FACTORS INFLUENCING USE OF MODERN CONTRACEPTIVES BY YOUNG WOMEN IN KENYA: MULTILEVEL ANALYSIS OF 2014 KDHS DATA

`By

BERNARD KIPROTICH

Q56/34877/2019

A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN POPULATION STUDIES, UNIVERSITY OF NAIROBI.

NOVEMBER 2023

DECLARATION

This research project is my original work and has never been submitted for an award of a degree in this or any other institution of learning:

Signature:_____ **Date:** 20th November 2023

Bernard Kiprotich - Q56/34877/2019

This project has been presented for examination with our approval as University supervisors:

Signature…  ……

Date…20.11...2023……

Dr. Andrew Mutuku

Signature: …*mk*…… Date: …20.11...2023……

Prof. Murungaru Kimani

DEDICATION

I would like to express my gratitude in honor of my parents and family in this research project for their moral, spiritual, and material assistance, which enabled me to recognize and attain my aspirations.

ACKNOWLEDGEMENT

To the Almighty God, who has been my constant source of support during this study and is solely responsible for my success, I am primarily grateful.

Dr. Andrew Mutuku and Professor Murungaru Kimani, my supervisors, also deserve my gratitude. For all the help you gave me with my research project, I am truly thankful. I appreciate the high bar you have set for me to reach because it has taught me a lot along the way. In addition, I would like to express my appreciation to PSRI staff and lecturers for their guidance and assistance throughout the course of my study at the faculty.

My classmates and I have learned a lot throughout this experience. I appreciate you by always sticking by my side. Additionally, I want to offer my sincere appreciation to my family—my wife, Patricia Kimutai, and my children, Leah, Carson, Cypril, and Claudia—for their prayers and support as I did the research. Last but not least, I want to thank everyone who has helped and inspired me while I have been studying, especially my close family members.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study examined factor's influencing modern contraception among women age 15-24 years in Kenya. This study sought to identify demographic, socio-cultural, socio-economic, and intervening factors influencing contraception among the target population. Furthermore, it also established the effect of these factors at community level. Data for the analysis was drawn from the 2014 Kenya Demographic and Health Survey. The sample size for the study was limited to the 6,467 young women not pregnant during the time of survey, and those who reported to have ever had sex. Desriptive Statistics and Multi level Logistic regression were main methods of data analysis. Bivariate analysis involved cross-tabulation, and assessment of statistical significance using the Pearson's Chi-square. In addition, four models were fitted using three-level mixed effect multi-level binary logistic regression. Models were tested for goodness of fit using log-likelihood ratios (LLR) and Akaike's Information Criterion (AIC) at a 95% confidence interval (CI).

The results from the bivariate analysis demonstrated significant correlations between modern contraceptive use by Kenyan women age 15 to 24 years, and a range of factors. These factors included; educational attainment, status of employment, place of residence, age, marital status, knowledge of modern contraceptive methods, number of children alive, wealth status, mass media exposure through television, radio, and newspapers, as well as the extent of media exposure within their communities. The results of the multilevel regression showed that there were differences in Kenyan young women's uptake of modern contraceptive methods at the county and community levels. These variations were more pronounced at county level than at the community level.

The study concludes that use of modern contraceptives among young women in Kenya is still low and recommends that family planning messages should be widely disseminated through the media in order to increase young women's awareness of and knowledge about using contraceptives. This strategy is essential for resolving the variations (at community and county level) observed in use of modern contraceptive methods among young women in Kenya.

ABBREVIATION

AGYW: Adolescent Girls and Young Women

AIC: Akaikes Criterion Information

AOR: Adjusted Odds Ratio

DESA: Department of Economic and Social Affairs

ICC: Intra-Cluster Correlation

KDHS: Kenya Demographic and Health Survey

KNBS: Kenya National Bureau of Statistics

KPHC: Kenya Population and Housing Census

mCPR: Modern Contraceptive Prevalence Rate

PCV: Proportional Change in Variance

SPSS: Statistical Package for Social Scientists

SSA: Sub-Saharan Africa

STI: Sexually Transmitted Infections

WHO: World Health Organization

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

In low and middle-income countries (LMICs), including Kenya, demographic change, specifically the growth in population, poses a significant challenge (DESA, 2021). High fertility rates resulting from early child bearing are the primary cause of the population's rapid growth (DESA, 2021). It is postulated that if a woman initiates childbearing during her teenage years, it is more likely that she will have more children, often without planning, outside of marriage, and with pregnancies that are closely spaced. This situation also carries health risks for both the young woman and her infant (Trussell & Menken, 1978).

