____   Date: _____

ABSTRACT

Zambia is in its second stage of demographic transition with high fertility rate. This aspect prompted this study aimed at investigating the factors that are significant in birth spacing among women contraceptive users in the reproductive age (15-49) owing to Zambian's youthful population. The study was drawn from the Zambian population consisting of women age 15-49 years from the cross-sectional Zambia Demographic and Health Survey 2013-14 data. Data analysis was performed using STATA 14 statistical package. Chi-square tests were performed between birth spacing and women status for association. Bivariate and multiple logistic regression analysis were performed in order to analyse the influence of predictor variables on child spacing among contraceptors using odds ratios. Model building was done.

The study indicated that 1182 (13.6%) of women practice short birth interval (< 2 years) and a majority 7538 (86.4 %) practice normal birth interval (2+ years). The study further reveals that 4620 (53 %) women are non-contraceptors and 4100 (47 %) women are contraceptors. Age, ethnicity and survivals status of index child predicted normal birth spacing among contraceptors. Women aged 24 – 34 years reported high odds of normal birth interval of factor 2 compared to the age group 15 – 24 years (AOR=2.124, 95% CI; (1.667, 2.759)). Women 35 year and above reported high odds of factor 3 to attain normal birth interval compared to women aged 15-24 years AOR=2.855, 95% CI; (2.061, 3.957)). By ethnicity, Bemba, Tonga and Nyanja reported less odds of 1.9, 2.7 and 2.1 to achieve normal birth interval compared to Barotse women (AOR=0.585, 95% CI; (0.335, 0.963)), (AOR=0.549, 95% CI; (0.318, 0.950)) and (AOR=0.584, 95% CI; (0.342, 0.998)) respectively. Women with preceding child alive reported high odds of normal birth interval of factor 2 compared to women whose index child was not alive (AOR=2.193, 95% CI; (1.310, 3.669)). However, age was significant predictor of normal birth interval among women using short, medium and long acting contraceptive methods. Furthermore, findings imply that women using a method mix of contraceptives are expected to practice normal birth interval and of age above 25 years. However, women of various ethnic groupings reported less likelihood to practice normal birth interval.

The results from the study entail strengthening of programs in the provision of contraception services especially method mix of contraceptives. Need to promote child related health programs to enhance survival status of children for normal birth spacing is to be achieved among women.

Key words: Birth interval, Contraceptive use, Women, predictors, Zambia.

DEDICATION

I dedicate this piece of writing to my family for the support rendered variously during my studies.

ACKNOWLEDGEMENTS

Am greatly appreciative to my supervisor Dr. Namuunda Mutombo for the guidance, encouragement, faith and parental support at all stages of this dissertation. I also extend my gratitude to friends, fellow students and lecturers for their relentless support and guidance.

Many thanks goes to my mother, wife Lucy and children Ivwananji, Nchimunya and Patience.

I thank God for the good health, strength and courage throughout my studies.

ACRONYMS

AOR	Adjusted Odds Ratio
CPR	Contraception Prevalence Rate
CSA	Central Statistical Agency
CSO	Central Statistics Office
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
MCDMCH	Ministry of Community Development, Mother and Child Health
MCH	Maternal and Child Health
MDG's	Millennium Development Goals
MoH	Ministry of Health
MoFNP	Ministry of Finance and National Planning
MoNPD	Ministry of National Planning and Development
ICPD	International Conference on Population and Development
IUD's	Intra-Uterine Devices
LARCs	Long Acting Reversible Contraceptives
PPAZ	Planned Parenthood Association of Zambia
SFH	Society for Family Health
SDG's	Sustainable Development Goals
UN	United Nations
UNPF	United Nations Population Fund
USAID	United States Agency for International Development
WB	World Bank

WHO   World Health Organization

ZDHS   Zambia Demographic and Health Survey

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER ONE

1.1 Introduction

This chapter provides a brief background of contraception and birth spacing among women form the global, African and Zambian perspective. Its will further dwell on the statement of the problem, objectives and significance of the study.

1.2 Background

Women determine fertility levels to a large extent because of their reproductive capacity. This has resulted in concerted efforts at global, regional and national level to ensure that fertility levels are kept in check. Vigorous fertility policies have been used to regulate fertility but population growth still persists. Today, access to contraception services is a matter of human rights. Globally, the use of natural, mechanical and chemical birth control methods are being promoted through contraception use. Traditional and modern contraception methods are encouraged in developing countries to ensure that births are adequately spaced to slow down population growth rate.

Contraception use among women has been on the increase worldwide (United Nations, 2015a). Historically, the western world has been instrumental in the provision of primary healthcare for women through family planning. Pioneers of contraception advocated for measures that enable individuals and couples to regulate fertility (National Research Council, 1993). The rising rate of population growth was of great concern on the world scale, hence the need to put deliberate measures to reduce the rate of demographic change. In the 1960's, concern was growing about population increases in developing countries and the strains placed on resources (United Nations, 2003). Population growth rate determines the socio-economic landscape in any given environment.

Contraception Prevalence Rates (CPR) have been rising among women worldwide. About 64 percent of married women in the reproductive age were using some form of contraception by the year 2015 (United Nations, 2015a). However, disparities exist on the levels of contraception use and birth spacing with developed countries. Developing countries are slowly getting on board towards increased access to reproductive healthcare through intense contraception campaign though unmet needremain very high. United Nations adds that, least developed countries especially in Africa have recorded a lower increase in contraception use. Africa has experienced various challenges in contraception use among women which could be reflected in the high fertility levels recorded, leading to rapid population growth.

In many countries, government's provision for contraception precedes the formulation of population policies. Nevertheless, most governments especially in developing countries support contraceptive use in the reproductive health service package even in the absence of population growth policies to lower fertility (United Nations, 2003). It is expected that this heightened use of modern contraception results in reduced fertility through birth spacing. Deliberate measures have been put in place to ensure universal access to safe and affordable contraception methods the world over through policy formulation, donors and multi-national organisations (UNFPA, 2006). Nonetheless, sub-Saharan Africa has some of the highest levels of unmet need for contraception of 25% (UN, 2017). Hence the need for African countries to intensify the provision of contraceptive services especially in rural and remote areas where unmet needs are relatively high.

Africa markedly experienced high birth rates where access to modern contraception was extremely limited prior to 1980's (Donaldson and Tsui, 1990). With predominant population based in rural areas where unmet needs for contraception are relatively high, birth intervals are very short coupled with high maternal and infant mortality. The factors affecting contraception use exist at regional, national, community and individual levels. Contraceptive use has risen worldwide, although at a slow pace in sub-Saharan Africa (Cleland, Harbison and Shah, 2014). Conversely, African governments are committed to fight for improved reproductive healthcare packages for women who are vulnerable to maternal deaths. Today, Africa has experienced increase in contraception use, driven by growing demand for modern and effective birth control methods. However, even amongst users of modern contraceptives, uptake of effective contraceptives was low (Pasha, et al, 2015). Regional conferences to support women's rights in relation to procreative health have been high on the agenda. Hence, bilateral, multilateral and non-governmental programs have promoted family planning initiatives among women (National Research Council, 1993).

African leaders collectively endorsed family planning and the necessity of integrating into Maternal and Child Health (MCH) programs in the 1984 Kilimanjaro Action Program (Economic Commission for Africa, 1984). Since 2001, USAID has mobilized more than $14 billion through Public-private partnerships (Ingram, 2014) Financial constrain have often been cited in many parts of Africa as being one of the major hindrance in the contraception use crusade though coupled with other social cultural constraints. Funding for Africa towards family planning programs

increased from 21.6 million dollars in 1983 to 128 million dollars in 1991 (UNFPA, 1992). Most of this financial aid has been done through massive donor aid for enhanced maternal and child health through aggressive family planning programs. Hence, Africa has experienced improvements in quality of life among women in terms of maternal health due to elevated contraception use especially among women. Recent analysis suggests decline in total fertility rates and short birth intervals between 1990 and 2005 in developing countries, Africa inclusive attributed to contraceptive use averting up to 1.2 million maternal deaths (Stover and Ross, 2010).

Contraception use in Zambia was introduced in the 1960's. Zambia has experienced increase in aggregates with regard to contraceptive use from 1990 onwards (Speizer and Justine, 2007). Though, limited to urban centres, the utilization of such services was relatively low and nearly absent in the rural locale at the time (Pinchoff, et al, 2017). The population policy document in Zambia has its history from the 1984 National Commission for Development Planning (NCDP) which was given the mandate to initiate a draft policy aimed at attaining a population consistent with growth rate of the economy. The first population policy was adopted in 1989 (NCDP, Zambia; 1991). However, immediately, in the 1990's, various issues of concern began to arise emanating from rapid urbanization, gender and HIV/AIDS which were not adequately addressed by the 1989 population policy document. This called for revision of the earlier policy in 1996. CSO (2015) adds that revision of the national population policy was based on issues adopted through the Cairo ICPD. The revised population policy in Zambia which came to light in 2007 addressed various issues of global nature on population and development among them HIV/AIDS, poverty, reproductive health, the environment, gender and unemployment. It is worth noting that the national population policy of 2007 was an attempt to improve the quality of life among Zambians tailored to achieve a stable population for socioeconomic development. In Zambia, maternal mortality rate is extremely high estimated at 549 per 100, 000 live births (CSO, 2007). Such figures are very high in comparison to other countries in the region. Millions of infants and children can be saved by spacing births at least 2 years apart (Ngoma, 2012). One of the main objectives of the 2007 population policy was to improve sexual and reproductive health (including Family Planning) for achieving manageable family size. In this vain, the need to understand contraception use for birth spacing to attain desired family size with regard to Zambia cannot be overlooked.

The Zambian Government through the Ministry of Health (MoH) plays an important role in the contraception crusade by offering family planning services. Government commitment in reproductive health has been on the up-swing in the provision of contraception after the 1984 Global Conference on Population in Mexico. Government took a more pragmatic approach after the Mexico Conference to address family planning issues (UNFPA, 1995). This led to policy formulation for rights to individuals and couples over their reproductive lifestyles. ICPD recognized intricate relationship which existed between population and sustainable development (UNFPA, 2004). Access to contraceptives among women is a matter of human rights aimed at giving women the opportunity to have control over their reproductive life. Programme of Action was initiated were member countries agreed to implement population policies which aimed at empowering couples and individuals through reproductive rights for women in domestic and international law (UNPFA, 2013)

Zambia switched to the integrated approach upon assenting to the International Conference on Population and Development (ICPD) program of action. Contraception use advocacy has been championed by Planned Parenthood Association of Zambia (PPAZ) and Society for Family Health (SFH). Family planning continues to be a priority for the Zambia government as highlighted in the Sixth and seventh National Development Plan of 2013-2016 and 2017-2021 respectively (MoFNP, 2014; MoNPD, 2017). Such efforts have promoted and scaled up the provision of family planning in reproductive healthcare packages countrywide and as such, levels of normal birth interval are expected to have increased in the same vain. The government of Zambia has indicated commitment to the implementation plan of MDGs and SDGs as shown in the SNDP at country level. Pinchoff et al (2017) adds that Zambian government has demonstrated strong commitment to expand Family Planning services. This is indicative of the need to achieve a stable and sustainable population needed for developing Zambia in general. The Seventh National Development Plan (SNDP) departs from sectorial-based planning to an integrated approach as pronounced in Agenda 2030. The SNDP is poised to harness demographic dividends in view of Zambia's youthful population. In this regard, Zambia can best maximize demographic dividends by ensuring a healthy and productive population through the provision of prudent health services. Hence, SNDP is a domestication of the SDGs and Agenda 2063 which focus on enhanced partnership among various stakeholders to achieve sustainable development. Greater economic, social and economic benefits can accrue to the majority Zambians with fertility decline (MoNDP, 2017). Accelerated fertility

reduction continues to be on top of government agenda as they have continued to provide funding to the health sector in general. Demographic dividends are worthy considering in the Zambian situation to attain the desired socio-economic development target through longer birth intervals. Zambia should facilitate accelerated fertility decline to access demographic dividend and family planning is key to this end which can help to space birth and reduce fertility.

Zambia's National Health Strategic Plan of 2011-2015 stressed the need to enhance mother and child health (MoH, 2010) Zambia's population is young comprising mostly young people indicating a rise in fertility levels and possible short birth intervals among women. However, Zambia's young age structure can be turned into valuable asset for attaining socio-economic transformation as enshrined in Vision 2030 through decline in birth rates (MOE, 2015) Private sector and Non-governmental Organisations (NGO's) have been encouraged to play an effective role in family planning programmes (MoH, 2006b). With provision of family planning services, it is expected that births will be optimally spaced among women in Zambia.

1.3 Statement of the problem

Access to contraception has increased in Zambia with respect to modern contraceptive methods as women have shown desire for healthy spacing of births. There are a number of safe and effective contraceptive methods that women use to optimize birth spacing (WHO, 2008). There is need for effective contraception to avoid unintended pregnancy for birth spacing among contraceptors (Kallner and Danielson, 2016). The Zambian government is committed towards fertility control and health spacing of births by promoting improved sexual reproductive health service provision through family planning. Zambia is in its second stage of demographic transition with high fertility (Ponga, 2017). Greater emphasis has been placed on economic benefits which can accrue to Zambia with decline in fertility by lengthening birth interval and increase in contraceptive use behavior in the population. On the other hand, most literature has concentrated more on aspects of contraceptive use. However, the extent to which contraceptive use in general influences birth spacing and vice versa is not known in Zambia. There is need for research on the relationship between birth interval length and contraceptive use (Towriss, 2014). Zambia's young population is expected to result in growth in the reproductive age group. There is scanty information on the relationship between birth spacing and contraceptive use in Zambia. It is from this background

that this study was conducted on contraceptive use in child spacing among women in the reproductive age in Zambia.

1.4 Research objectives

1.4.1 General objective

The general objective of the study is to determine Contraception use in child spacing among women in the reproductive age in Zambia.

1.4.2 Specific objectives

The specific objectives of the study will be;

1. To determine birth intervals among women in the reproductive age.

2. To establish the demographic, socio-economic and mediating predictors of normal birth interval among women in the reproductive age who use contraceptives in Zambia. And. 3. To investigate how contraception use is related to birth interval.

1.4.3 Research questions

In the quest to achieve the above objectives, the following research question will be used:

i. What is the status of birth interval among women in the reproductive age in Zambia?

ii. What demographic, socio-economic and mediating factors contribute to birth interval among women in the reproductive age using contraceptives in Zambia? And

iii. how is contraception use related in birth interval?

1.4.4 Significance of the study

The study will add literature and knowledge especially in the field of reproductive healthcare for women with regard to contraception use in birth spacing among Zambian women.

The findings will help healthcare providers to adequately provide detailed information on how contraception use relates to birth interval among women in Zambia and vice versa.

On the practical aspect, the study will help policy makers and program implementers in family planning to focus attention on key factors influencing birth interval among women contraceptive users. The outcomes of the study could help influence planning and future policy formulation for

women in the reproductive age to supplement existing information. The integrated approach advocated in the SDGs and Agenda 2063 may depend on such information to understand local dynamics with regard to birth spacing and contraceptive use among women. .

The study is also expected to provide a base for further studies in reproductive health among women in the reproductive age in view of the integrated approach enshrined in the SDGs and Agenda 2063. This study will provide basis for the government and other stakeholders to align plans and programmes aimed at slowing down high fertility levels with regard to the country's stage of demographic transition and the need to tap into demographic dividends anticipated for socioeconomic development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section highlighted review of literature which encompassed areas of historical review of contraception policies, methods and benefits of contraception use in relation to birth spacing. Others include perspectives of birth spacing, determinants and benefits to the mother and child. The conceptual framework and definition of key concepts as used in the research are also aspects addressed.

2.2 Contraception use and Family Planning Policies: Historical review

Population policies are more robust in developed compared to developing countries (United Nations, 2003). On global scale, population policies have undergone 5 notable stages of fulfilment. United Nations further adds that 5 population policies include;

- 25 years period following the establishment of the United Nations (1945-1970);

- The decade of the 1974 World population conference in Bucharest (1970-1980);

- The decade of 1984 International conference on population in Mexico (1980-1990);

- The decade of the 1994 International Conference on Population and Development (ICPD) in Cairo (1990-2000); and

- The beginning of the 21st century.

The first phase in evolution of population policies, was the 1954 World Population Conference in Rome, Italy. The conference brought attention of the inadequacies in population statistics at world scale (Macura, 1987). The conference proposed demographic research for policy formulation by emphasizing the study of population based on economic, social and cultural conditions. At the time, several developing countries initiated birth control programmes as deliberate measure to address rapid population growth.