Worldwide, it is approximated that about 15 percent of young women become mothers before reaching the age of 18, resulting in approximately 21 million pregnancies annually. The majority of these pregnancies occur in sub-Saharan Africa, where approximately 16 million young women under the age of 20 give birth annually, accounting for approximately 11 percent of births overall worldwide (DESA, 2021). Recent research and reports in Kenya highlight a notable occurrence of early childbearing among young girls. In 2014, the prevalence was 18 percent (KNBS, 2014), and 10 percent in 2019 (KNBS, 2019).

Majority of births among young girls are unplanned or unintended, as indicated by a 2018 World Health Organization report. This report showed that almost half of the pregnancies among adolescent girls in developing countries were not planned. Such unplanned pregnancies have adverse health implications for both the young girl and her baby and influence shifts in population structure (DESA, 2021). To address this issue, the utilization of modern contraceptive methods by young adolescent girls has been established as beneficial and effective in reducing a country's fertility rates (Graff & Bremner, 2014).

In their study, Cleland et al., (2012) highlighted the significance of utilizing modern contraceptive methods in order to decrease fertility. They underlined that higher fertility rates have consistently been the outcome of sub-Saharan countries' limited use of contraceptive methods. Moreover, the research findings indicated that improving the accessibility of

contraceptive methods has resulted in a 25 percent decrease in fertility rates in developing countries since 1980. This emphasizes the vital role of contraceptive use in reducing birth rates in these nations. Cleland's study also highlighted additional advantages of contraceptive use, including but not limited to mitigating the risks associated with pregnancy, especially among young adolescent girls, such as reducing the incidence of abortion and infant and maternal deaths.

Despite the documented advantages of using contraception, many sub-Saharan African countries continue to record low usage, notably among young girls between the ages of 15 and 24. Ahinkorah et al., (2020) found that this group's prevalence of contraceptive use was approximately 32% for those in the 15–19 age range and 44% for those in the 20–24 age range. In Kenya, contraceptive utilization rates among young girls are relatively low, with an estimated 9.3 percent for individuals between the ages of 15 and 19 and 39% for those between the ages of 20 and 24 (KNBS & ICF 2015).

The existing literature explores numerous determinants that have an impact on women between the ages of 15 and 24 using modern methods of contraception. Research by Gayatri & Utomo, (2019), Ahinkorah et al. (2020), and Mutumba et al., (2018) has identified various factors that play a role in a woman's decision regarding contraception. These factors include the woman's age, fertility aspirations, knowledge of the ovulation cycle, employment status, and income level, marital status, parity, ethnic background, intended total number of children, community knowledge about modern contraception, media exposure, and number of live births.

It is critical to have a deeper comprehension of the personal and environmental factors influencing the young women's decision to use modern methods of contraception. To address this, the study investigated the factors influencing modern contraceptive method used by young Kenyan women using a multilevel analysis approach.

1.2 Problem Statement

Since the implementation of the government's contraception policy in 1967, Kenya has seen significant improvements in the uptake of modern methods of contraception. The prevalence of

modern contraceptives has been steadily growing, as stated in the 2014 Kenya Demographic Health Survey (KDHS). Nevertheless, disparities in the use of modern contraception across several age groups, geographical regions, and Counties continue despite these noteworthy advancements. These disparities vary widely, with rates as low as 9 percent among young women aged 15-19 and as high as 54 percent among women aged 30–34 (KNBS &ICF, 2015).

Available literature on factors influencing contraceptive use by young women has identified several variables that influence their decision to utilize modern contraception. These factors include marital status, place of residence, level of income, educational attainment, number of children desired , religion, and awareness of various types of contraception (Audu et al., 2008; Ekani-Bessala et al., 1998; Gichanga, 2011; Kimani et al., 2013; Ngome & Odimegwu, 2014; Oye-Adeniran et al., 2006; Saleem & Bobak, 2005). Majority of these studies have combined all women of reproductive age without taking into consideration variation in use of contraceptives by age as confirmed from a Ugandan research by Asiimwe et al., (2014) that use of contraceptives vary according to woman's age.

Studies conducted in the past that examined influence of modern contraceptive use between adolescent girls and young women have generally focused on individual variables like age, wealth status, education level, and media exposure without taking into account the contextual factors that may influence young women's contraceptive decision making (Ahinkorah et al., 2020, Mutumba et al., 2018). Thus, knowledge on how the contextual factors such as community socio-cultural beliefs, community education attainment, influence a young woman's contraceptive decision-making is limited. Therefore, this study will enhance understanding of the issue beyond the level of personal factors that may shape a young woman's choice to use a contraceptive.

Furthermore, prior researches investigating use of modern contraception by young women have predominantly relied on the conventional regression analysis model to examine determinants of young women's use of contraception (Mutumba et al., 2018). However, these studies often overlooked the hierarchical structure of the data collection for Demographic and Health Surveys. The common regression analysis model does not consider the hierarchical data structure, leading

to potentially incorrect odds ratio estimations. Therefore, employing a multilevel analysis model becomes crucial as it properly addresses the hierarchical nature of the data (Ahinkorah, 2020).

A key advantage of employing multilevel analysis compared to the traditional regression model is its capacity to incorporate random components at each level of analysis. This enables the identification and examination of heterogeneities at both individual and group levels (Heck et al., 2013). Second, in contrast to traditional regression analysis, multilevel analysis can adjust standard errors estimates. There has been a rise in research using this method, although there is still a dearth of published work in this area. This study addresses this knowledge gap by employing a multilevel analysis strategy to investigate factors that influence young Kenyan women's uptake of modern contraceptives.

1.3 Research Questions

The study was guided by the following research questions:

1. What impact do demographic, socioeconomic, sociocultural and intervening factors have on Kenyan young women's use of modern contraception?
2. What part do community-level variables play in influencing young Kenyan women's use of modern contraceptives?

1.4 Objectives of the study

The study's main goal was to determine the factors that influence young Kenyan women's use of modern contraceptives. The specific objectives of the study were to;

1. Determine the socio-economic, socio-cultural, demographic, and intervening factors influencing young Kenyan women's use of modern contraception.
2. Determine if community-level factors influence Kenyan young women's use of modern contraception.

1.5 Justification for the study

Previous studies regarding young women's uptake of modern contraceptive methods, and particularly in developing states, have depicted many gaps. First, nearly all studies have mainly centered on institutional and individual issues without taking into account the influences of community and contextual-level factors (Mutumba et al., 2018). However, evidence shows that

decisions that young people make can be influenced by the environment they live in (National Research Council, 2011).

This study will shed light on Kenya's distinct sociocultural and economic setting by utilizing multilevel analysis to evaluate contextual factors influencing Kenyan young women's use of modern contraception. This understanding is crucial for tailoring interventions and policies to address the specific needs and challenges faced by young women in the country.

Focusing on young women is important as they represent a critical group with distinct contraceptive needs and preferences. Understanding the factors that influence contraceptive use in this population can contribute to reducing unintended pregnancies, enhancing mother and child health outcomes and advancing reproductive rights and choices. The results of the study can be used to guide focused programs aimed at boosting young women's use of modern contraceptives in Kenya.

Research exploring contextual factors influencing the uptake of modern contraceptives has employed multilevel analysis. Examining contextual and individual-level factors influencing the use of contraceptives is possible when employing a multilevel analysis approach. By considering factors at multiple levels, such as those at the individual and communal levels, the study can offer extensive knowledge of the factors influencing young women's use of modern contraception (Heck et al., 2013). This approach recognizes the complex interplay between individual and contextual influences, resulting in more accurate and nuanced findings (Goldstein, 2011).

Understanding variables influencing young women's use of modern contraceptive methods is crucial since it will help policy makers and program implementers to come up with interventions, approaches, and strategies that address barriers and enhance facilitators. This can include interventions related to education, healthcare access, community engagement, and awareness campaigns, leading to increased contraceptive uptake and improved reproductive health outcomes amongst young women (Ahinkorah et al., 2020). Therefore, this study closes this gap

by employing a multilevel analysis approach to examine the variables influencing young Kenyan women's use of modern contraceptives.

1.6 Scope and limitations of the study

The study examined influences of community-level, intervening, demographic, socioeconomic, and sociocultural factors on young women's use of modern contraceptives in Kenya. Only young women between the ages of 15 and 24 who had ever had sex and were not pregnant at the time of the study were included in the analysis.

Given the self-reporting nature of questions on health behaviors particularly sexual behaviours, it is difficult to exclude recall and social desirability biases, particularly among young women. This has been reiterated by Mandiwa (2018), who pointed out that social desirability biases compromise the data quality of DHS surveys, especially indicators of sexual activity among 15 to 24 year old women and girls (Mandiwa et al., 2018). Secondly, the data used was cross-sectional and this limited the determination of underlying causes and effects of the independent and dependent variables. Despite these limitations, this study still offers novel and practical insights into the factors influencing modern contraceptive use among young women in Kenya, ages 15 to 24.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the factors that influence young women's (15–24 year old) use of modern contraceptives. Section 2.2 presents the theoretical perspective on young women using modern contraception. Section 2.3 covers an empirical review of prior studies, while the operational and adopted frameworks are provided in sections 2.4 and 2.5.

2.2 Theoretical perspectives

The basis for this study is the Classical Demographic Transition Theory. This theory offers a comprehensive framework for studying the factors influencing modern contraceptive use among young women aged 15-24 by considering the interplay of societal, economic, cultural and educational factors during the demographic transition. It allows contextualization of the dynamics of contraceptive behavior within the broader process of societal development and change.