The Rome conference was followed by the Belgrade and Teheran conferences in 1965 and 1968 respectively. The conferences made the international community recognise and protect the family and children by intensifying contraception use (United Nations, 2003). The Teheran conference

led to improved research in safe, effective and affordable forms of contraception through enhancements of population policies. The 1974 Bucharest world population conference saw the formation of the World Population Plan of Action (WPPA).

By the 1980's, the International conference on population was held in Mexico. This conference reviewed and appraised the WPPA for further implementation (Macura, 1987). This was a reinforcement of earlier efforts at global level to address growing concerns of population growth at the time.

At the close of the 20th century, Cairo in 1994, the International Conference on Population and Development (ICPD) gave birth to the Programme of Action. Three goals of the ICPD of 1994 was to reduce infant, child, maternal mortality, provision of universal access to education and provision of universal access to a full range of reproductive health services especially family planning (UNFPA, 2004). This saw the integration of family planning and women's health services through women's rights with regard to fertility. Universal access to safe and reliable family planning methods by the year 2015 was recommended in member countries (United Nations, 1999). At the same time, Millennium Development Goal (MDG) number 5 emphasizing the need to improve maternal health was initiated. Today, SDGs have taken heart in the development agenda of many countries especially third world countries. SDGs have come on board to strengthen the MDG's by emphasizing the need for universal access to various forms of birth control among women by taking an integrated approach based on local needs. At the same time, Agenda 2063 has been incorporated to supplement the SDGs in the long term to ensure collaborative efforts towards achieving sustainable development for socio-economic and environment transformation in the midst of demographic dynamics. It is believed that Agenda 2063 will shape socio-economic outlook for the next 50 years by building upon past and existing initiatives for growth and sustainable development. Africa Agenda 2063 has in mind the need for Africa to manage its own growth and transformation by not leaving anyone behind in the quest to develop various resources. Birth spacing and contraceptive use are important aspects which can empower women once they take charge of their reproductive lives through decision making. Reducing fertility rates in Zambia would have immediate impact on female economic participation (World Bank, 2018). Family planning provision through contraceptive use plays an important role in empowering women to achieve the desired fertility rate needed for sustainable socioeconomic development considering

the young nature of Zambia's population with 50% under 15 years of age (CSO, 2007). People-driven development is profound under Agenda 2063 to achieve the African dream. Hence, women are important stakeholders in sustainable development at various levels of engagement.

The London summit of 2012 was committed to putting additional resources to support family planning initiatives (Asekun-Olarinmoye et al, 2013; United Nations, 2015a). Many developing countries have continued to face financial and material challenges in the contraception use crusade leading to short birth intervals and later on high population growth rates. The desire for health spacing of births today has led to increases in the number of women needing reproductive health services, therefore, demand for contraceptive services is expected to continue growing as unmet needs remain high.

In Africa, a conference held in Yaounde, Cameroun in 2002 indicated an increase in family planning services. Most African countries have revised population policies through reproductive health programmes and strategies (UN ECA, 2002). However, unmet needs for effective contraception remain high especially in developing countries, Africa inclusive.

Agenda 2030 has been brought on board to re-affirm commitment of promoting SDG's for sustainable development the world over (United Nations, 2015b). The Agenda aims at ensuring universal access to sexual and reproductive healthcare services integration of reproductive health into national strategies and programmes. Agenda 2063 has projected growth in contraceptive use especially in regions where less than half of married women in the reproductive age currently use contraception (United Nations, 2015a). It is anticipated that contraception use will increase in the near future to cater for diverse fertility desires among women for improved spacing of births.

2.3 Methods of Contraception

Contraception falls into various categories which among others include; chemical, mechanical and natural by method. Chaudhuri, (2004) adds that categories of contraception methods include; barrier, oral, non-oral hormonal, intrauterine devices emergency, sterilization and natural methods of contraception. Contraception methods can be put into two main groups namely; modern and traditional methods. Modern methods include; sterilization, pill, Intrauterine Devices (IUD's), Injectables, Implants, Condoms, Standard Days Methods (SDM), Lactational Amenorrhea Method (LAM) and Emergency Contraception while Traditional Methods include; Rhythm and Withdrawal (CSO; 2015, Wang et al; 2017).

2.3.1 Oral contraceptives

Oral contraceptives include; combined oral contraceptives, progesterone oral pills and emergency contraception pills. Combined oral contraceptives are pills that use synthetic estrogens and progestin to prevent pregnancy (MoH, 2006b). This chemical combination in oral contraceptives makes it possible for women to avoid conception and eventually pregnancy.

2.3.2 Non – Oral Hormonal Contraceptives

These constitutes a form of birth control which is not taken by mouth. Under this category of contraceptives, are projesterone-only injectables, implants and contraceptive patches.

2.3.3 Barrier Contraceptives

This category of contraceptives act as barriers between a man and woman during sexual intercourse. Chaudhuri, (2004) adds that these contraceptives prevent joining of a sperm and an ovum.

2.3.4 Intra-Uterine Devices (IUD's)

These constitute Long-Acting Reversible Contraception (LARC) which last for many years and effectively prevent pregnancy in women. Intrauterine protects against pregnancy by use of a loop. Long-acting reversible contraceptives such as IUDs are most effective methods of contraceptive device (Winner et al, 2012). However, use of LARCs is very low among women in most developing countries Zambia inclusive. A survey of 18 countries in sub-Saharan Africa indicated that less than 10% of contraceptive use was attributed to LARCs and permanent methods (Van Lith, Yahner and Bakamjian, 2013).

2.3.5 Sterilization

Sterilization is a medical procedure of contraception for both men and women who no longer want to reproduce permanently. Sterilization can be done for both male and female especially for limiting births.

2.3.6 Spermicide Method

Spermicide contraceptives destroy sperms once inserted in the vagina prior to sexual intercourse to prevent pregnancy. Chilangwa (1995) states that spermicides are chemicals available in form of jelly, foam, cream and tablets.

2.3.7 Withdrawal Method

This is regarded as a traditional method of contraception and one of the oldest birth control method which is highly mechanical (Cullins; 2011). Withdrawal method is a practice of ending sexual intercourse before ejaculation.

2.3.8 Natural Family Planning Method

Natural family planning techniques are centered on fertility awareness-based methods that teach women how to identify the fertile days of the menstrual cycle (McSweenney, 2005). This method includes; rhythm, basal body temperature and cervical mucus method.

2.4 Benefits of contraception use

Contraception has profound benefits for women to make informed choices about fertility (Chersich, et al 2017; Feucht, Meyer and Kinger, 2014). Family planning can save and enhance the lives of women, children and the family. Thus, improved contraceptive practice should imply reduction in unwanted fertility because births will be widely spaced for improved health outcomes for mothers and children. Fertility has serious implications on the health of mothers and children (Hailemariam, et al; 2013).

2.4.1 Benefits to the mother

Family planning prevents maternal deaths by allowing women to delay motherhood, space birth, stop child bearing and avoid unintended pregnancies and abortion (Carl and Mary, 2008). It is vital to understand the health benefits that are associated with contraception use among women especially when births are adequately spaced. Maternal deaths have become a major cause of death among women especially in developing countries where reproductive health services are relatively poor and inaccessible. Contraceptive use has resulted in improved health-related outcomes among women (Asekun-Olarinmoye et al, 2013; Rutstein and Winter, 2015).

A study done in the United States in 2002 revealed that contraception use among women was responsible for the decline in pregnancy levels (Abma, Martinez and Copen, 2010). Unplanned pregnancies have often resulted in unsafe abortions leading to death. Illegal abortions arising from unwanted pregnancies constitute a major reproductive health problem especially in poor countries. Women are dying in large numbers as a result of unsafe abortions which are mostly conducted by untrained individuals. Contraception reduces reliance on elective abortions and can avert between 13 to 15 percent of maternal deaths that can result from unsafe abortions (Tsui et al, 2011).

Contraceptive use can improve schooling and economic outcomes for girls and women (Canning and Schultz, 2012; Schultz and Joshi, 2013; Kavanaugh and Anderson, 2013). Women deserve to have satisfying life that accord them chance to actively participate in wealth creation. Controlled fertility can accelerate socioeconomic and sustainable environmental development especially in the developing world as women are key partners in development. However, implementing the integrated programmes remains limited (Gaffied, Egan and Temmerman, 2014). Contraception services accord women the freedom to make independent decisions with regard to child bearing which is a matter of human rights today.

On the other hand, hormonal contraceptive methods have protective effects with respect to anemia (Yeakay, et al, 2009). This has meant improved health living for women who are anemic among other diseases to be able to space births conveniently. At the same time, contraception has the capacity to help women with underlying medical conditions such as cardiovascular, diabetes, seizure disorder and breast cancer to manage their condition if and when they decide to become pregnant (CDC, 2010). The need for contraception for women in the reproductive age must adequately be addressed if lives are to be preserved among women with diverse medical conditions.

2.4.2 Benefits to the child

Generally, contraception use has a wider range of potential benefits for children. Pregnancies which are well spaced can enhance the well-being of the children in terms of health and nutrition. Contraception use helps to time pregnancies to avoid pre-term births and low weight thereby decreasing medical challenges for the baby at birth and beyond (IMC, 2007). In this vain, contraceptives are used to adequately and conveniently space births. There is a link between the inter pregnancy interval and the three birth outcomes; low birth weight, pre-term birth and small size for gestational age (Conde-Agudelo, Rosas-Bermudez and Kafury-Goeta, 2006). Despite the associated benefits of using contraceptives in maternal and child health, unmet needs for contraception still remain high. On the other hand, socio-cultural orientations have influenced acceptance of contraception in certain societies especially in third world countries. Goldie, et al (2010) adds that more than 220 million women in the developing world who want to avoid and postpone child bearing are not using any form of modern contraception. This entails diversity in the manner contraception uptake is perceived which could possibly help to understand high short birth intervals in developing countries especially in Africa.

2.5 Determinants of Contraception use

Demand and supply factors that influence contraception use can be grouped into socio-economic, demographic and cultural factor. Various socioeconomic and cultural factors influence contraception use and births interval (Muanda, et al, 2016). On the other hand, fear of side effects, husband disapproval and desire to have more children are also associated with contraceptive use.

2.5.1 Age

Age is an important determinant of contraception use among women. Young women (15-24) in the reproductive age are less likely to use a contraceptive method (Beekle and McCabe, 2006). Henceforth, older women (35+) have a higher propensity of using contraceptives to limit and space births adequately. Contraception use is low among women in their teens and rises thereafter. Moreover, older women are more exposed to sexual intercourse due to high marriage unions and hence more likely to use contraceptives to avoid pregnancy. A study in Kenya indicated that young women experience higher risk of mistimed pregnancy compared to older women (Ochako, 2015). However, a study by Khraif, et al (2017) among women staff at Saud University, Saudi Arabia found that age had a negative role in contraceptive use in that increase in age reduced the likelihood of contraceptive use..

The median number of months since preceding birth increases significantly with age (CSO, MoH and ICF (2014). A study done in Tanzania indicated that maternal age is inversely related with non-adherence to recommended minimum length between two live births. This could be responsible for variations in birth spacing intervals among women in the reproductive age.

2.5.2 Marital status

Contraceptive use among women varies based on marital status. Married women have greater exposure to sexual activity (Rao, Townsend and Askew, 2006). Hence, unmarried women are mostly associated with longer birth intervals, hence, less likely to use contraceptives unlike married women. A descriptive cross-sectional study by Adeyemi, et al (2016) conducted in Nigeria among women in the reproductive age revealed that married women were 4 times more likely to use contraceptives than single women (OR 4.5; CI (3.03 – 6.71: P < 0.0001). Therefore, marital status among women determines the chances on utilization of contraceptives.

2.5.3 Parity

Women in higher parity have higher chances of using contraception than those in lower parity. Obwoyo, et al (2018), conducted a study in South Sudan among women in the reproductive age and found Parity (AOR: 1.242, 95% CI: 1.000-1.544). Hence, Women who have reached a preferred number of children may tend to have longer birth intervals than those whose preference has not been attained. The number of living children can determine the potential to use contraceptives which in turn influences birth interval.

2.5.4 Residence

Women in urban setups have access to a wide range of contraception methods than those in the rural areas based on location. A study conducted in Kenya revealed that women in urban Kenya were 73.1 percent more likely to use contraception compared to those rural areas (Amoi, 2011). Uneven distribution of reproductive health facilities causes disparities in utilization of family planning services based on residence. Another Cross-sectional study done by Hossain et al (2018) publicized that women from rural setting were 23% less likely to use contraceptives than women from urban setting (AOR: 0.77, 95% CI: 0.69-0.86).

2.5.5 Knowledge

Poor knowledge of contraceptive methods has been associated with poor uptake (Wu, 2010; Wafula, Obare and Bellow, 2014). Use effectiveness of contraception methods relies heavily on the knowledge base of contraceptors. Counselling services have been heightened in healthcare packages at various levels of health service provision. Community based reproductive health service provision in Zambia is being championed through involvement of community health workers as key personnel in bringing such facilities closer to the clients especially women. The Zambian government has adopted the primary health care model as a strategy for achieving a health population (Shikabi, 2013). Knowledge enables women to effectively use contraceptives as well as seek methods that are more effective.

2.5.6 Education level

Highly educated women have a higher propensity to utilize modern methods of contraception unlike uneducated.. There is association between diffusion of contraceptives and women's education (Frost and Lindberg, 2012). The more women are educated, the greater the access to

birth control methods. Conversely, having knowledge does not mean use of contraception (Banda, 2015).

A study by Obwoya, et al (2018) in Juba city, South Sudan among women found education positively associated with contraceptive use. A study in India, indicated similar results (Suwal, 2001).

The power of information among women in the reproductive age is manifested in the length between successive births. Educated mothers are more likely to access information and utilize contraceptive methods consistently to achieve longer birth intervals (Getachew, et al, 2013). On the other hand, education capacitates exposure to variety and effective methods of contraceptives which respond to individual needs and aspirations for spacing births.

2.5.7 Wealth quintile

Women with lower socioeconomic status are associated with less contraception use (Karibu and Orpinas, 2009). Women's wealth status has a big influence on their probability to use family planning services in form of contraception and hence attainment of adequately spaced births. Rich women enjoy benefits that finances can offer in terms of capacity to afford a wide range of contraceptive services offered on the market. A multivariate study by Tappis, (2015) in Pakistan found wealth quintile to have positive influence on contraception use where women in the richest category were 2.38 times more likely to use contraception than women in the poorest category (95% C.I.:1.59-3.56). Short birth intervals are more prevalent among the majority poor women who are cannot afford to purchase reproductive health services at a fee. However, a study by Mandiwa, et al (2018) in Malawi indicated that wealth quintile was insignificant in determining contraceptive use among women.

2.5.8 Social cultural norms

Contraception use among women is influenced by cultural norms (Murty and Devos, 1994; Hall, 1996). Cultural norms compel women to use their fertility to earn respect from society by having many children, hence opt not to embark on contraception use. Cultural norms have negative influence on the capacity to fully utilize a wide range of contraceptive services available on the market. Culture influences women to bear children to prove their ability to reproduce (Srikanthan and Reid, 2008). This entails that traditions have influence on birth spacing among women. African tradition cannot be ruled out in spacing births.

2.5.9 Religion

Most religions are against artificial birth controls in marriage. Religion especially Christianity sights the use of contraception as sin and against God's law of reproduction (Mutombo and Bakibinga, 2014). The ability to use contraceptives is largely based on religious connotations upheld by a given social setup through norms and beliefs which have in most cases rendered women vulnerable in terms of decision making with regard to child bearing. Religious beliefs is one of the reasons for non-use of contraception in sub-Saharan Africa (Ajayi, Adeniyi and Akpan, 2018).

2.5.10 Decision making and Partner involvement

Women have less grip on reproduction issues as husbands are key decision makers where such matters are concerned (Orji, Ojofeitimi and Olanrewaju, 2007). Gender power in couples restricts women's ability to practice family planning subsequently, their ability to space births. Women consider men to be a barrier to contraception use as they dominate the decision making process regarding fertility (Banda, Bradley and Hardee, 2004; Mutombo and Bakibinga, 2014).

However, partner involvement is key in the utilization of contraception by women. Lack of male involvement in family planning is a barrier to contraception use among women (Frost, 2013). Hence, envelopment of male is essential in family planning utilization process because women need support from their partners who are key decision makers especially at household level.

2.5.11 Body Mass Index

Research has shown that increasing bodyweight affects rates of estradiol metabolism in women (Edelman, et al, 2009). Obesity among women is more pronounced today and can to some extent increase the probability of oral contraception failure which in turn influence birth spacing among women. Evidence shows that obese population have poorer adherence to oral contraceptives (Westoff, et al, 2012). Poor adherence to contraceptives imply heightened chances of becoming pregnant leading to short birth intervals which can lead to high birth rates in a population. A study in study in Bangladesh using DHS data revealed that overweight women had approximately 29% less chance of contraception use than women of normal weight (AOR: 0.71, 95% CI: 0.60-0.84).