The focus of the theory is on fertility changes in Europe between the 19th and 20th centuries. This concept has progressed since its inception by American Demographer Warren Thompson in 1929. Further contributions to this theory came from Landry, (1987). This theory explains why countries with low levels of technology, education (particularly for women), and economic development have high birth and infant mortality rates. Furthermore, it outlines the process through which these societies can eventually transition to achieving lower birth and death rates.

According to the traditional notion of the demographic transition, there are four distinct phases. The first phase, the pre-transition phase, was marked by very high birth and mortality rates. Due to widespread hunger, the population growth rate slowed significantly. While birth rates remained high, mortality rates decreased in stage two due to food supply and sanitation improvements that raised life expectancies and reduced disease. Access to contraceptives, urbanization, salary rises, and women's education lowered birth rates during the third phase. As health care and infrastructure have improved, so too have mortality rates. Stage 4 was

characterized by low birth and death rates. Birth rates were too low to maintain population growth, which was causing the population to decline.

The transformative changes experienced in the demographic transition, as seen in various stages of the transition, have influenced people's reproductive behavior (Lee & Reher, 2011). Concerning this study, the transition has influenced women's reproductive behavior at individual and societal/community levels through socio-economic, socio-cultural, and demographic changes observed throughout the transition period. At first, the declining mortality observed in stage two led to increasing population growth because of improvement in child health—this increased family size, which ultimately increased child dependency ratio. Eventually, at the advanced stage of the transition, families were motivated to regulate family size since they could access contraceptives due to improved technology (Reher & Sanz-Gimeno, 2007).

With the continued decline of childhood mortality observed over the transition period, couples could regulate their fertility with certainty. The desire for more children to counter the high childhood mortality experienced in earlier stages of the transition declined, and couples started embracing small family norms. Numerous impacts on family life and other aspects of social structure were caused by these changes in the demographic transition. For instance, there was no familial investment in children prior to the demographic transition, which was described by high mortality rate in children. However, as mortality rate declined, investments in fewer children due to education levels began (Reher, 1995). As a result of this focus on parents investing in their children, the cost of upbringing children eventually increased, which in turn encouraged couples to regulate their fertility by using contraceptives.

Another key influence of the demographic transition, particularly at the advanced stage, was the entry of women into the workplace. Due to declined births, women were liberated from the heavy workload of looking after kids. Ronald posited that when family size declines in terms of births, women will have more time to engage in economic activities than rearing children (Lee, 2003). The entry of women into the job market was also necessitated by the high cost of children, that necessitated economic need for increased income (Reher, 2007) as well as increased educational attainment.

The most notable social change associated with the transition in the four stages is the change in basic assumptions in the role of women in society experienced in most developed countries. This is also being realized in the developing nations, where communities were increasingly adopting the “developmental idealism” of developed countries (Thornton & Filipov, 2007).

2.3 Empirical review of literature

In their research centered on data from 2018 Mali Health and Demographic Survey, Ahinkorah et al. (2020) investigated influencing factors of access to and contraception utilization among Mali's young women and girls. The researchers examined factors that influence contraceptive use at the personal and community levels using multilevel regression analysis with mixed effects. The research's findings revealed that various individual characteristics considerably influenced the use of modern contraceptive methods by young women (15–24 years) in Mali. Marital status, educational attainment, wealth quintile, parity, race, and desired family size were among the variables found to have a strong association with contraceptive adoption. Consistent with prior research, the study also highlighted the positive relationship between widespread knowledge about modern contraceptives and their increased use.

The authors acknowledged several limitations in their study. Firstly, they acknowledged that historical reporting on modern contraceptive methods may have introduced recall bias into the data. Secondly, the sensitive nature of the survey's questions might have contributed to social desirability bias, which could have impacted the responses' accuracy. Additionally, the study's cross-sectional design limited the researchers' capacity to ascertain cause and effect or capture temporal relationships. Considering these constraints, the authors reached the conclusion that there is a need to implement extensive educational campaigns on contraceptive utilization. As a result, more young women and girls in Mali will have access to modern contraceptives, and disparities in their use will be addressed.

Mandiwa (2018) conducted a study in Malawi to explore the factors that motivated young women to initiate the use of birth control. The study utilized data from the 2015-2016 Survey on Demography and Health in Malawi to look into the country's low rate of young women using

modern contraceptives. By employing multiple logistic regressions and bivariate analysis, the study examined various demographic, socioeconomic, and additional factors that might affect the contraceptive utilization of young women. The study's results indicated that numerous factors significantly influenced young women's uptake of contraceptives in Malawi. These factors included age, geographic region, marital status, education level, religious affiliation, occupation, visits to health facilities, and awareness of ovulation. These factors were found to be crucial determinants of young women's use of contraception in the country.

The author pointed out some limitations of the study. First, the findings were generalized across all types of contraceptives, despite the possibility that certain independent factors might have different effects depending on the specific method of contraception used. Secondly, due to the possibility of recall bias brought about by self-reporting, the accuracy of the data gathered might have been influenced. This study was also unable to assess some independent factors that could potentially influence contraceptive use. Understanding of the temporal relationships between events was also hindered by the cross-sectional data collected. Furthermore, the study focused on all methods of contraceptives, including both modern and traditional methods, without exploring potential differences in the effects of independent variables on these distinct types of contraception.

The author recommended further study to gain a better understanding of the issues prompting young women's use of contraception in Malawi. Future studies could investigate whether certain independent variables have differences between the influence of modern and traditional forms of contraception. By addressing these limitations and conducting more targeted research, policymakers and healthcare professionals may devise more effective methods to promote contraceptive use among young Malawians and enhance the state of their reproductive health.

Appiah et al., (2020) conducted a retrospective analysis using information from the Ghana health and demographic surveys covering the years 2003 to 2014. Their aim was to identify the patterns and indicators of contraceptive use in Ghanaian adolescent girls. The research employed descriptive statistics and multinomial regression analysis using the Stata software. The study's results underscored several key factors that had a substantial influence on contraceptive

utilization among teenage girls and women in Ghana. Numerous factors, including place of residence, marital status, media exposure, and number of children (parity), have been established to have a major influence on the use of contraceptives. These factors significantly influenced how the nation's teenage girls used contraception.

Based on their findings, Appiah and colleagues advocated for the use of media outlets to disseminate information about the benefits and advantages of contraceptive utilization to young females. They also emphasized the need for increased awareness regarding the issue of contraceptive use, particularly amongst married and unmarried teenage girls. By addressing these aspects, the authors believed that contraceptive uptake among young women in Ghana could be improved.

While interpreting the findings, the authors acknowledged certain caveats that should be taken into account. For instance, recall bias, where respondents may not be able to remember certain information, and social norm influence were identified as potential biases in the study. Notwithstanding these shortcomings, the research offered insightful information about the factors influencing young women's use of contraception in countries that are developing. Overall, the study carried out by Appiah and colleagues (2020) contributes to the ongoing debate about the factors that influence young women's use of contraception. These findings underscores importance of considering factors such as marital status, parity, media exposure, and place of residence when designing interventions to promote contraceptive utilization among adolescent females in Ghana and similar contexts.

Obare et al., (2011) carried out a research project that provided valuable information regarding the occurrence, trends, and discrepancies in contraceptive use among adolescent girls in Kenya. To inform the study, the researchers utilized the Kenya Demographic and Health Surveys undertaken in 1998, 2003, and 2008–2009. Family planning and fertility indicators were cross-tabulated with a variety of factors, including educational level, area of residence, age, region, marital status, and wealth quintile. The study's findings made a number of significant observations. Firstly, postulated that the likelihood of using methods of contraception was low among individuals who were involved in sexual activity. This calls for focused interventions to

better this particular group's access to contraception. Furthermore, the study highlighted that preferences for contraceptive methods varied depending on marital status and geographical location. Understanding these differences is crucial for implementing effective family planning initiatives. The research similarly showed that teenagers' primary information source about family planning came from radio. This emphasizes how important it is to use this platform to effectively reach this specific population group by providing accurate and thorough information about contraception. Based on their findings, the researchers suggested that more work be done to enhance access to family planning options and customize them to meet the particular requirements of various groups of adolescent girls. By doing so, it is expected that better outcomes in terms of contraceptive use and reproductive health can be achieved.

The study conducted by Obare et al. (2011) contributes important insights to the field of adolescent contraceptive use in Kenya. It emphasizes the need for targeted interventions, taking into account factors such as sexual activity, marital status, geographical location, and preferred sources of information. By addressing these factors and tailoring family planning services accordingly, the study suggests that the effectiveness and accessibility of contraceptive services for adolescent girls in Kenya can be significantly improved.

Mutumba et al. (2018) in his study examined how communities in low- and middle-income nations influence young women's decisions to use modern methods of contraception. In particular, he looked at how economic, gender, reproductive, and fertility factors within the community context affected the rate at which young women used modern contraception. The Bronfenbrenner socio-ecological theory was applied to investigate the contextual factors affecting decision-making. The study utilized a multilevel logistic regression model that accounted for community-level effects correlated across different levels. The results of the study demonstrated that several demographic aspects including education level, income, age, place of residence, media exposure, and the number of live births, positively influenced young women's use of modern contraceptives. On a community level, they established that some characteristics influenced the use of contraceptives. Modern contraceptive methods were more probable to be used in communities where more women chose to post-pone marriage, had more control over household decisions, were more educated, and came from wealthier families. Conversely,

communities with higher percentages of young women who involved in early sexual activity, had more children, began having children at a young age, and were exposed to patriarchal norms that supported wife beating were less probable to use modern contraceptive methods.