2.5.12 Side Effects

Contraceptives react differently on individuals leading to physiological effects. Contraceptive users may experience headaches, prolonged bleeding, become infertile, high blood pressure and

weight gain (Muanda et al, 2016; Ochoko, et al, 2015). On the other hand, prolonged use of contraception may lead to various types of cancers especially cervical cancer (Bosetti, et al, 2009). Henceforth, women have to weigh the options with regard to purported side effects before settling for a specific methods.

2.5.13 Cost

Cost of contraception can compel women to resort to traditional methods of birth control which are often unreliable. In poor countries, economic constraints affect women's ability to buy contraceptives and when seeking sexual reproductive health services (Chapagain, 2006; Sundby, 2006). Cost of contraception is an aspect of access as it can influence levels of contraception prevalence rates thereby influencing birth interval among women.

2.5.14 Demand and Supply factors

Contraception use has been abetted by limited access. Mwaikambo, et al (2011) state that supply and demand factors have profound influence in the utilization of family planning services. Rural and remote areas have proved to be barriers in the access to contraceptives. A study in Ethiopia concluded that the problems of availability and accessibility influenced the use of contraceptives (Gizaw and Gegassa, 2011).

2.5.15 Exposure to Mass Media

Various health tips are given through print and electronic media regarding contraception use. Access to such information is empowerment which can help women to make informed decisions regarding the method of contraception to use and the benefits that accrue to women and the family when births are well spaced. Women exposure to mass media influence child spacing (Rafalimanana and Westoff, 2001). Knowledge empowers women with knowledge which helps in decision making especially when selecting contraceptives to suit individual needs.

2.5.16 Employment/ Occupation

Working mothers are more likely to use contraception to achieve longer birth intervals than full-time housewives. Likelihood of employed women to use contraception is high (Iyayi, 2012; Osuofor, Maputle and Ayiga, 2018). Women involved in any form of employment need more time to attend to work errands hence, rely more on fertility control methods to postpone pregnancy based on individual needs and aspirations. A study in Saudi-Arabia indicated that employed women were practicing optimum birth interval of 3 to 5 years (Rasheed and Aldabal, 2007).

2.5.17 Survival Status and sex of Index Child

Death of the index child results in short birth interval because parents immediately plan a new pregnancy to replace the loss. A study done in Manipur revealed that survival status of previous child was important in determining child spacing patterns (Singh, Singh and Narendra; 2010). On the other hand, sex of the index child can determine birth interval of the succeeding birth. A study in Oromia region, Ethiopia, women who had a female index child were more likely to have shorter birth intervals and less likely to use contraceptives compared to mothers who had a male index child (Rao, Townsend and Askew, 2006).

2.5.18 Contraception method.

Various contraceptive methods are available for women to choose from based on efficiency and effectiveness in terms of preventing pregnancy. Some contraceptive methods are inherently more effective than others at preventing pregnancy (Fu et al, 1999). Increase in access to both traditional and modern methods of contraceptive methods shows the desire by women to have grip on their reproductive lives which aims at improving birth outcomes for both mother and child. A study by Ahmed (2016) using community based cross-sectional survey design in Ethiopia among married women indicated that contraceptive use status was associated with duration of birth interval. Women not using contraceptives were found to be 1.7 times more likely to practice short birth interval (AOR=1.66, 95% CI (1.09, 2.77)).

2.6 Birth Spacing

Birth interval is an important factor in determining levels of child and maternal health in a population. Elevated risks of neonatal, infant and child mortality and child malnutrition are statistically linked to short term birth intervals less than 30 months (Rustein, 2005). Many health complications emanate from short term birth intervals which may have adverse effects on the child. Premature rupture of membranes, preeclampsia, high blood pressure and anemia are associated with inter-pregnancy intervals of less than 6 months (Razzaque et al, 2005). The interval between pregnancies is an important window during which contraceptive benefits for maternal health are experienced. Hence, a period of at least 2 years is recommended before attempting to the next pregnancy (WHO; 2006).

Risk for neonatal, infant and under-five mortality decline when births are adequately spaced to a period not less than 2 years. However, birth intervals longer than 5 years can be unhealthy for

expectant mothers for improved birth outcomes (UN, 2011). Achievement of optimal birth interval among women in the reproductive age can have adverse effects on both mother and child.

2.6.1 Birth Spacing in Africa

Traditionally, birth spacing in African societies was controlled by prolonged breastfeeding, postnatal abstinence and polygyny. Traditional methods of birth control have recorded high numbers of unplanned pregnancies resulting in short intervals between successive pregnancies. However, volitional birth control has had a major impact on the length of birth interval in sub-Saharan Africa (Towriss and Timaeus, 2018). Increased urbanization, cultural change and contraception use have altered birth spacing in many parts of Africa. Walters (2008) points out that Tanzania experienced decline in birth intervals between 1940 and 1970 with the emergency of modern contraception methods. Birth spacing continues to be an important aspect of family structure and dynamics in sub-Saharan Africa. Contraception use is associated with birth spacing rather than family limiting in most parts of Africa (Westoff, 2006). Women in the reproductive age prefer longer birth intervals though the actual birth spacing is shorter on average. Longer birth intervals should be significant in sub-Saharan Africa since variety of contraceptives are used for spacing births are available.

A study by Green (1998) revealed that contraception use in spacing births in sub-Saharan Africa has limited effect on the length of birth interval for only a few months. Africa is associated with short birth intervals even in the midst of high modern contraception utilization campaign. However, in developing region, 57% of women of the reproductive age desire to space births for at least 2 years or limit child bearing at all (Singh, et al; 2014).

Nigeria has regional disparities among women of reproductive age where birth intervals range between 28 to 35 months (National Population Commission, 2009). Overall, birth intervals in Nigeria are below the recommended interval between successive births. NPC (2009) further states that irrespective of the contraceptive method used by women in Nigeria, birth intervals are relatively short with median birth interval of 31.2 and 31.4 months in 2003 and 2008, respectively.

A study in Ghana indicated that 80% of women practiced birth intervals less than 2 years (Christina et al, 2014). Such statistics are worrisome and have health implications on women and children to a large extent. On the other hand, this entails rapid population growth for the population in general because of high birth rate. Such a scenario is common in a young population where in birth

intervals are expected to be shorter than 2 years. However, a study in Yazd revealed that less than 30% of women in the reproductive age practiced birth intervals less than 2 years (Fallahzadeh, 2013).

Another study indicated that the median birth spacing interval for Ethiopia, Kenya and Tanzania stood at 37 months between 2005-2009 (Towriss, 2014). Furthermore, birth intervals in Zimbabwe stood at 52 months for women in the age cohort 25-29 within the same time period. This shows variations in birth intervals among women in Africa. A recent study in Ethiopia indicates a median birth interval of 32 months among married women (Ahmed, 2016). Sub-Saharan Africa revealed wide spread desire of women to have longer birth intervals than they currently have in the region..

2.6.2 Birth Spacing in Zambia

The Zambian fertility rate of 6.2 births per woman is one of the highest in the world (MCDMCH, 2013). Though birth spacing in Zambia has shown variations with time. In 2001-2002 ZDHS, 41 percent of births occurred at least 36 months after previous birth. The report shows that the median birth interval stood at 33 months, which is 3 months shorter than the 'safe' birth interval (CSO and CBH, 2003). However, there seems to be little consensus between increase modern contraception use and current birth spacing levels in Zambia with reference to fertility rates among women in the reproductive age.

ZDHS – 2007 shows that the average birth interval among women in the reproductive age was over 2 year (CSO, 2009). This displays a slight improvement from the 2001-2002 ZDHS. Hence, birth spacing has been improving among women in Zambia. In ZDHS 2013/14, the median birth interval stood at 35 months, indicating a small increase from 34 months in 2007 (CSO, MoH, and ICF, 2014). Could this small improvement be attributed to high contraception prevalence rate (CPR) in Zambia at present?

2.7 Benefits of birth spacing among women

Maternal and child health is achieved by promoting birth spacing, timing and spacing of pregnancy (UNAIDS; 2014). Waiting time between two pregnancies has the capacity to determine the well-being of the mother and children. Sufficiently spaced birth intervals help the body to have enough time to recover from pregnancy and child birth. Longer birth intervals have the capacity to reduce abortion among women in the child bearing age. A woman who waits until her child is at least 2

years old before becoming pregnant again makes them healthiest (Barde, Khobragade and Gawali, 2013).

Longer birth interval enable women to recover physically and nutritionally. Adequate spacing of births of at least 2 years apart is linked to reduction of a key measure of malnutrition and stunting among children under 5 years of age. Perinatal and maternal nutrition may be improved by adequately spacing births (Kahn, Chien and Khan, 1998).

Extended birth intervals enable mothers to engage in other gainful activities (Feucht, Meyer and Kruger, 2014; Michalow, et al; 2015). Birth interval affects the mother's employment and ability to contribute effectively to the economic status of the home. Mothers need more time, energy and resources to breastfeed infants which can better be achieved through improved spacing of births. Women make up the majority of individuals engaged in the informal sector of the economy especially in developing countries where the majority of women reside in rural milieu where economies are agricultural based. However, Conde-Agudelo (2000) argues that birth interval is a risk factor independent of socioeconomic status.

Well-spaced birth intervals enable women to effectively attend prenatal services for the unborn child. Women with unintended pregnancies that are continued to term are more likely to receive inadequate prenatal care and have poor health outcomes. Undoubtedly, short birth intervals are a risk factor among women in the reproductive age because upon realizing that they have mistakenly conceived, some resort to unsafe abortion which has proven to be fatal especially in developing countries. Unsafe abortion has been on the increase in the developing world leading to death among women because traditional methods are commonly used. As such, short birth intervals less than 2 years have been linked to poor health conditions on women and children (Fotso, et al; 2013). Birth spacing determine and shape population and development of society. Implications of high levels of closely spaced and unintended births accelerates population growth and undermine development efforts across sectors (Hailu and Gulte; 2016). Developing countries are the most affected by unprecedented rates of population growth resulting from closely spaced births.

2.8 Determinants of Birth interval
Policy makers and planners have focused more attention on birth interval as a driving force in understanding fertility and natural population growth. Various factors are at play with regard to the manner in which women space births. Yohannes, et al, (2011) points out that

sociodemographic, economic and birth history are significantly associated with inter birth intervals among women in the reproductive age. However, Pillai and Gupta (2010) argue that birth spacing decisions among Zambian spouses are influenced by noneconomic factors. The interaction of these broad categories of birth interval predictors determines the level of birth spacing attainable in a given society.

2.8.1 Contraception use

The use of modern and effective methods of contraception has gained popularity today due to the many benefits that accrue to women and children especially when births are spaced adequately. USAID (2010b) points out that in most developed countries, the use of contraception for spacing predominates, motivated by improving the health of mothers and children. It is for such reasons that contraception utilization is deemed effective when it can help to avoid unplanned pregnancies. Hence, women resorted to contraceptive use to ensure that they promote health living. Hagain-Tilaki et al (2009) indicated significant correlation between birth interval and the type of contraception used. Hence, it is expected that contraception use can enable women to adequately space birth among contraceptors. A study by Yohannes et al (2011) revealed that non-Contraceptor women were 1.56 times more likely to practice short birth interval (AOR=1.56, 95% CI; (1.2, 2.2)). Another study in Southern Ethiopia by Begna, et al (2013) among married women indicated that mothers not using contraception were more likely to experience short birth interval (AOR 5.91, 95% CI; (4.02, 8.69)). These findings are further reinforced by Ahmed

(2016) who did a study in Ethiopia using community based cross-sectional survey design where women not using contraception were 1.7 times more likely to practice short birth interval (AOR=1.66, 95% CI (1.09, 2.77)). However, a study in Dar-es-salaam, Tanzanian by Maganyiza and Mageta (2013) revealed that contraception use did not promote health spacing of births (AOR=1, 95% CI; (0.5, 1.9)). It is important to understand environmental dynamics and their effects with regard to reproductive life of women in a given society. Social cultural aspects tend to dominate society which have influenced women adaptation on acceptance of birth control remedies provided by the healthcare system which may in turn affect birth spacing levels. However, contraception is an important tool not only in reproductive health wishes but also in women empowerment leading to achievement of ideal family size through birth spacing (Ndahindwa, et al; 2014). It is worth noting that among contraceptors, levels of birth interval are highly dependent on the type of contraception method. Method effectiveness plays an important

role in the manner women are able to postpone pregnancy. However, modern contraceptive methods are more pronounced today due to the perceived advantages they have over traditional methods. A study in Ethiopia indicated that use of modern contraceptives showed significant positive correlation with birth interval (Yohannes et al, 2011). Effective contraceptives could prevent as many as 1 in every 3 maternal deaths by allowing women to delay motherhood, space births, avoid unintended pregnancies and abortions and stop child bearing when they have reached the desired family size (Jason, et al; 2009). Hence, couples are using contraceptives not only to space births but also to limit births. Couples who have achieved the required family size, they have restricted births by utilizing long acting contraceptives to ensure that they do not conceive at all. However, EDHS (2011) indicated that, of 75% of married women of reproductive age who desired to space birth for at least 2 years, only 5% used long-acting reversible contraceptives (LARCs)s. Method mix in the provision of reproductive health services is very important by government and other organizations involved in providing family planning among women. As expected, using contraceptives leads to large and significant increase in the space between births (Saha and Van Soest; 2013).

2.8.2 Age
Maternal age has proved to be an important determinant of birth spacing. Older women are more likely to use contraception to space or limit births because it is assumed that they may have achieved the number of children unlike young ones. A study in Tanzania by Exavery, et al (2012) indicated inverse relation of age with non-adherence to the recommended minimum length between two live births where short interval birth was highest at 76% among the youngest (15-19) women and declined with increase in age among older age groups. . Conversely, a study by Hailu and Gulte (2016) in Ethiopia indicated that mother's age was significantly associated with short birth interval. The results are similar to Karkee and Lee (2016).

One the other hand, age at first marriage has influence on birth spacing among women. Early marriages which have often resulted in short birth spacing are very common in developing countries which has heightened fertility levels. However, a study in Manipur indicated that the median birth interval decreased with increasing age at first marriage (Singh, et al; 2010).

2.8.3 Wealth index
Economic status of women has the capacity to influence birth spacing decisions. In most cases, women in the poor bracket have closely spaced births as opposed to those in the rich category who

usually have afford and access contraception services with ease. However, a study conducted by CSA (2011) in Ethiopia revealed no statistical significance in the median birth interval by wealth index. In contrast, a study by MGuire and Stephenson (2015) concluded that rich women in Zimbabwe were significantly and 2 times more likely to achieve optimum birth spacing to reference category.

2.8.4 Education.
Education status of women is highly associated with their reproductive behaviour. Formal education empowers women with knowledge on reproductive health and accords them economic independence by engaging into various economic activities which enables them to have control over their reproductive life. Educated women are better place to understand health and economic trade-offs between normal and short birth intervals. A study by Begna, et al (2013) in Southern Ethiopia indicated that women with no formal education were 1.9 times more likely to have short birth interval practice compared to those who had formal education (AOR=1.89, 95% CI; (1.15, 3.39)). The finding is consistent with evidence from the study conducted in Pakistan (Asifa and Khalid; 2012). Women exposed to formal education are well informed and understand the benefits of achieving normal birth spacing in relation to maternal and child health. Education ensures that women are literate enough on issues of reproductive health. Suwal (2001) adds that women with education level of secondary stage and beyond have longer birth intervals than those with no or elementary education. A study by Palamuleni (2013) in Malawi using 2000 and 2004 DHS data had similar findings.

2.8.5 Residence
Place of residence has a bearing on the manner women influence fertility through birth spacing intervals. Rural areas tend to experience high levels of short birth intervals as opposed to urban areas. This situation could be attributed to strong social and cultural norms on the value placed on child bearing Dissanyake (2000) contends that place of residence has an impact on the length of birth interval. Women in urban areas are more likely to time births adequately. Urban women can easily access reproductive services in contrast to their rural counterparts. Hence, unmet needs are more pronounced in the rural milieu leading to pronounced practice of short birth intervals among women.

2.8.6 Sex of index child

In most developing countries, especially in Africa, sex of index child influences birth spacing based on cultural norms that seem to attach value to a particular sex of children. However, such norms vary from place to place but very dominant in third world counties Zambia inclusive. Gray and Evans (2004) point out that birth intervals for women are short when the preceding child is female. In such instances, women are more likely to succumb to external pressure from the spouse and relatives who may prefer a particular sex of a child. A study done in Southern Ethiopia by Begna, et al; (2013) found sex of index child to be significantly related to inter-birth interval among married women. Ultimately, short interval births become more pronounced as women strive to impress their spouse and relatives by concurrently conceiving in view of giving birth to an assumed sex of a child. Nonetheless, EDHS 2011 showed no statistical significance between sex of index child and birth interval (CSA; 2011).