The findings of the study will have a big impact on future research projects and ongoing campaigns to promote women's use of modern contraception. The results, for instance can offer direction for developing community-driven programs that specifically address the impact of cultural norms and gender stereotypes on contraceptive use. There is also emphasis from the study on the requisite for further qualitative and longitudinal studies to better comprehend the intricate interplay between social, institutional, and personal factors that affect women's decisions about contraceptive methods. The research carried out by Mutumba et al. (2018) reveals the ways in which community-level factors influence the use of modern contraceptives by young women. The research offers useful information that may be used to develop and devise strategies and regulations that will promote the use of modern contraceptives.

Research by Asiimwe et al., (2014) investigated the variables that influence a woman's choice of contraception, paying close attention to how these variables change with age. The authors compared the variables influencing contraceptive use amongst younger and older Ugandan women using data from the 2011 Uganda Demographic and Health Survey. In order to investigate the relationships concerning age and various demographic factors like education level, wealth, region of residence, need for children, and use of contraception, the researchers included the respondent’s ages as an interacting variable in the logistic regression analysis. The study's findings showed a positive and statistically significant relationship between a variety of demographic characteristics and contraceptive use. The likelihood of using contraceptives was found to be influenced by a number of variables, including education level, financial status, residence, and desire for children. The multivariate study also discovered significant variations in the use of modern contraceptives based on geographical location, age, the perceived distance to medical services, and radio listening. As an illustration, older women who admitted to listening to the radio had a higher propensity to use contraceptives than younger women (OR = 1.97; p = 0.030). These results highlight the value of targeted media. The study acknowledged a limitation in the dataset, specifically the presence of heaping in certain categories, such as education level,

which may have skewed the results. Notwithstanding this constraint, the study's findings suggested the importance of addressing socioeconomic disparities between younger and older women, improving the Village Health Teams' effectiveness in delivering family planning services, and looking into alternative media strategies to enhance modern contraceptive use by young women.

In conclusion, the authors compared the variables influencing Ugandan young and older women's use of contraception. Results emphasized the influence of several demographic aspects on contraceptive use and emphasize the necessity of focused media campaigns and interventions for addressing the disparities observed. The study's limitation regarding data skewness underscores the importance of considering and addressing potential biases in future research. The research provides valuable insights to inform efforts aimed at promoting contraceptive use and improving reproductive health outcomes among Ugandan women from various age groups.

Kafle, (2018) undertook a study to look into the changing trends of contraceptive use between married Nepalese women aged 15 to 24. The analysis concentrated on examining patterns and disparities in contraceptive use, variations in the different contraceptive methods, and the factors prompting contraceptive uptake, while considering particular socioeconomic and demographic variables. The data employed in this study was obtained from the national representation waves of the Nepal Demographic and Health Survey from 2001, 2006, and 2011. To investigate the variables associated with young women's use of contraceptives, the researchers used cross-tabulations, logistic regression, and descriptive statistics. The study's findings revealed that throughout the three survey rounds, the main factors affecting young women's use of contraception remained the same. Factors such as having more living children, having at least one son, higher education, belonging to relatively better-off households, and working in non-agricultural sectors were significantly linked to an increased likelihood of contraceptive utilization. Over time, the importance of exposure to the media in describing differences in women's contraceptive use diminished, and the importance of women's household wealth status in explaining differences in young women's contraceptive use also diminished. However, when accounting for other variables, a positive association was still observed among women's

education, household wealth status, and use of contraceptives. The likelihood of using contraceptives was also linked to living in an urban area.

Remarkably, women whose husbands resided elsewhere exhibited notably reduced chances of contraceptive use in comparison to those whose husbands lived with them. This underscores the significance of incorporating both socioeconomic and demographic variables, alongside the residential status of husbands, in the analysis. Based on their findings, the authors recommend that programs should place special emphasis on women whose husbands are migrants to ensure that they can effectively avoid unintended pregnancies upon their husbands' return. The program should focus on the low-use of long-acting contraceptive methods among young women and direct its services to encourage the adoption of these methods, which are known to be more efficient.

In their research, Kristiana et al. (2020) sought to ascertain factors influencing use of modern contraceptives amongst Indonesian married women aged 15 to 24. The researchers used information taken from the 2019 Indonesian Population, Family Planning, and Family Development Program Performance and Accountability Survey to carry out their research. The analysis concentrated primarily on a subgroup of 3,927 young married women who were not pregnant at the time of the survey because it was thought that this group would be more accurate in reporting their use of contraceptives.

In order to examine the many factors that influenced how married women used modern contraceptives, descriptive statistics, bivariate, and multivariate logistic regression models were used. The findings revealed a strong correlation between the use of modern contraceptives, a variety of demographic, socioeconomic, behavioral/attitude, and family program exposure factors. Notably, the household wealth index did not show a significant relationship. Additionally, the study emphasized the significance of contact to family planning programs in explaining the use of contraceptives, including information about contraceptive methods and discussions about family planning with medical professionals. The findings of the research highlight the significance of initiatives that seek to improve access to current contraceptive knowledge with a particular focus on specific subsets of adolescents. These categories include

individuals of advanced age, residents of urban areas, inhabitants of islands beyond Java-Bali, and individuals with higher educational attainment. The study also highlights the significance of fostering interpersonal interaction between family planning professionals and clients to support use of contraception. Finally, Kristiana et al. (2020) emphasize the demand for specialized intervention plans that address the particular factors influencing Indonesian married women's use of modern contraceptives. The researchers believe that the use of modern methods of contraception can be increased by focusing on these factors and encouraging effective provider-client communication.

Ahinkorah's (2020) study sought to examine the factors influencing use of modern contraceptives amongst young women and girls in sub-Saharan Africa. The statistics used in the research was obtained from 29 different demographic and health surveys. The research aimed to close the current knowledge gap by examining the individual and environmental factors that influence women aged 15 to 24 use of modern methods of contraception.

The main goal of the study was to assess the association between personal and environmental factors and the use of contraceptive methods by sexually active women aged 15 to 24, who stated they were aware of the use of contraceptives. Ahinkorah utilized the Health Belief Model and Anderson and Newman's Health Care Utilization Model as the theoretical underpinnings for the research. To assess the data, multilevel binary logistic regression and Pearson's chi-square test for independence were utilized. The findings of the study revealed several sociodemographic and environmental factors that were positively associated with use of modern contraception in sub-Saharan Africa by young women. Age, parity, occupation, religion, educational level, media exposure, place of residence, ideal number of children, age of first sexual experience, literacy level in the community, desire for more children, socioeconomic status in the community, and knowledge of modern contraceptives were among these variables.

Based on the findings, Ahinkorah and colleagues recommended that policymakers in the relevant countries develop policies and interventions aimed at reducing stigma surrounding contraceptive use and improving availability of modern contraceptive methods. These suggestions are meant to address the variables that have been identified as influencing contraceptive use in sub-Saharan

Africa by young women. In summary, Ahinkorah's (2020) study shed light on the individual and contextual variables influencing young women and girls' use of modern contraception in sub-Saharan Africa. The research emphasized the importance of targeted policies and interventions to address these factors and enhance access to modern contraceptive methods.

Subedi et al., (2018) conducted a literature review to examine the frequency and changes among teenagers in Nepal who use modern contraception. Their research also sought to determine the variables influencing use of contraceptive methods by young married and unmarried women. The research explored the factors affecting female teenagers' use of contraceptives in Nepal by reviewing a range of relevant literature, including published and unpublished studies and reports. Research findings depicted a number of inter-associated, multidimensional factors that have an impact on how often teenage girls in Nepal who are married or unmarried use contraceptive methods. These factors included sociocultural, demographic, and service delivery factors. The study pointed out the significance of using a multi-level analysis method from studies carried out in low- and middle-income countries (LMICs) to comprehend the dynamics of adolescent contraceptive use.

In summary, Subedi et al. (2018) conducted a comprehensive literature review on teenagers in Nepal who use modern contraception. The research underscored the complex nature of factors that influence contraceptive behavior among young women who are married and unmarried. The findings emphasized the need to consider sociocultural, demographic, and service-associated factors in understanding and addressing contraceptive use among adolescents. Furthermore, the study highlighted the significance of using a multi-level analysis strategy based on evidence from LMICs to gain a comprehensive understanding of behavioral patterns of teenage contraception use.

Nsanya et al. (2019) in their research conducted in Northwest Tanzania, investigated factors influencing use of modern contraceptives by sexually active women in the age range 15-19. Cross-sectional baseline survey was used in the study with a focus on young women and teenage girls within the age range of 15 to 19. The effects of marital status on young adult women's contraceptive behaviors were examined using logistic regression model. The research revealed

that use of modern contraceptives among teenage girls differed depending on whether they were married or unmarried. A number of factors, including age, higher educational attainment, and higher levels of knowledge and self-efficacy regarding contraceptives, have been identified as significant indicators of contraceptive use among sexually active unmarried women. Additionally, hearing about recent contraceptives from friends, family, or the media within the preceding year was linked to increased use of contraception.