2.8.7 Occupation

Women who are engaged in some form of employment are more likely to postpone child bearing as opposed to the unemployed. Employment encourages delays in marriages and the use of contraceptives (Islam, et al; 2011). Hence, women in employment are more likely to achieve normal and longer birth interval because they often put value on the job than child bearing. On the other hand, women who are working are more committed to the job and are not willing to put their job on the line through the utilization of various forms of birth control methods. A study by Suwal (2001) in Saudi Arabia indicated that employment status was significantly related to birth spacing.

2.8.8 Ethnicity

Ethnicity can influence birth interval variously. Cultural orientations in form of beliefs, norms and customs valued in a given social setting has the potential of determining birth interval likely to be practiced among women. A study by Dibaba (2010) in Ethiopia indicated that ethnicity was insignificant in determining birth interval.

2.8.9 Survival status of index child

The survival status of preceding child has been found to important in determining child spacing (Dissanyake; 2000). Biologically, survival of preceding child results in continuous breastfeeding of the child which consequently leads to late return of ovulation increasing the chances of postponing conception among women leading to achievement of longer birth intervals. It is worth noting that survival status of preceding child entails lactational amenorrhea resulting from constant

breastfeeding which may lengthens birth interval. A Study done by Singh, Singh and Narendra (2010), in Manipur, India indicated that women with survival of preceding child were 44% less likely to have short birth interval compared to women having the death of previous child.

2.9 Benefits of child spacing to the child

Optimal birth spacing is a pre-requisite to the attainment of health children. Long birth intervals reduce infant mortality. Preventing closely spaced births, family planning could save lives of over 2 million infants and children annually (Rutstein, 2005).

Preterm births have significant negative effect on maternal weight and body mass index on the child at birth. Sufficient birth spacing is advantageous to the child and reduce premature births. Adequate birth spacing reduces the risk of adverse birth outcomes (Kaye, Gootman and Finley, 2014; Sonfield, 2014). A study in Bangladesh indicated that birth intervals less than 2 years were more likely to give still and neonatal death in succeeding pregnancy (Jonge et al, 2014). Henceforth, birth spacing of 2 years and above helps to save lives of living children by enhancing survival rates unlike when birth intervals are short.

2.10 Conceptual framework
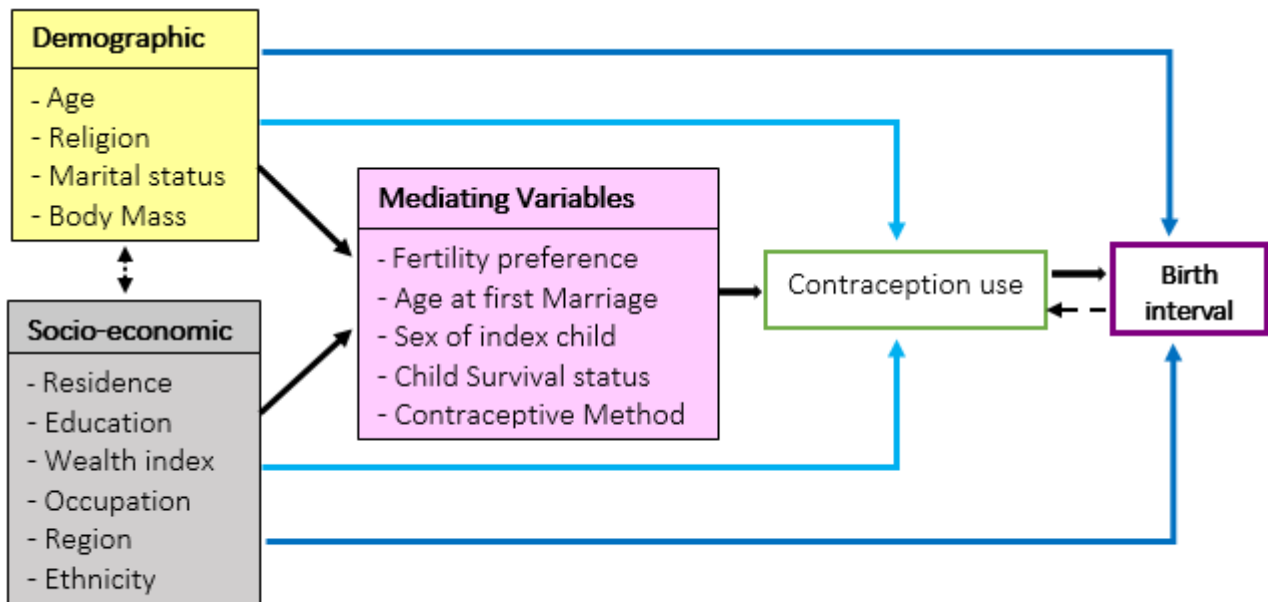
Figure 2.0: Factors associated with contraception use and birth interval.
Source: Designed by Author based on literature

The conceptual framework highlights demographic, socio-economic and mediating variables that may possibly influence contraception use and birth interval among women either directly or indirectly. Demographic variables include; age, religion, marital status, body mass index interact with socioeconomic and mediating variables. Residence, region, ethnicity, education, wealth quintile and occupation make up the socio-economic factors which may influence birth interval. Though influenced by demographic and socioeconomic factors, mediating factors;fertility preference, age at first marriage, sex of index child, survival status of index child and contraceptive method can have bearing on contraceptive use and birth interval. **Figure 2.0** shows the conceptual frame work.

2.11 Definition of Concepts

Contraceptor - A user of a contraceptive method

Contraception - Refers to measures taken by couples to prevent conception

Birth interval – This is the length of time between two successive live births.

Contraceptive Prevalence Rate – Percentage of currently married women using method of contraception.

Normal birth interval - This denotes '2+ years' birth interval after preceding live birth.

Short birth interval – Birth interval of less than 2 years after preceding live birth.

Summary of Literature

Literature has shown policies and conferences in contraception implementation at global, continental and Zambian perspective. Various methods as well as the importance of contraception use and birth spacing among women and children. On the other hand, literature was appraised with determinants to contraception use and birth spacing separately. Literature has shown scanty information on the relationship between birth spacing and contraceptive use among women in the reproductive age in Zambia. This study will fill the identified gap. Conceptual framework was generated based on literature review of the various possible determinants of contraception use and birth spacing. Thereafter, key terms were defined as used in the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section indicates the research methodology employed in this study. The chapter looks at research and sample design, population definition and data collection/source of data. This chapter further outlines data processing and analysis as well as study limitations.

3.2 Research Design

Cross-sectional research design was used in this study. . The study was based on secondary data from the 2013/14 ZDHS. This data upholds high levels of validity and reliability due to the nature of consistency checks and data quality methodologies applied.

3.3 Sampling Design

The 2013/14 ZDHS sample was a stratified cluster sample selected at two stages based on the 2010 census. Ten provinces were stratified into 20 sampling strata (Each province into urban and rural areas). Sampling was done at two stages, firstly using 722 Enumeration Areas and secondly through selection of households in each enumeration area to come up with a representative sample of 18, 052 households. ZDHS data was weighted using STATA (survey) command considering the complex survey design of DHS

3.4 Population Definition

The study population was drawn from the Zambian population consisting of all women aged 15-49 and all men aged 15-59 who were either permanent residents of the household in 2013/14 ZDHS sample or visitors present in the household on the night before the survey. A representative sample of 18,052 households was drawn based on the 2013/14 ZDHS comprising of 16,411 women in the reproductive age (CSO, 2015). However, a total of 8, 720 women in the reproductive age (15-49) qualified for this study who reported having a preceding live birth during the DHS survey.

3.5 Data Source

The female dataset obtained from the 2013-14 ZDHS was used for this study. The questionnaires used to collect the data contains aspects of fertility, infant and child mortality, family planning,

HIV/AIDS as well as breastfeeding, antenatal care and child health. Hence, for this study, information on birth interval and contraception use was obtained from the women questionnaire.

3.6 Data Processing and Analysis

Data processing of ZDHS 2013-14 consisted of editing, coding questions, data entry and editing computer identified errors using CSPro computer package.

Data was cleaned and some variables recoded to suit the study objectives. Data assessment was done for quality purposes by the candidate by comparing DHS data to 2010 census data. Data quality assessment table is provided for under appendix I. The table indicates high level of confidence to use the DHS data as a representation of the actual Zambian population of women in the reproductive age 15-49 years. 2013/14 ZDHS data gave greater level of confidence and validity to perform analysis.

Data analysis was performed using STATA 14 statistical package. Descriptive statistics were applied in form of frequency distribution and percentages for the dependent variable and independent variables. Correlation analysis was performed in order to analyse relationships between and among variables as shown in the correlation table in appendix II. Cross-tabulation was done to explore the relationship between dependent and independent variables. The dependent variable birth interval among women using contraceptives was recoded into two categories (0=Short and 1=Normal Birth interval) before regression with independent variables. Chi-square test was also done between birth interval among women using contraceptives and the independent variables for association. Statistical test using bivariate logistic regression analysis was performed in order to analyse influence of other independent variables on birth interval among women using contraceptives. 95 percent confidence interval was used. Binary logistic regression was used to analyse the probability of an event to occur. The model is described in the logit function as follows (Hosmer and Lemeshow, 2000).

$$Logit(y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots \beta_P \beta_P$$

Estimate probability of short and normal interval is given by;

$$P(y = 1) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots \beta_p \beta_p}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots \beta_p \beta_p}}$$

Where Y is dichotomous dependent variable (logit) defined as;

a) $y = (0 = $ Short birth interval; 1=Normal birth interval) among women using contraceptives. Multiple Logistic Regression analysis was used because the dependent variable had two categories.

$\beta_0 = $ is the intercept

$\beta_1, \beta_2, \beta_p = $ Logistic regression coefficient of X_1, X_2, X_P respectively

$X_1, X_2, X_P = $ Independent variables

$e = $ Exponential value

$p = $ number of predictors (independent variables)

This paper used odds ratios to represent a constant effect of a predictor X (independent variable) on the likelihood occurrence of one outcome. Odds ratios were used to measure net effect of the independent variable on the dependent variable. A ratio greater than 1 means likelihood, a ratio less than 1 means lower likelihood and a ratio of 1 means same likelihood to the reference category. Hence, the exponential function of the regression coefficient is the odds ratio associated with increase on one unit in the independent variable. Models are developed using multiple logistic regression analysis by enter mode. Model I is fitted with main independent variables to predict contraceptive use among women with short birth intervals. Model II is fitted with main independent variables to predict contraceptive use among women achieving normal birth intervals. Model III is fitted with main independent variables to predict short birth interval among women using contraceptives. Model IV is fitted with main independent variables to predict normal birth interval among women using contraceptives.. Further analysis was done to identify the major predictors of normal birth interval among women to using short, medium and long acting contraceptive methods. Log likelihood statistics were used to test for goodness of fit for the models.

3.7 Ethical Consideration

Permission to use Demographic and Health Survey data was sort from Measure DHS through formal correspondence by highlighting the aim of the study. The researcher provided justification to Measure DHS on how the data was to be used and how the research findings may contribute to women reproductive health issues. All guidelines were respected as provided for by Measure DHS. Weaver was then sort from University of Zambia Ethics Committee since the study was using DHS data.

3.8 Variable definition

3.8.1 Dependent variable

➢ The dependent variable of the study were Birth Interval and Contraception use obtained through the women's questionnaire. Preceding birth interval was categorized into dichotomous variable among women using contraceptives. [Recoded] (0=< 2 years "Short birth interval", 1 = 2+ years "Normal birth interval")

3.8.2 Independent variables

➢ **Demographic characteristics of women**

Age, [Recoded] 0=15-24, 1=25-34, 2=35-49 (Ordinal). Age was summarized into three cohorts of 10 years interval based on literature.

Body Mass Index, [Recoded] <18.5=0 "Underweight", 18.5 – 24.9=1 "Normal", 25+ =2 "Obese". (Nominal). Body mass index variable was recoded based on 2013/14 ZDHS categorization of body mass index.

Marital status, 0= Never Married 1= Married and 2=Formerly Married (Nominal)

Age at first marriage [Recoded] 0= < 18 years and 1 = 18 + years (Ordinal)

➢ **Socio-economic variables**

Religion, [Recoded] Dummy variables, 0= Other (Catholic and Muslim), 1=Protestants, (Nominal). Other comprised of both Catholic and Muslim.

Education status, [Recoded] 0=No education, 1=Primary, 2= (Secondary and higher) (Nominal)

Residence, Type of residence. 0=Urban, 1=Rural. (Nominal)

Ethnicity, [Recoded] 0= Barotse, 1= Bemba, 2= Tonga, 3= North Westerners, 4=Nyanja (Nominal). To reduce redundancy during analysis, ethnicity was recoded into five categories based on literature.

Region [Recoded] 0= Luapula and Western (Low CPR), 1= C/Belt, Eastern, Lusaka, Southern (High CPR) and Region 2= Central, Muchinga, Northern, N/Western, Region (Medium CPR) (Nominal). This variable was recoded based on the contraceptive prevalence rate at national scale. Region categorized Low comprised provinces with less than 40% contraceptive prevalence rate, Medium with contraceptive prevalence rate between 40 – 50 % while High region included provinces with prevalence rate above 50% as recorded in ZDHS.

Wealth index, 0=Poor, 1=Middle, 2=Rich (Nominal).

Occupation, Dummy variables 0=Not Employed, 1=Employed (Nominal)

➢ **Mediating Variables**

Fertility preference, 0= Have another, 1= No more (Nominal)

Sex of Index child, 0= Female, 1=Male (Nominal)

Survival status of Index child, 0= Not Alive, 1=Alive. (Nominal)

➢ **Contraception Method categorized as** 1=Short acting (Condoms, Pill, Lam, Standard days), 2=Medium acting (Injectables), 3=Long acting/ Permanent acting (Sterilization, IUD, Inplants) (Nominal). This variable was recoded based on literature.

3.9 Study limitations

Some analysis on certain variables could not be performed as earlier intended because of the manner the data was collected. The manner in which some variables are recorded in the dataset made it challenging to use them in the analysis because they are attached to married women only making it difficult use them as earlier intended.

The research findings only show aggregates with no account for causality. Hence, causal associations between dependent and independent variables cannot be elucidated.

Lack of qualitative data to support these results.

Some independent variables were eliminated due to high correlation and not being significant with the dependent variable which could have influenced the general outcome. The independent variable 'parity' was eliminated from analysis because it was highly correlated with age and was found to be insignificant associated with the dependent variable.

Some variables with continuous data especially age was divided into categories which could have led to information loss and ultimately influencing the outcomes (Aggarwal and Ranganathan, 2017).

CHAPTER 4

RESEARCH FINDINGS

4.1 Introduction

This section pinnacles the research findings based on the research questions raised in chapter one. Descriptive statistics, binary logistic regression and multiple logistic regression analysis were the three analysis techniques employed to achieve relevant information concerning this study.

4.2 Characteristics of the study population

Out of 16, 411 women in the survey, only 8,720 qualified for this research. Descriptive statistics were done in form of frequencies and percentages with regard to women characteristics as shown in Table 4.0.

With regard to ages, 45.2 % of the women were in the age group 25 – 34 while those in the cohort 15 – 24 were the minority with 14.8 % representation. The majority of the women were from rural areas making up 60.3 %. Primary education had 57.4 % representation. Protestants make up 81.7% of the women against other religions. Only 2.5% of the women were never married with those in marital union 81.6 %. Age at first marriage less than 18 years of 41.2%. Wealth quintile has poor and middle class with 41.1 % and 20.6% respectively. Only 36.0 % of the women are employed. 7.8 % belonged to the underweight category and 64.4 % are of normal weight. Barotse makes up 7 % and Bemba 41.9 % under ethnicity. Region 2 makes up 58.3 % and region 1 with 14.4 %. Fertility preference shows that women with desire to have another child stood slightly above 50 %. Desire for male children was 50.3 %. Child survival of index child was at 95.4 %. Contraception use represents 53.0 % for non-contraceptors.

4.3 Birth interval among women

The study shows that 1182 (13.6%) of women practice short birth interval (< 2 years) and a majority 7538 (86.4 %) practice normal birth interval (2+ years) as depicted in **Table 4.0**. This represents a difference of 72.8 % between short and normal spaced births.

The study reveals that 4620 (53.0 %) women are non-contraceptors and 4100 (47.0 %) women use contraceptives. This shows a small difference of 6.0 % in contraception use among users and non-users. High proportion of non-contraceptors against a high proportion of normal birth spacing indicates little correlation between normal birth interval and contraception utilization among women in Zambia.

Table 4.0 Background characteristics of women in the study

Background characteristics	Number	Percentage
Age		
15 – 24	1292	14.8
25 – 34	3938	45.2
35 – 49	3489	40.0
Residence		
Urban	3463	39.7
Rural	5257	60.3
Education		
No education	950	10.9
Primary	5007	57.4
Secondary	2763	31.7
Religion		
Other (Catholic and Muslim)	1596	18.3
Protestants	7124	81.7
Marital Status		
Never Married	214	2.5
Married	7121	81.6
Formerly Married	1384	15.9
Age at first marriage		
< 18	3588	41.2
18 +	5132	58.8
Wealth Index		
Middle	1796	20.6
Poor	3582	41.1
Rich	3341	38.3
Occupation		
Unemployed	3147	36.1
Employed	5573	63.9
Body Mass Index		
Underweight	677	7.8
Normal	5615	64.4
Obese	2438	27.8
Ethnicity		
Barotse	612	7.0
Bemba	3648	41.8
Tonga	1583	18.2
North Westeners	788	9.0
Nyanja	2086	23.9
Region		
Region 1 (Low CPR)	1256	14.4
Region 2 (High CPR)	5088	58.3
Region 3 (Medium CPR)	2376	27.2
Desire for Children		
Have another	4510	51.7
No more	4210	48.3
Sex of Index child		
Female	4330	49.7
Male	4390	50.3
Survival status of Index child		
Not Alive	402	4.6
Alive	8318	95.4
Contraception use		
No	4620	53.0
Yes	4100	47.0
Birth interval		
< 2 Years	1182	13.6
2+ Years	7538	86.4
	8720	**100%**

Source: 2013/14 ZDHS Dataset

Cross-tabulation of birth spacing against contraception use shows that contraceptors achieved 14.2 % and 85.8 % of short and normal birth interval respectively. Non-contraceptors achieved 12.9 % short and 87.1 % normal birth interval. This shows minimal difference in birth spacing.

Table 4.1 Cross-tabulation of contraception use and Birth spacing by background characteristics of women

Co-variate	Contraception Use			Birth Spacing		
	Using	Not Using		< 2 Years	2+ Years	
	%	%	P - Value	%	%	P - Value
Age						
15 – 24	49.6	50.4		23.7	76.3	
25 – 34	51.7	48.3	0.000	13.1	86.9	0.000
35 – 49	40.8	59.2		10.3	89.7	
Residence						
Urban	53.1	46.9		11.7	88.3	
Rural	43.0	57.0	0.000	14.8	85.2	0.000
Education						
No education	34.5	65.5		15.3	84.7	
Primary	44.9	55.1	0.000	13.8	86.2	0.202
Secondary+	55.1	44.9		12.6	87.4	
Religion						
Protestants	46.5	53.5		13.9	86.1	
Other (Catholic and Muslim)	47.1	52.9	0.810	13.5	86.5	0.036
Marital Status						
Never Married	37.1	62.9		14.5	85.5	
Married	51.7	48.3		14.1	85.9	
Formerly Married	24.7	75.3	0.000	10.8	89.2	0.005
Age at first marriage						
< 18 Years	46.2	53.8		14.5	85.5	
18 + Years	47.6	52.4	0.296	12.9	87.1	0.087
Wealth Index						
Poor	48.9	51.1		13.6	86.4	
Middle	39.2	60.8		15.6	84.4	
Rich	54.4	45.6	0.000	11.4	88.6	0.000
Occupation						
Unemployed	51.0	49.0		15.0	85.0	
Employed	44.8	55.2	0.000	12.7	87.3	0.004
Body Mass Index						
Underweight	42.8	57.2		12.4	87.6	
Normal	44.9	55.1		14.3	85.7	
Obese	53.1	46.9	0.000	12.2	87.8	0.009
Ethnicity						
Barotse	40.9	59.1		8.5	91.5	
Tonga	44.1	55.9		13.5	86.5	
North Westeners	51.6	48.4		15.8	84.2	
Bemba	38.8	61.2	0.000	12.7	87.3	0.000
Nyanja	47.0	53.0		13.7	86.3	
Region						
Region 1 (Low CPR)	33.7	66.3		11.7	88.3	
Region 2 (High CPR)	52.6	47.4	0.000	13.5	86.5	0.010
Region 3 (Medium CPR)	42.2	57.8		14.7	85.3	
Desire for Children						
Have another	49.4	50.6		15.3	84.7	
No more	44.4	55.6	0.000	11.7	88.3	0.000
Sex of Index child						
Male	47.5	52.5		14.1	85.9	
Female	46.6	53.4	0.524	13.1	86.9	0.739
Survival status of Index child						
Not Alive	22.8	77.2		18.0	82.0	
Alive	48.2	51.8	0.000	13.3	86.7	0.000
Contraception use						
Using	-	-		14.2	85.8	
Not Using	-	-	-	12.9	87.1	0.044
Birth Spacing						
< 2 Years	44.7	55.3		-	-	
2+ Years	47.4	52.6	0.044	-	-	-

Source: ZDHS 2013/14

Note: These are weighted statistics which may not add up to the Total

Cross-tabulation of contraception use against birth spacing shows a difference of 2.7 % between contraceptors as well as non-contraceptors with regard to short interval (< 2 years) and normal interval (2+ years). Non-contraceptors are the majority with 55.3 % in the short birth category. Normal birth interval shows a difference of 5.2 % in contraception use with majority non-contraceptors at 52.6 %. Table 4.1 shows that birth interval is significantly associated with contraception use at P<0.05.

4.4 Contraception use and Birth interval

Bivariate regression analysis of contraception use against predictors at p<0.05 revealed significant association with Maternal age, residence, marital status, wealth index. Occupation, body mass index, ethnicity, region, fertility preference and survival status of index child strongly associated with contraception use. There was significant association though not very strong between contraception use and birth spacing at p<0.05. Table 4.1 shows the outcomes of bivariate regression analysis.

4.4 Predictors of contraception use by Birth interval

Multiple regression analysis indicated that age, residence, marital status, education and survival status of index child were significant predictors of contraception use at p<0.05 among women with short birth interval. This result is shown in Table 4.2 Model I with Pseudo R^2 accounting for 80% of variance in explaining contraception use and model fit = 128.79.

On the other hand, predictors of contraception use among women achieving normal birth interval were age, residence, marital status, and ethnicity. Others included region, wealth quintile, and survival status of index child and education. This result is indicated in **Model II** with $R^2 = 68\%$ being variance explained by the model in contraception use and model fit = 702.69. Hence, predictors of contraception use were different between women practicing short and normal birth interval. On the other hand, predictors of contraceptive use were significantly stronger among women practicing normal birth interval as indicated in Table 4.2.

Women aged 34 – 49 reported less odds of contraceptive use of 1.5 compared to those aged 15 – 24 years among women practicing short birth interval.   (AOR= 0.714, 95% CI; (0.599, 0.850)). This shows negative association of age with contraception use.

By residence, women in rural areas reported less odds of contraceptive use of 1.2 compared to those in urban areas practicing birth interval (AOR=0.871, 95%; (0.765, 0.912)).

Marital status influenced contraception decisions among women. Married women practicing short birth interval reported odds of 2 more likely to use contraceptives compared to the never married (AOR=1.986, 95% CI; (1.471, 2.681)). Nevertheless, formerly married women reported less odds to use contraceptives of 1.6 compared to the never married (AOR=0.694, 95%; (0.503, 0.958)).

By ethnicity, only North Westener women indicated significance association with contraception use who reported less odds of 1.5 of contraceptive use compared to Barotse women..

Regionally, provinces with high Contraception Prevalence Rate indicated positive association with contraception use among women in the normal birth category. Women in region 2 and 3 were 1.5 and 1.3 times more likely to use contraception than the reference category (AOR=1.491, 95% CI; (1.265, 1.757)), (AOR=1.272, 95% CI; (1.098, 1.473)) respectively. This indicates that regional disparities in prevalence of contraception among women has the capacity to influence access to and later on use of contraceptives.

Wealth quintile was found to be negatively associated with contraception utilization among women achieving normal birth interval.. Poor women reported less odds of contraceptive use of 1.4 compared to women in the middle category. (AOR= 0.745, 95% CI; (0.652, 0.852)).

Education showed positive association with contraception use. Women who attain primary and secondary education were 1.4 and 1.8 times more likely to use contraceptives compared to women with no education (AOR=1.395, 95% CI; (1.185, 1.643)), (AOR=1.819, 95% CI; (1.509, 2.192)) respectively.

Survival status of preceding child was positively related to contraceptive utilization among women practicing normal birth interval which recorded the highest odds than any other predictor. Women in the normal birth interval category whose index child was alive were 2.5 times more likely to use contraceptives than women whose index child was not alive (AOR=2.484, 95% CI; (1.891, 3.264)).

However, occupation, body mass index, religion, maternal age at marriage, desire for children and sex of index child were found to be insignificantly associated with contraception utilization for women with birth interval >2 years at p<0.05.

Table 4.2 Multivariate Regression of Contraceptive Use against Background characteristics for women by birth interval					
		Model I		Model II	
		< 2 Years		2 + Years	
Category	Co-variate	Exp(B)	C.I for Exp(B)	Exp(B)	C.I for Exp(B)
Age					
	15 - 24 (**RC**)	**1**		**1**	
	25 - 34	0.993	[0.718, 1.374]	1.053	[0.903, 1.228]
	35 - 49	**0.646***	[0.427, 0.978]	**0.714****	[0.599, 0.850]
Residence					
	Urban (**RC**)	**1**		**1**	
	Rural	**0.630***	[0.445, 0.893]	**0.871***	[0.765, 0.992]
Marital Status					
	Never Married (**RC**)	**1**		**1**	
	Married	**2.845***	[1.315, 6.158]	**1.986****	[1.471, 2.681]
	Formerly Married	0.668	[0.281, 1.592]	**0.694***	[0.503, 0.958]
Ethnicity					
	Barotse (**RC**)	**1**		**1**	
	Bemba	0.870	[0.448, 1.689]	0.902	[0.740, 1.100]
	Tonga	0.875	[0.420, 1.823]	0.993	[0.784, 1.258]
	North Westeners	0.823	[0.391, 1.729]	**0.710****	[0.564, 0.893]
	Nyanja	1.181	[0.574, 2.430]	1.181	[0.942, 1.473]
Region					
	Region 1 (Low CPR) (**RC**)	**1**		**1**	
	Region 2 (High CPR)	1.413	[0.905, 2.208]	**1.491****	[1.265, 1.757]
	Region 3 (Medium CPR)	1.182	[0.793, 1.762]	**1.272****	[1.098, 1.473]
Wealth Quintile					
	Middle (**RC**)	**1**		**1**	
	Poor	0.895	[0.641, 1.250]	**0.745****	[0.652, 0.852]
	Rich	0.814	[0.551, 1.203]	0.971	[0.841, 1.122]
Occupation					
	Unemployed (**RC**)	**1**		**1**	
	Employed	1.124	[0.861, 1.466]	1.059	[0.912, 1.125]
Body Mass Index					
	Underweight (**RC**)	**1**		**1**	
	Normal	1.224	[0.738, 2.029]	0.902	[0.753, 1.080]
	Obese	1.410	[0.806, 2.467]	1.059	[0.867, 1.294]
Education					
	No education (**RC**)	**1**		**1**	
	Primary	**1.725***	[1.130, 2.635]	**1.395****	[1.185, 1.643]
	Secondary	**2.716****	[1.680, 4.392]	**1.819****	[1.509, 2.192]
Religion					
	Other (Catholic and Muslim) (**RC**)	**1**		**1**	
	Protestants	1.081	[0.790, 1.480]	0.993	[0.875, 1.127]
Age at first marriage					
	< 18 (**RC**)	**1**		**1**	
	18 +	0.826	[0.639, 1.067]	0.914	[0.826, 1.011]
Desire for Children					
	Have another (**RC**)	**1**		**1**	
	No more	1.090	[0.802, 1.481]	1.021	[0.913, 1.142]
Sex of Index child					
	Female (**RC**)	**1**		**1**	
	Male	0.929	[0.727, 1.188]	1.057	[0.961, 1.163]

Survival status of Index child				
Not Alive (**RC**)	1		1	
Alive	1.945*	[1.112, 3.403]	2.484**	[1.891, 3.264]
Constant	**0.108****	**[0.029, 0.393]**	**0.178****	**[0.107, 0.295]**

Source: ZDHS 2013/14, **Significant at p<0.0, *Significant at p<0.05

This shows that contraception use has different predictors among women practicing short and normal birth interval. In addition, odds for contraceptive use among women spacing births normally are high than those for women achieving short birth interval in predictor variables except for age, education and survival status of index child as observed in **Table 4.2**. Both models are significant at p<0.05.

4.5 Predictors of Normal interval among Contraceptors

Predictors of birth interval under bivariate regression analysis significant at P<0.05 were maternal age, residence, region, marital status, wealth index, occupation, body mass index ethnicity, fertility preference and survival status of index child. **Table 4.1** shows this result.

Multiple logistic regression **Model III** under **Table 4.3** indicated age, ethnicity, education, religion and survival status of index child as major predictors of normal birth interval among non-users of contraceptives.

Women in age cohort 25 – 34 were found to be 1.8 times more likely to achieve normal birth interval than the women in the age group 15 - 24 (AOR= 1.816, 95 % CI; (1.750, 8.046)). Ethnicity was significantly associated with birth interval among women achieving >2 years birth intervals.Women of Bemba, Tonga and Nyanja ethnicities reported less odds of normal birth interval of 1.9, 2.7 and 2.1 (AOR=0.604, 95% CI; (0.402, 0.909)), (AOR=0.498, 95% CI; (0.311, 0.799)) and (AOR=0.570, 95% CI; (0.359, 0.904)) respectively to the Barotse women. Women who have attained secondary education were 1.4 times likely to space births normally against those with no formal education (AOR=1.388, 95% CI; (1.028, 1.872)). Protestants reported 1.3 times likelihood to achieve normal birth interval compared to other religion (Catholic and Muslim) (AOR=1.258, 95% CI; (1.021, 1.551)). Women with preceding child alive reported 1.7 times likelihood to achieve normal birth interval compared to women whose preceding child was dead (AOR= 1.700, 95% CI; (1.152, 2.312)). **Model III** in shows Pseudo R^2 of 25 % in explaining variance in birth interval; among non-contraceptors with model fit =101.76. The full model containing all predictors were statistically significant at P<0.05.

Table 4.3 Multivariate Logistic Regression for birth Interval among Contraceptive users

Category	Co-variate	Model III Not Using Contraceptives Exp(B)	C.I for Exp(B)	Model IV Using Contraceptives Exp(B)	C.I for Exp(B)
Age					
	15 – 24 (**RC**)	**1**		**1**	
	25 - 34	**1.816****	[1.434, 2.301]	**2.145****	[1.667, 2.759]
	35 - 49	**2.309****	[1.750, 3.046]	**2.855****	[2.061, 3.957]
Residence					
	Urban (**RC**)	1		1	
	Rural	0.849	[0.670, 1.078]	1.051	[0.812, 1.361]
Marital Status					
	Never Married (**RC**)	1		1	
	Married	1.042	[0.657, 1.651]	0.700	[0.359, 1.365]
	Formerly Married	1.187	[0.728, 1.936]	1.252	[0.586, 2.674]
Ethnicity					
	Barotse (**RC**)	1		1	
	Bemba	**0.604***	[0.402, 0.909]	**0.585***	[0.355, 0.963]
	Tonga	**0.498****	[0.311, 0.799]	**0.549***	[0.318, 0.950]
	North Westeners	0.675	[0.430, 1.060]	**0.513***	[0.295, 0.890]
	Nyanja	**0.570***	[0.359, 0.904]	**0.584***	[0.342, 0.998]
Region					
	Region 1 (Low CPR) (**RC**)	1		1	
	Region 2 (High CPR)	0.873	[0.651, 1.169]	0.957	[0.673, 1.362]
	Region 3 (Medium CPR)	0.806	[0.630, 1.032]	0.933	[0.678, 1.285]
Wealth Quintile					
	Middle (**RC**)	1		1	
	Poor	0.972	[0.772, 1.223]	0.822	[0.631, 1.071]
	Rich	0.996	[0.757, 1.309]	1.252	[0.940, 1.668]
Occupation					
	Unemployed (**RC**)	1		1	
	Employed	1.154	[0.965, 1.380]	1.008	[0.812, 1.238]
Body Mass Index					
	Underweight (**RC**)	1		1	
	Normal	0.846	[0.616, 1.162]	0.669	[0.423, 1.012]
	Obese	0.849	[0.591, 1.220]	0.671	[0.429, 1.051]
Education					
	No education (**RC**)	1		1	
	Primary	1.232	[0.967, 1.570]	0.909	[0.630, 1.310]
	Secondary+	1.388*	[1.028, 1.872]	0.828	[0.554, 1.238]
Religion					
	Other (Catholic and Muslim) (**RC**)	1		1	
	Protestants	**1.258***	[1.021, 1.551]	1.102	[0.863, 1.409]
Age at first marriage					
	< 18 (**RC**)	1		1	
	18 +	0.936	[0.787, 1.114]	0.954	[0.780, 1.168]
Desire for Children					
	Have another (**RC**)	1		1	
	No more	0.990	[0.812, 1.205]	0.901	[0.716, 1.135]
Sex of Index child					
	Female (**RC**)	1		1	
	Male	0.983	[0.833, 1.161]	1.081	[0.895, 1.306]
Survival status of Index child					
	Not Alive (**RC**)	1		1	
	Alive	**1.700****	[1.152, 2.312]	**2.193****	[1.310, 3.669]
Constant		**3.034***	**[1.406, 6.547]**	**6.250****	**[2.077, 18.814]**

Source: ZDHS 2013/14, * *Significant at p <0.01, * Significant at p <0.05

Multiple regression **Model IV** in Table 4.3 revealed that age, ethnicity and survivals status of index child as predictors of normal birth intervals among women using contraceptives at p<0.05. Women in the age cohort 25 – 34 are 2 times likely to attain normal birth interval compared to women in the age group 15 – 24 (AOR=2.124, 95% CI; (1.667, 2.759). Older women aged 35 – 49 were 3 times more likely to attain normal birth interval compared to those age 15 -24 (AOR=2.855, 95% CI; (2.061, 3.957)).

Ethnicity was found to be negatively but significantly associated with normal birth interval. Women of Bemba, Tonga, North Westerners and Nyanja ethnicities reported less odds of normal birth intervals of 2.0 , 2.3, 2.6 and 2.1 respectively compared to women of Barotse ethnicity (AOR=0.585, 95% CI; (0.335, 0.963)), (AOR=0.549, 95% CI; (0.318, 0.950)) (AOR=0.513, 95% CI; (0.295, 0.890)) and (AOR=0.584, 95% CI; (0.342, 0.998)) . The odds are not very different to those of women achieving short birth intervals.

Survival status of preceding child was significantly related to normal birth interval among contraceptive users. Women with preceding child alive were 2 times more likely to achieve normal birth interval with regard to the reference category (AOR=2.193, 95% CI; (1.310, 3.669)) indicating a slight increase in the odds than those among non-contraceptors (AOR=1.700, 95% CI; (1.152, 2.312)). **Model IV** shows Pseudo R^2 of 32% of variance in explaining birth interval among contraceptors with model fit = 97.20. The full models containing all predictors were statistically significant at p<0.05.

. However, age, residence, marital status and survival status of index child were found to be significant predictors among women practicing short birth intervals. Predictors of contraception use among women practicing normal birth interval are age, residence, marital status, ethnicity, region, wealth quintile, education and survival status if index.

Further analysis of normal birth interval based on three categories of contraceptive methods (short, medium and long acting) has given an in- depth picture of how contraceptives by method influence various predictors as indicated in Table 5. Notably women using short, medium and long acting methods recorded age as a significant predictor of normal birth interval among women 25 years and above compared to women 24 years and below.

Table 5 Normal Birth Interval among women using short, medium and long acting Contraception methods

Co-variate	Category	Short Acting Methods		Medium Acting Methods		Long Acting Methods	
		Exp(B)	C.I for Exp(B)	Exp(B)	C.I for Exp(B)	Exp(B)	C.I for Exp(B)
Age	15 – 24 (**RC**)	**1**		**1**		**1**	
	25 - 34	**3.059****	[1.875, 4.991]	**1.771****	[1.237, 2.537]	**2.357***	[1.248, 4.450]
	35 - 49	**3.394****	[1.859, 6.197]	**2.202****	[1.313, 3.692]	**4.158****	[1.934, 8.939]
Residence	Urban (**RC**)	**1**		**1**		1	
	Rural	1.111	[0.674, 1.832]	0.861	[0.575, 1.287]	1.195	[0.594, 2.095]
Marital Status	Never Married (**RC**)	**1**		**1**		1	
	Married	0.544	[0.119, 2.486]	0.729	[0.292, 1.820]	0.684	[0.168, 2.789]
	Formerly Married	0.875	[0.164, 4.675]	2.449	[0.757, 7.918]	0.807	[0.180, 3.613]
Ethnicity	Barotse (**RC**)	**1**		**1**		1	
	Bemba	0.786	[0.364, 1.698]	**0.349***	[0.113, 0.915]	0.519	[0.141, 1.917]
	Tonga	0.871	[0.374, 2.029]	**0.271***	[0.097, 0.755]	0.571	[0.135, 2.415]
	North Westeners	1.288	[0.449, 3.698]	**0.329***	[0.119, 0.907]	0.275	[0.069, 1.099]
	Nyanja	0.894	[0.389, 2.057]	0.362	[0.130, 1.008]	0.503	[0.129, 1.968]
Region	Region 1 (Low) (**RC**)	**1**		**1**		1	
	Region 2 (High)	0.856	[0.430, 1.705]	0.861	[0.499, 1.486]	1.388	[0.680, 2.834]
	Region 3 (Medium)	1.065	[0.541, 2.095]	0.661	[0.410, 1.066]	1.630	[0.833, 3.191]
Wealth Quintile	Middle (**RC**)	**1**		**1**		1	
	Poor	0.833	[0.498, 1.392]	0.678	[0.460, 1.002]	1.280	[0.677, 2.455]
	Rich	1.394	[0.807, 2.408]	1.067	[0.682, 1.671]	1.404	[0.761, 2.590]
Occupation	Unemployed (**RC**)	**1**		**1**		1	
	Employed	1.004	[0.688, 1.466]	0.899	[0.657, 1.230]	1.080	[0.665, 1.754]
Body Mass Index	Underweight (**RC**)	**1**		**1**		1	
	Normal	0.454	[0.175, 1.180]	0.636	[0.337, 1.200]	0.715	[0.263, 1.945]
	Obese	0.419	[0.154, 1.144]	0.799	[0.398, 1.605]	0.598	[0.208, 1.716]
Education	No education (**RC**)	**1**		**1**		1	
	Primary	1.142	[0.597, 2.189]	0.751	[0.419, 1.346]	0.922	[0.326, 2.609]
	Secondary+	0.865	[0.427, 1.753]	0.665	[0.351, 1.261]	0.938	[0.309, 2.095]
Religion	Other (Catholics and Muslim) (**RC**)	**1**		**1**		1	
	Protestants	1.106	[0.638, 1.616]	1.300	[0.896, 1.887]	1.195	[0.594, 1.702]
Age at first marriage	< 18 (**RC**)	**1**		**1**		1	
	18 +	0.879	[0.597, 1.294]	0.993	[0.729, 1.352]	1.019	[0.646, 1.607]
Desire for Children	Have another (**RC**)	**1**		**1**		1	
	No more	1.147	[0.740, 1.777]	1.042	[0.722, 1.504]	0.779	[0.457, 1.329]
Sex of Index child	Female (**RC**)	**1**		**1**		1	
	Male	0.819	[0.597, 1.216]	1.131	[0.846, 1.511]	0.701	[0.451, 1.090]
Survival status of Index child	Not Alive (**RC**)	**1**		**1**		1	
	Alive	**2.703***	[1.180, 6.190]	1.465	[0.587, 3.656]	2.406	[0.742, 7.805]
Constant		**5.194**	**[0.609, 44.277]**	**26.413****	**[4.334, 160.97]**	**2.712**	**[0.186, 39.537]**

Source: ZDHS 2013/14, **Significant at p <0.01, * Significant at p <0.05

The higher the age over 25 years of women using short acting methods the more likely to report normal birth interval by factor of 3.0 compared to women aged 15 – 24 years. However, survival status of index was also significant in predicting normal birth interval among women. Women whose index child was alive reported high odds of normal birth interval of 2.7 compared to those whose index child was not alive.

Women aged 25-34 years and above 35 years using medium acting methods reported odds of 1.8 and 2.2 likelihood of practicing normal birth interval respectively compared to women aged 15-24 years. However, Ethnicity was found a negative predictor of normal birth interval among women using medium acting contraceptive methods among women of Bemba, Tonga and North western ethnicities who reported less odd of normal birth interval of 6.4, 14.9 and 7.6 respectively.

Age was the only predictor of normal birth interval among women using long acting contraceptive methods. Notably, women above 35 years using long acting methods reported high odds of normal birth interval of 4.3 compared to women aged 15-24 years.

Chapter summary

This chapter has presented the research findings. Descriptive statistics, binary logistic regression and multiple logistic regression analysis were highlighted in tables. Major findings have been noted with regard to the aims of the study regarding birth spacing among women using contraceptives in the reproductive age. Significant predictors of normal birth spacing and how contraceptive methods influence independent predictors have been presented.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Normal Birth interval

The research has revealed that many women in the reproductive age in Zambia practice normal birth interval accounting for 86.4% although contraception use is relatively low at 47.3% among women. This outcome is in contrast with the finding by Christina et al (2014) in Ghana where short birth intervals among women were at 80%. However, it is anticipated that practice of normal birth interval should go hand in hand with heightened contraceptive use, which is not the case among Zambian women.

Normal birth interval is relatively not very different between among women in the reproductive age using and those not using contraceptives representing 85.8% and 87.1% respectively in Zambia. This finding is similar Ahmed (2016) in Ethiopia where 82.7 % of women in the reproductive age reported birth interval 2 years and above. This entails that more women not using contraceptives are actually achieving normal birth interval more than those using contraceptives in Zambia. In addition, other factors could be responsible for this state of affairs among women achieving normal birth interval.

The study also indicated that 44.7% of women using contraceptives practicing short birth interval against only 47.4% who achieved normal birth interval. Conversely, majority women non-contraceptors practiced normal birth interval than users.

5.1.2 Determinants of Contraception use

Age, residence, marital status, ethnicity, region, wealth quintile, education and survival status of index child were significant predictors of contraception use among women practicing normal birth interval. However, residence was not a strong predictor.

Women in older age group are significantly less likely to use contraceptives than those in lower age groups. This assertion is sustained by Khraif, et al (2017) who found age to have a negative role in contraceptive use where increase in age reduced the likelihood of contraception. This finding is further buttressed by Banda (2015) with regard to modern contraception use among women where age was deemed significantly associated to contraception use. This could be due to

the fact that older women would have achieved the desired number of children hence, less likely to engage in frequent sexual intercourse as compared to younger women.

Marital status of women was found to be significant in predicting contraceptive use among women. This result is reinforced by Adeyemi et al (2016) based on a study in Nigeria. Married women are more likely to use contraceptives because the frequency of sexual intercourse is higher than the unmarried counterparts. The high frequency of sexual intercourse renders them vulnerable to conceiving, hence resort to the use of contraceptives to postpone pregnancy.

Ethnicity indicated negative association to contraceptive use. This could be attributed to the existence of strong cultural norms that promote child bearing. Zambian culture puts more emphasis on the need to procreate and most women with strong cultural backgrounds would not be willing to use contraceptives for spacing or limiting births.

Women whose index child was alive were found to be more likely to use contraceptives to space births. When the index child is alive, women tend to utilize effective methods of contraception consistently to postpone births in order to protect existing child. Women would not risk the health of the existing index child hence resort to contraceptives to avoid pregnancy. On the other hand, breastfeeding practices could be responsible for effective spacing of births among women through Lactational Amenorrhea.

Women in regions of high CPR are positively associated with contraception use. High CPR entails increased access to variety of contraception methods for spacing births than in regions with low CPR. This result implies variations in program design in contraceptive use among women countrywide. Hence, heightened contraception campaign and distribution can lead to increase in usage of contraceptives and result in low unmet needs among women.

Women in the poor category by wealth were strongly but negatively association with contraception use among women practicing normal birth interval. Poor women were less likely to use contraceptives because weak financial standing is a barrier where access to quality birth control methods is concerned. However, this finding is in contrast to a study by Mandiwa, et al (2018) in Malawi where wealth quintile was found to be insignificantly associated to contraceptive use among women.

Education was found to be positively associated to contraception use among women achieving normal birth interval. Women who have attained primary and secondary education were more likely to understand and appreciate the benefits that accrue to well-spaced births and willing to take up contraceptives to effectively space births. This finding is reinforced by Obwoya, et al (2018) who did a study in Juba city, South Sudan. This entails that education empowers women with knowledge which translates into increased access to available forms of family planning. On the other hand, education unshackles women to make autonomous choices with regard to fertility issues as a matter of human right advocated for today.

Survival status of index child specified strong positive association to contraception use. The odds of predicting contraceptive use was the highest than any other in predicting contraceptive use among women. This could be attributed to protective measure that women may take to ensure that the preceding child is given the best care. Women treasure children and would try by all means to postpone pregnancy in order to adequately space births. Women's education could be the explanatory predictor which can influence the value attached to well-spaced births for maximized maternal and child health benefits.

Residence was found to be negatively associated with contraceptive use behaviour among women. Women resident in rural areas were less likely to utilize contraceptives among those practicing normal birth interval. This finding is supported by Hossain et al (2018) in a study done among Bangladesh women were women in rural setting were less likely to use contraceptives than women in urban setting.

5.1.3 Predictors of Normal Birth interval

Age, ethnicity and survival status of children were independent predictors of normal birth interval among contraceptive users. However, predictors of normal birth interval are the same among women not using contraceptive except for education and religion which become insignificant predictors among contraceptive users.

Older women have shown strong positive association with normal birth interval to the reference category. This finding is reinforced by McGuire and Stephenson (2015) who did a study in Uganda and Zimbabwe where age was found to be positively associated with birth spacing behaviour. Similarly, Jonje, et al (2014) in Bangladesh found that older women to be less likely to experience

short intervals. Older women would try by all means to adequately space births by using contraceptives because they may have achieved the desired family size. Hence, they would use contraception to limit births other than spacing births. Age indicated high odds than any other predictor of normal birth interval among women contraceptive users. However, this finding is in contrast with Hailu and Gulte (2016) whose study in Ethiopia found age to be significantly associated with short birth interval.

Ethnicity is negatively associated to normal birth interval among contraceptive users combined. Bemba, Tonga, North westerners and Nyanja are on less likely to practice normal birth interval. This finding is contradictory with a study in Ethiopia where ethnicity was found to be insignificant in determining birth interval (Dibaba, 2010). This is indicative of the value attached to child bearing among women. Cultural values support high fertility in Zambia (Ngoma, 2012). This finding implies that almost all ethnic groups in Zambia may not favor the use of contraceptives hence, more prone to pregnancy and more likely to practice short birth interval. However, findings by Hancock, el at (2015) found oral contraceptives remained the most popular over the use of Long Acting Reversible Contraceptives (LARCs) over the period of study.

Women contraceptors whose index child is alive recorded high likelihood to space births 2 years and over than those whose child is not alive. This could be attributed to the fact that women whose index child is alive have courage to seek more effective methods of contraception hence practicing normal birth intervals. On the other hand, exclusive breastfeeding is mostly practiced among women to ensure that the child gets the best nutritional value which in turn acts as form of natural contraception leading to normal birth intervals. These finding are supported by a Study done by Singh, Singh and Narendra (2010), in Manipur, India which indicated that women with survival of preceding child were found to be less likely to have short birth interval compared to women having the death of previous child.

Based on further analysis, findings indicated age as a significant predictors of normal birth interval among women using short, medium and long acting contraceptive methods. Age has indicated positive and strong association with normal birth interval among women. However, survival status of index child significantly predicted normal birth interval among women using short acting methods. Ethnicity was significant but negatively associated with normal birth interval among women using medium acting methods only.   This finding is buttressed by a study in Iran by

Hajian-Tilaki et al (2009) who indicated significant correlation between birth interval and method of contraception used. This findings confirm the reasons why the use of LARCs is very low among women using contraceptives for spacing births.

The findings of this study has implications on Zambian women. The results entails that women in the reproductive age using contraceptives expected to practice normal birth interval in Zambia are of older age groups and those whose index child is alive. At the same time, survival status of index child is a strong and significant predictor among women using spacing births normally and using contraceptives in Zambia. However, ethnicity is likely to impact negatively on women's ability to achieve normal birth interval even among those using contraceptives especially women using medium acting methods. Moreover, women using method mix of short, medium and long acting contraceptive methods are more likely to achieve normal birth interval unlike women using one method.

5.2 Conclusion
This study has examined birth interval among women using contraceptives using ZDHS 2013/14 data.

The results have shown that most women in Zambia are practicing normal birth interval whether using or not using contraceptives. Moreover, there is no significant difference in birth intervals between women contraceptive user and non-users. However, results from this study accentuate that women using contraceptives are more likely to achieve normal birth interval. This finding reinforces the need to promote contraceptive use especially method mix to achieve normal birth interval among women in the reproductive age in Zambia. On the other hand, birth interval achieved by women influences contraceptive use among Zambian women.

The study identified age, ethnicity and survival status of preceding child as significant predictors of normal birth interval among women contraceptive users. Hence, normal birth interval varies significantly by age, ethnicity and survival status of index child among women in the reproductive age in Zambia. Predictors of contraception use are replicated in predicting normal birth interval. However, birth interval influence decisions among women using contraceptives. It is worth noting that education, religion and survival status of index child are major predictors of contraception use among women practicing normal birth interval. Survival status of the index child is a common predictor for contraception use as well as birth interval among women in the reproductive age in

49

Zambia. Based on the findings, older women contraceptive users indicated high likelihood to practice normal birth interval than young women. Older aged women indicated higher odds than any other predictor.

Ethnicity was negatively associated with normal birth interval among women. Women of Bemba, Tonga, Nyanja and North western ethnicities were found to be less likely to practice normal birth interval.

Survival status of index child was found to be a stronger predictor of normal birth interval. The study indicated positive association of survival status of index child in predicting normal birth interval. Women whose index child was alive were more likely to practice normal birth interval unlike otherwise.

Moreover, women using method mix of short, medium and long acting contraceptives were found to be more likely to achieve normal birth interval by age. In general, women using method mix of contraceptive methods whose index child is alive are guaranteed to achieve normal birth interval in Zambia.

Based on the conceptual framework, demographic (age), socio-economic (ethnicity) and mediating (survival status of index child) characteristics of women in the reproductive age are significant predictors of normal birth (2+ years) interval among women using contraceptives in Zambia. This study identified age, ethnicity and survival status of index child as significant predictors of normal birth interval among women contraceptive users. However, maternal age and survival status of index child were positive and significant predictors of normal birth interval among women using contraceptives. Moreover, women using method mix of short, medium and long-acting contraceptive methods are more likely to achieve normal birth interval. However, age was a strong predictor of normal birth interval among women contraceptive users.

5.3 Recommendations
There is need for continued counselling, communication and outreach programmes among women to increase access to contraceptive use through the Ministry of Health and cooperating partners. Owing to the fact that current use of family planning among women is low, it is essential to improve access to family planning as well as counseling services at health posts and in the community to reduce unmet need for contraception. Health extension officers in reproductive

health should intensify counselling services and prioritize information dissemination on optimal birth spacing especially at community and household levels. Programs to sensitize women on the benefits of normal birth interval should be intensified if women are to appreciate benefits that accrue to well-spaced births and hence utilize various methods of contraception to effectively postpone pregnancy. On the other hand, government and other cooperating partners in reproductive health service provision should continue to promote girls and women education especially on the benefits of marrying later in life among women in the reproductive age. Literacy can help women to realise that access to reproductive health services and contraceptives are matters of human rights.

Traditions against family planning must be defied through engagement of traditional leaders and Community Health Workers in information dissemination on the importance of family planning at local and household level. A positive attitude towards family planning should be cultivated in the minds of the people (Ngoma, 2012). There is need to demystify cultural norms and beliefs which discourage women from using contraceptives for spacing births in order to achieve a healthy population for socioeconomic development advocated in the National development plan. Early marriage should be discouraged among young women below 19 years in order to raise the age at which women start child bearing. Massive literacy campaigns should be promoted through the Ministry of General Education (MoGE) under Open and Distance Learning (ODL) in all social setting especially in rural areas where illiteracy levels are seemingly high due to strong cultural inclinations based on strong traditions, beliefs, norms and customs. Socio-cultural values that do not support contraceptive use must be counteracted through intensified community based family planning provision.

Programmes in the provision of contraception services must continue to be strengthened especially in areas where unmet need is relatively high. On the other hand, access to wide variety of contraception methods must be promoted through methods mix to effectively respond to reproductive aspirations among women with diverse and changing reproductive needs of current and future generations for Zambia to tap into demographic dividends. Making more contraceptive options available especially method mix can raise contraceptive prevalence (Ross et al, 2002). The Ministry of Health should ensure that women in the reproductive age are empowered with accurate and relevant information with regard to proximate determinants of normal birth interval for both

contraceptors and non-contraceptors to ensure that incidences of short birth interval are reduced for the country to reduce the high infant mortality rate and also tap into the anticipated demographic dividends that may accrue to Zambia's young population.

Necessity exists to promote child related health programs running under the Ministry of Health such as child immunization to enhance child survival as a significant predictor of normal interval among women.

Need for follow-up research on the predictors of short birth interval among women contraceptive users to ascertain the contributory factors.

Need for qualitative studies to determine the reasons which account for observed variations among ethnic groups in birth interval duration.

A study on birth interval in relation to birth weight among women in the reproductive age group.

REFERENCES

Abma, J., G. Martinez and C. Copen, 2010. *Teenagers in the United States: Sexual Activity, Contraceptive Use and Child Bearing, National Survey of Family Growth 2006-2008.* National Center for Health Statistics.

Adeyemi, A. et al, 2016. "Contraceptive Prevalence and Determinants among women of reproductive age group in Ogbomoso, Oyo State, Nigeria." Open Access Journal of Contraception. 7, 33 – 41.

Aggarwal, R. and Ranganathan, P. 2017. Common Pitfalls in Statistical analysis: Linear Regression Analysis. Perspect Clin Res. 8:100-2

Ahmed, S., 2016. Duration of Birth Interval and Associated Factors Among Married Women in Dodota Woreda, Arsi Zone, Ethiopia. Master's Thesis, Haramaya University.

Ajayi, A.I., Adeniyi, O.V. and Akpan, W. 2018. Use of Traditional and Modern Contraceptives among Child bearing women: findings from a mixed methods study in Two Southwestern Nigerian States. BMC. 18:604.

Akim, J. and I. Mtur, 1997. "The Determinants of Birth Interval Among Non-contraceptive User Tanzanian Women." Journal Union for African Population Studies. 12(2).

Asekun-Olarinmoye, E.O. et al, 2013. "Barriers to use of Modern Contraceptives Among Women in an Inner City Area of Osogbo Metropolis, Osun State, Nigeria." Dove Press Journal; International Journal of Women's Health.

Asifa, K. and P.M. Khalid, 2012. "Determinants of higher order birth intervals in Pakistan". Journal of Statistics. 19, 54 – 82.

Banda, C., 2015. Factors associated with Modern Contraceptive use in Zambia. Master's Dissertation, University of Zambia.

Banda, N.H., S. Bradley and H. Hardee, 2004. "Provision and Use of Family Planning in the Context of HIV/AIDS in Zambia: Perspectives of Providers, Family Planning and Antenatal Care and HIV-positive Women."

Bankole, A., and C.F. Westoff, 1995. Childbearing Attitudes and Intentions. DHS Comparative Studies No. 17. Calverton, Maryland: Macro International Inc.

Barde, P., A. Khobragade and V. Gawali, 2013 "Knowledge Regarding Health Benefits to Mother and Children in Relation to Birth Spacing Among Mothers." International Journal of Science and Research. 4(1), 159-164.

Beekle, A.K., and C. McCabe, 2006. "Awareness and Determinants of Family Planning Practice in Jimma, Ethiopia." International Nursing Review. 53, 267-276.

Begna, S., et al, 2013. "Determinants of inter-birth interval among Married Women living in Rural Pastoral Communities of Southern Ethiopia: A Case control study." BMC Pregnancy and Childbirth. 13(116).

Bernstein, S., and L. Edouard, 2007. "Targeting access to Reproductive Health: Giving Contraception More Prominence and Using Indicators to Monitor Progress." Reproductive Health Matters. 15(29), 186-191.

Bosetti, C. et al 2009. Oral contraceptives and colorectal cancer Risks: a systematic Review and meta-analysis. Hum Reprod Update. 15:489-98.

Bradley, S., H. Schwandt and S. Khan, 2009. Levels, Trends and Reasons for Contraceptive Discontinuity. DHS Analytical Studies No. 20. Calverton, MD: ICF International.

Canning, D., and P.T. Schultz, 2012. "The Economic Consequences of Reproductive Health and Family Planning." Lancet, 380, 165-171.

Carl, H., and M.K. Mary, 2008. World Population Data Sheet. Washington D.C.: Population Reference Bureau.

Central Statistics Office [Zambia] 2015. Zambia Demographic Health Survey 2013-14. Lusaka: CSO.

CDC, 2010. Medical Eligibility Criteria for Contraceptive Use. Atlanta: CDC.

Chapagain, M., 2006. "Conjugal Power Relations and Couple's Participation in Reproductive Health Decision-making Exploring the Links in Nepal." Gender, Technology and Development. 10(2), 159-189.

Chaudhuri, K., 2004. Practice of Fertility Control. New Delhi: Saurabh Printers.

Chersich, M.F., et al, 2017. "Contraception Coverage and Methods Used Among Women in South Africa: A National Household Survey." SAMJ Research. 107(4), 307-314.

Chilangwa, W.B., 1995. Youth and Sex. Lusaka: Multi-Media.

Christina A.N., et al, 2014. "Knowledge, Attitude and Practice of Birth spacing among Ghana Mothers: Implications for maternal and Child Nutritional status." World Applied Sciences. 31(11), 1971-1978.

Cleland, J., S. Harbison and I.H. Shah, 2014. "Unmet Need for Contraception: Issues and Challenges." Stud Fam Plann. 45(2), 105-122.

Cohen, B., 1998. "The Emerging Fertility Transition in Sub-Saharan Africa." World Development. 26(8), 1431-61.

Conde-Agudelo, A., A. Rosas-Bermudez and A. Kafury-Goeta, 2006. "Birth Spacing and Risk of Adverse Perinatal Outcomes: A Meta-analysis." American Medical Association 295(15), 1809-1823.

CSA, 2011. Ethiopia Demographic and Health Survey 2011: Central Statistical Agency Report. Addis Ababa: CSA.

CSO, 2007. Zambia Demographic and Health Survey. Calverton, Maryland; CSO and Macro International Inc.

CSO, 2009. [Zambia] Zambia Demographic and Health Survey 2007: Key Findings. Calverton, Maryland: CSO and Macro International Inc.

CSO, 2015. Zambia Demographic and Health Survey 2013-14. Lusaka: CSO.

CSO and CBoH, 2003. [Zambia] Zambia Demographic and Health Survey 2001-2002. Calverton, Maryland: Central Statistics Office, Central Board of Health and ORC Macro.

CSO [Zambia], MoH [Zambia] and ICF International, .2014. Zambia Demographic and Health Survey 2013-14. Rockville, Maryland, USA: CSO, MoH and ICF International.

Cullins, M., 2011. "Pull Out Method – Withdrawal Methods." http://plannedparenthood.org/healthhtml . Accessed on 10/10/2017

Dibaba, Y., 2010. "Child Spacing and Fertility Planning behaviors among women in Mana District, Jimma Zone, South West Ethiopia." Ethiopian Journal of Health Science. 20(2), 83-90.

Dissanyake, L., 2000. "The Influence of Child Mortality and Breastfeeding on Inter-live Birth Interval in Sri-Lanka." Family Welfare 46(1), 229 – 239.

Donaldson, P.J., and A.O. Tsui, 1990. "The International Family Planning Movement." Population Bulletin. 45(3), 1-45.

EDHS, 2011. Demographic Health Survey 2011. Ethiopia Final Report. http://www.usaid.gov/default/files/documents. Accessed on 10/11/2018.

Economic Commission for Africa, 1984. "Kilimanjaro Plan of Action. Second African Population Conference." *Arusha, Tanzania.* January, *9-13*.

Edelman, A.B., et al, 2009. "Impact of Obesity on Oral Contraceptive Pharmacokinetics and Hypothalamic-Pituitary-Ovarian Activity." Contraception. 80, 119-127.

Exavery, A., et al, 2012. "Levels and Correlates of Non-adherence to WHO Recommended Inter-birth Intervals in Rufiji, Tanzania." BMC Pregnancy and Childbirth. 12(152).

Fallahzadeh, H., et al, 2013. Duration and Determinants of Birth interval in Yazd, Iran: A Population Study. Iran Journal of Reproductive Medicine. 11, 379-384.

Feucht, U.D., A. Meyer and M. Kniger, 2014. "Missing HIV Prevention Opportunities in South African Children – A 7 year Review." BMC Public Health 14(1), 1265-1273.

Fotso, J.C., et al, 2013. "Birth Spacing and Child Mortality: An analysis of Prospective data from the Nairobi Urban Health and Demographic Surveillance System." Biosocial Science. 45, 779-798.

Frost, J., and L.D. Lindberg, 2012. Reasons for using Contraception: Perspectives of US Women Seeking Care at Specialized Family Planning Clinics. New York: Guttmacher Institute.

Fu, et al 1999 "Contraceptive Failure Rates: New Estimates from the 1991 National Survey of Family Growth." Family Planning Perspective, 31(2), 56-63.

Gaffield, M.E., Egan, S. and Temmerman, M. 2014. It's about time: WHO and Partners release Programming Strategies for Post-partum Family Planning. Glob Health Sci Pract 2(1): 4-9.

Getachew, A.T., M.Z. Barihun and A.A. Tadesse, 2013. "Birth Interval and its Predictors Among Married Women in Dabat District, Northwest Ethiopia: A Retrospective Follow-up Study." African Journal of Reproductive Health, 17(2).

Gizaw, A., and N. Regassa, 2011. "Family Planning Service Utilization in Mojo Town, Ethiopia: A Population Based Study." Geography and Regional, 4(6).

Goldie, S.J., et al 2010. "Alternative Strategies to reduce Maternal Mortality in India: A cost-effectiveness Analysis." PLoS Med, 7(4), e1000264.

Gray, E. and A. Evans, 2004. "Parity Progression in Australia: What role does sex of existing child play?" Proceedings of the 12th Biennial Conference of the Australian Population. Canberra.

Green, D., 1998. Contraceptive Use for Birth Spacing in Sub-Saharan Africa. PhD, Thesis, Princeton University.

Hagian-Tilaki K.O., et al, 2009. "The Patterns and Determinants of Birth Intervals in Multiparous Women in Babol, Northern Iran." Southeast Asian Journal of Trop Med Public Health. 40, 852-860.

Hailu, D. and T. Gulte, 2016. "Determinants of Short Inter-birth Interval among Reproduction Age Mothers in Arba Minch District, Ethiopia." International Journal of Reproductive Medicine. http://dx.doi.org/10.1155/2016/6072437html . (Accessed on 12/06/2018).

Hailemariam, T., et al, 2013. Components of fertility change in Ethiopia. Further analysis of 2000, 2005 and 2011 Demographic and Health Surveys. DHS further Analysis Report No. 80. Calverton, Maryland, USA: ICF International.

Hall, G., 1996. Eye on Sub-Sahara Africa: Population policy. Poverty Lines No. 1, World Bank.

Hancock, N.L. et al, 2015. Temporal Trends and Predictors of Modern Contraceptive use in Lusaka, Zambia 2004 – 2011. BioMed Research International. 521928.

Hosmer, W.D. and Lemeshow, S. 2000. Applied Logistic Regression. Toronto; John Wiley and Sons Inc.

Hossain, M.B., et al 2018. "Identifying factors influencing Contraceptive use in Bangladesh: Evidence from BDHS 2014 data." BMC Public Health, 18, 192.

Institute of Medicine Committee, 2007. Board on Health Science Policy: Preterm Birth: Causes, Consequences and Prevention. Washington, DC: National Academic Press.

Ingram, G.M. 2014. A Data picture of USAID Public-Private Partnership: 2001 – 2014. Washington, DC: Brookiings Institute,

Islam, M.M., et al 2011. "Proximate Determinants of declining Fertility in Oman in the 1990's." Can Stud Population, 35(3-4), 133-52.

Iyayi, F. et al 2012. The control of Nigerian women over their sexuality in an era of HIV/AIDS: A Study of Women in Edo State in Nigeria. Int NGO J. 6(5):113-121

Jason, B., et al 2009. World Population Highlights: Key findings from PRB's 2009 World Population data sheet. Washington D.C.: Population Reference Bureau.

Jonge, et al 2014. "Determinants and Consequences of short birth intervals in Rural Bangladesh: A cross-sectional study." BMC Pregnancy and Child birth. 14: 427.

Kahn, K.S., P.F.W. Chien and N.F. Khan, 1998. "Nutritional Stress of Reproduction." Act Obstet Gynecol Scand, 77, 395-401.

Kallner, H.K., and K.G. Danielson, 2016. "Prevention of Unintended Pregnancy and the Use of Contraception: Important Factors for Pre-conception Care." Upsala Journal of Medical Science. http://dx.doi.org/10.1080/03009734.2016.1208310html . Accessed on 12/12/2017

Karkee, R. and Lee, A.H. 2016. Birth spacing of pregnant Women in Napa: A Community-Based Study. Front Public Health. 4:205.

Karibu, C.W., and P. Orpinas, 2009. "Correlates of Condom Use Among Male High School Students in Nairobi, Kenya." School Health, 29, 425-432

Kaye, K., N.A. Gootman and C. Finley, 2014. The Benefits of Birth Control in America: Getting the Facts Straight. Washington DC: The National Campaign to Prevent Teen and Unplanned Pregnancy.

Khraif, R., et al 2017. "Dynamics of contraceptive use: A study of King Saud University women staff, Riyadh." Middle East Fertility Society Journal. 22, 18-26.

Kost, K., D.J. Landry and J.E. Darroch, 1998. The Effects of Pregnancy Planning Status on Birth Outcomes and Infant Care." Fam Plann Perspect, 30, 223-230.

Kwan, M., 1994. When the Client is King. Planned Parenthood Challenges. London: Public Affairs Department of IIPF.

Maganyiza, P., and D. Mageta, 2013. "Does the use of modern Family Planning Promote Healthy Timing and Spacing of pregnancy in Dar-es-salaam?" Reproductive Health. 10(65).

Mandiwa, C. et al, 2018. Factors associated with contraceptive use among young women in Malawi: Analysis of the 2015-2016 Malawi demographic and health survey data. Contraception and Reproductive medicine 3:12.

MCDMCH, 2013. Family Planning Services: Integrated Family Planning Scale-up Plan 2013-2020. Lusaka; MCDMCH.

McGuire, C. and R. Stephenson, 2015. "Community Factors Influencing Birth spacing among married women in Uganda and Zimbabwe." African Journal of Reproductive Health, 19(1), 14.

Mc Sweeney, L., 2005. Love and Life: Billing Method of Natural Family Planning. Nairobi: Kolbe Press.

MoFNP [Zambia] 2014. Revised Sixth National Development Plan 2013-2016. Lusaka, Zambia: Ministry of Finance.

Michalow, J., et al 2015. "Triple Return on Investment: The Cost and Impact of 13 Interventions that could Prevent Still Births and Save the lives of Mothers and Babies in South Africa." BMC Preg Child. 15(1), 456.

MoH, [Zambia] 2006. Family Planning Guidelines and Protocols. Lusaka, Zambia: Ministry of Health.

MoH, [Zambia] 2006b. Zambia Family Planning Guidelines and Protocols, The Family Planning Circle: For Cheap Health Family. Lusaka: Ministry of Health.

MoH, [Zambia] 2007. The Family Planning Circle: Policy, Framework, strategies and Guidelines. Lusaka: Ministry of Health.

MoH, 2010. National Health Strategic Plan 2011-2015. Lusaka, MoH.

MOE, 2015. Accelerating Fertility decline in Zambia: Opening the window of opportunity for the demographic dividend. Policy Brief.

MoNDP, 2017. Seventh National Development Plan 2017-2021. Lusaka; MoNDP.

Muanda, M., et al 2016. "Barriers to Modern Contraceptive Use in Kinshasa, DRC." PLoS ONE. 11(12), e0167560.

Murty, and Devos, 1994. "Ethnic Differences in Contraceptive Use." Sri Lanka in Studies in Family Planning, 15(5), 222-232.

Mutombo, N., and P. Bakibinga, 2014. "The Effect of Joint Contraceptive Decisions on the use of Injectables, Long-Acting and Permanent Methods (LAPM's) among Married Female (15-49) Contraceptive in Zambia a Cross-Section Study." Reproductive Health, 11:51.

Mwaikambo, L., et al 2011. "What Works in Family Planning Interventions: A Systematic Review." Studies in Family Planning. 42(2)

National Population Commission (NPC) and ICF Macro, 2009. [Nigeria] Demographic and Health Survey 2008. Calverton, Maryland: National Population Commission and ICF Macro.

National Research Council, 1993. Factors Affecting Contraceptive Use in Sub- Sahara Africa. Washington D.C.: National Academy Press.

NCDP, [Zambia] 1991. Zambia National Population Policy. Lusaka; NCDP.

Ndahindwa, V., et al 2014. "Determinants of Fertility in Rwanda in the context of a fertility Transition: A Secondary Analysis of 2010 Demographic Health Survey." *Reprod Health* 11(1), 87.

Ngoma, C.M., 2012. Extension of Birth Interval in Zambia: A Public Health Challenge. Journal of Women's Health Care. 1:103.

Obwoya, J., et al 2018. "Factors influencing Contraceptive use among women in Juba city of Sudan." International Journal of Population Research. http://doi.org/10/1155/2018/6381842html. Accessed on 10/10/2018

Ochako, R., et al 2015. "Barriers to Modern Contraceptive Methods Uptake among Young Women in Kenya: A Qualitative Study." BMC Public Health, 15, 118

Orji, E.O., Ojofeitimi, E.O. and Olanrewaju, B. 2007. The Role of Men in family planning decision-making in rural and urban Nigeria. European Journal of Contracept Reprod Health Care. 12(2):70-75.

Osuafor, G., Maputle, S.M. and Ayiga, N. 2018 Factors related to Married of cohabiting Women's decision to use modern contraceptive methods in Mahikeng, South Africa. 10(1):1431

Palamuleni, E., 2013. "Socio-economic and Demographic Factors affecting Contraceptive Use in Malawi." African Journal of Reproductive Health 17(3), 91 – 104.

Pasha, O. et al 2015. Postpartum Contraceptive use and Unmet need for Family Planning in five Low-income Countries. Reproductive Health. 12(2):511.

Pillai, V.K. and Gupta, R. 2010. Child spacing and contraception use among the poor in Zambia. Journal of Contraception. 1:1-8.

Ponga, A., 2017. Changing Population Age structure and Sustainable development. Statement Fiftieth Session of the Commission on Population and development. New York.

Rao, S., J. Townsend and I. Askew, 2006. Correlates of Inter-birth Intervals: Implications of Optimal Birth Spacing Strategies in Mozambique. Population Council.

Rafalimanana, H., and C.F. Westoff, 2001. Gap between Preferred and Actual Birth Intervals in Sub-Saharan Africa: Implications for Fertility and Child Health. DHS Analytical Studies No. 2. Calverton, Maryland: ORC Macro.

Rasheed, P. and B.K. Aldabal, 2007. "Birth Interval Perceptions and Practices Among Urban-based Saudi-Arabian Women." Eastern Mediterranean Health Journal. 13(4), 881-891.

Razzaque, A., et al 2005. "Pregnancy Spacing and Maternal Morbidity in Matlab, Bangladesh." International Journal Gynaecol Obstet, 89(1), 541-549.

Ross, J. et al, 2002. Contraceptive Method choice in developing Countries. Int Fam Plan Perspect. 28(1): 32-40.

Rustein, S.O., 2005. "Effects of Preceding Birth Intervals in Neonatal Infant and Under-five Years Mortality and Nutritional Status in Developing Countries: Evidence from the Demographic and Health Surveys." International Journal of Gynaecol Obstet. 89(1), S7-S24.

Rustein, S. O., and R. Winter, 2015. Contraception needed to avoid High-fertility-risk births, and Maternal and Child Deaths that would be Averted. DHS Analytical Studies No. 50. Rockville, Maryland: ICF International.

Saha, U.R., and A. Van Soest, 2013. "Contraceptive use, Birth spacing and Child Survival in Matlab, Bangladesh." Studies in Family Planning. 44(1), 45-66.

Saleem, S. and M. Bobak. 2005. "Women's Anatomy, Education and Contraception Use in Pakistan: A National Study." Report Health, 2(1), 8. http://dx.doi.org/10.1186/1742-4755-2-8.html. Accessed on 10/12/2017.

Schultz, T.P. and S. Joshi, 2013. "Family Planning and Women's and Children's Health: Consequences of Outreach Program in Matlab, Bangladesh." Demography, vol. 50. N1, 149-180.

Singh, N.S., N. Singh and R.K. Narendra, 2010. "Demographic and Socio-economic Determinants of Birth Interval Dynamics in Manipur: A Survival Analysis." Health Allied Sciences. 9(4), 3

Singh, S., et al 2014. Adding it up: The costs and Benefits of investing in Sexual and Reproductive Health. New York: Guttmacher Institute.

Sonfield, A., 2014. "Beyond Preventing Unplanned Pregnancy: The Broader Benefits of Publicly Funded Family Planning Services." Guttmacher Policy Review, 17(4).

Speizer, E. and W. Justin, 2007. "Can Family Planning Outreach Bridge the Urban-rural Divide in Zambia?" http://www.ncbi.nlm.nih.gov/guide/genes-expression.html. Accessed on 10/10/2017

Srikanthan, A. and R.L. Reid, 2008. "Religions and Cultural Influences on Contraception." JOGC-Toronto, 30(2), 129

Stover, J. and J. Ross, 2010. "How Increased Contraceptive Use has Reduced Maternal Mortality." Maternal and Child Health, 14(5), 687-695.

Sundby, J., 2006. "Young People's Sexual and Reproductive Health Rights." Best Practices and Research Clinical Obstetrics and Gynaecology, 20(3), 355-368.

Suwal, J.V., 2001. "Socio-cultural Dynamics of Birth Intervals in Napal." CNAS, 28(1), 11-33.

Tappis, H., et al 2015 "The role of Quality Health Services and Discussions about Birth spacing in Postpartum Contraception use in Sindh, Pakistan: A Multilevel Analysis." PLoS ONE, 10(10), e0139628.

Towriss, C.A., 2014. Birth Intervals and Reproductive Intentions in East Africa: Insights from Urban Fertility Transition. PhD, Thesis: University of London.

Towriss, C.A., and I.M. Timaeus, 2018. "Contraception Use and Lengthening birth intervals in Rural and Urban East Africa." Population Sciences. 38(64), 2027-2052

Tsui, A.O., et al, 2011. "Managing Unplanned Pregnancies in Five Countries: Perspectives on Contraception and Abortion Decisions." Global Public Health.

UNFPA, 1995. Fast Facts on Maternal Mortality and Morbidity. Geneva: UNFPA.

UNPF, 1992. Global Population Assistance Report (1982-1990). New York: UNPF.

United Nations, 1999. General Assembly Resolution S-21/2, Key Action for the Further Implementation of the Programme of Action of the International Conference on Population and Development. http://www.un.org/documents/ga/res/215pr02.html. Accessed on 10/12/2017

United Nations, 2003. Fertility, Contraception and Population Policies. New York: United Nations.

United Nations, 2011. The Millennium Development Goals Report. New York: United Nations.

United Nations, 2015a. Trends in Contraception Use Worldwide 2015. New York: United Nations.

United Nations, 2015b. Transforming Our World: The Agenda 2030 for Sustainable Development. A/RES/70/1.

United Nations, Economic Commission for Africa, 2002. Report of the Fourth Meeting of the Follow-up Committee on the Implementation of Dakar/Ngor Declaration (DND) and the Programme of Action of the International Conference on Population and Development (ICPD-PA) Yaounde, Cameroun. 28-31 January.

UNFPA, 2004. Programme of Action. Brief Paper.

UNPFA, 2013. ICPD and Human Rights: 20 years of Advancing Reproductive Rights through UN treaty bodies and legal Reforms. Brief Paper, Centre for Reproductive Rights.

United Nations Population Division 2017. World Population Prospects: The 2017 Revision. New York: United Nations.

USAID, 2010a. Family Planning. Birth Spacing. http://www.usaid.gov/our_work/global/_health/pop/techaeas/birthspacing.html. Accessed on 12/12/2017

USAID, 2010b. Birth spacing and limiting connections: DHS Analytical Studies 21. Calverton, Maryland: USAID.

Wafula, S., F. Obare and B. Bellows, 2014. Evaluating the impact of Promoting Long Acting and Permanent Methods of Contraceptives on Utilization: Results from a Quasi-Experimental Study in Kenya. Population Association of America.

UNAIDS, 2014. Engaging Families for Healthy Pregnancies. A Focused Desk Review of knowledge, attitudes and behaviors related to pregnancies in Three High-Risk situations: Advanced maternal Age; High Parity and Rapid Repeated pregnancies after abortion of miscarriage. Baltimore; John Hopkins Bloomberg school of Public Health Center for Communication programs.

Walters, S.L., 2008. "Fertility, Mortality and Marriage in Northwest Tanzania, 1920-1970: A Demographic Study Using Parish Registers." University of Cambridge. http://www.geog.cam.ac.uk/people/walters./phd.pdfhtlm . Accessed on 15/09/2017

Wang, W., et al, 2017. Women's Mental Status, Contraceptive use and Unmet Need in Sub-Saharan Africa, Latin America and the Caribbean. DHS Comparative Report No. 44. Rockville, Maryland, USA: ICF.

Westoff, C.F., 2006. New Estimates of Unmet Need and the Demand for Family Planning. DHS Comparative Report. Calverton, Maryland, USA.

Westoff, C.F., et al, 2012. "Predictors of Contraceptive Clinical Trial." Contraception, 85, 465-469.

WHO, 2006. Report of a WHO Technical consultation on Birth spacing. Department of making pregnancy safer. Department of Reproductive Health and Research. WHO.

Winner, F.B. et al 2012. Effectiveness of Long-acting reversible contraception. N Engl J Med. 366(12): 1998-2007.

World Bank, 2018. Republic of Zambia: Systematic Country Diagnostic. Lusaka; World Bank.

Wu, L., 2010. "A Survey on the Knowledge, Attitude and Behaviour Regarding Contraception Use among Pregnant Teenagers in Beijing, China." Clinical Nursing Research. 19(4), 403-415.

Yohannes, S., et al, 2011. Duration and Determinants of Birth interval among women of child bearing age in Southern Ethiopia. BMC Pregnancy and Childbirth, 11(38).

APPENDICES

Appendix I

Distribution of reproductive women in 2010 Census and 2013/14 DHS

	2010 Census		2013/14 DHS	
Age	**Number(N)**	**Percentage (%)**	**Number (N)**	**Percentage (%)**
15 - 19	154, 787	24.9	3, 487	26.6
20 - 24	121, 086	19.5	2, 888	18.7
25 - 29	107, 009	17.2	2, 629	17.0
30 - 34	85, 032	13.7	2, 272	14.7
35 - 39	69, 021	11.1	1, 839	11.9
40 - 44	47, 732	7.7	1, 368	8.9
45 - 49	38, 004	6.1	950	6.2
15 - 24	275, 873	44.3	6, 375	41.3
25 - 34	192, 041	30.8	4, 901	31.8
35 - 49	154, 757	24.9	4, 157	26.9

Appendix II

Correlation Analysis

	Birth	Age	Resid	Wealth	Reli	Marital	Educa	Occu	BMI	Ethn	Regi	Fert Pref	Age FM	Sex IC	Surv IC	Parity	Cont use
Birth spa	1																
Age	0.10	1															
Reside	0.04	0.03	1														
Wealth	0.02	0.03	-0.37	1													
Religion	0.03	0.03	-0.03	0.00	1												
Marital	0.03	0.18	-0.05	-0.01	0.01	1											
Educa	0.02	0.10	-0.32	0.27	0.03	-0.01	1										
Occu	0.03	0.13	0.00	-0.03	0.01	0.09	0.03	1									
BMI	0.01	0.08	-0.22	0.22	0.01	0.00	0.15	0.00	1								
Ethn	0.02	0.02	0.02	0.02	0.02	0.02	-0.06	0.10	0.07	1							
Region	0.03	0.01	-0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.13	1						
Fert Pref	0.04	0.50	-0.04	0.01	0.02	0.16	-0.06	0.05	0.07	0.03	0.00	1					
Age F M	0.02	0.14	-0.04	0.07	0.00	0.00	0.13	0.02	0.03	0.05	0.03	-0.03	1				
Sex IC	0.00	0.01	0.02	0.01	0.01	0.00	0.00	0.02	0.01	0.00	0.00	-0.01	0.00	1			
Sur IC	0.04	0.08	0.02	0.01	0.01	-0.07	0.01	0.01	0.02	0.00	0.03	0.01	-0.02	0.01	1		
Parity	0.01	0.59	0.20	-0.16	0.02	0.03	-0.30	0.08	0.00	0.02	0.04	-0.12	0.46	0.00	-0.02	1	
Cont use	0.00	0.10	-0.09	0.05	0.12	-0.11	0.12	0.03	0.07	0.05	0.01	-0.04	-0.03	-0.01	0.08	-0.03	1