According to these results, the authors emphasized that in order to encourage teenage girls to use modern contraception, targeted interventions in sexual and reproductive health are crucial. The study highlighted the need for comprehensive efforts that address knowledge gaps, enhance self-efficacy, and provide access to information through various channels such as interpersonal communication and media platforms. These findings underscored the significance of tailored approaches in improving contraceptive practices among Tanzanian young women.

A research by Ngome and Odimegwu (2014) looked into factors influencing access and use of modern contraceptives by young women in Zimbabwe. The study investigated how societal, domestic, and personal factors affected the use of contraception. The study focused on young women aged 15 and 19 who reported having sex in the year prior, utilizing the most recent data from Zimbabwe Demographic and Health Survey, which was carried out in 2010–2011. The data analysis involved the application of generalized linear mixed models, including multilevel binary logistic regression and univariate and bivariate tests (GLMM). The results showed that using modern methods of contraception was associated to a higher birth rate, with an odds ratio of 13.6. Furthermore, married teenagers had 2.5 times likelihood to use modern contraception in comparison to unmarried teenagers. Adolescent girls who had media access used modern contraception more as opposed to those who had no access (OR=2.1), suggesting that media access also played a significant role.

At the communal level, the research noted that factors like the average children born alive to women (OR=0.071), mean years of schooling by women (OR=0.4), and proportion of women with high school education (OR=0.5) positively influenced the use of modern contraceptives.

These findings revealed that characteristics at personal and community levels were significant predictors of young women's use of modern contraceptives in Zimbabwe.

From the examination, it was concluded that programs designed to lower the number of teen pregnancies should consider addressing issues at both the personal and community levels, such as education, cultural norms, and attitudes. They also recommended that future research explore other aspects, such as political and cultural factors, at the community level to further enhance understanding in this area.

Islam et al., (2016) looked at the prevalence and variables influencing the use of contraceptives amongst young women who are employed, and unemployed in Bangladesh. The study's goal was to identify specific factors influencing this population's use of contraception. The analysis utilized data from the Bangladesh Demographic and Health Survey (BDHS) conducted in 2011. Identifying the causes that are associated to young women in Bangladesh using contraceptives, the data were analyzed using a variety of statistical methods, including univariate analysis, bivariate analysis, and binary logistic regression. Study's findings showed that a number of variables positively associated with employed women's use of modern contraceptives. Age, educational attainment, children alive, residence, and desire for contraception were some of these variables. For example, employed women with advanced levels of education showed a high likelihood of using contraceptives linked to women with no formal education. Based on their research, the authors concluded that socio-demographic characteristics influenced use of contraception by young women in Bangladesh. They stressed the significance of considering these issues when creating policies and putting initiatives linked to family planning and reproductive health into action.

The study's overall findings provided light on the factors influencing young women's use of contraceptives in Bangladesh, particularly among those who hold jobs, and they underlined the necessity for focused interventions that focus on socio-demographic factors to enhance access to and use of contraception.

Li et al., (2020) undertook a study with the goal of investigating the adoption of contraceptive methods within countries with Low and Middle-Incomes (LMICs) with the aim of evaluating the utilization levels and patterns in these areas among adult women (20-34 years) and teenage girls (15-19 years). The researchers reviewed data from 261 national surveys conducted between 2000 and 2017 in 103 developing countries, which included different demographic and health factors. Bivariate and multivariate methods were used in the data analysis to evaluate the factors associated with modern contraception. The findings of the study indicate that age is a statistically significant predictor of contraceptive use. Women aged 20 to 34 were shown to have a greater likelihood of utilizing these methods than women aged 15 to 19, with an odds ratio of 0.44. The results of the research highlight the need of using age-appropriate strategies to increase use of contraception by teenage girls who are sexually active. It also highlights the necessity to expand access to contraceptive methods to ensure availability of diverse choices of contraception for adult women and teenage girls.

Overall, the study emphasizes the need to address age-associated disparities in contraceptive use and seeks for specific measures to increase adolescent girls' use of contraception while also guaranteeing that women in LMICs have access to a variety of options for contraception.

O'Regan & Thompson, (2017) study, titled "Assessment of Indicators of Young Women's Modern Contraceptive Use in Burkina Faso and Mali," offers valuable insights into the potential predictors on the use of short-term (STM) and long-lasting (LAPM) contraceptive methods among young women. The research employed the most recent data from the Mali Demographic and Health Surveys in 2001, 2006, and 2012 as well as the Burkina Faso Demographic and Health Surveys, conducted in 1998, 2003, and 2010. Women in the age range of 15-19 who were more likely to have unplanned pregnancies were the study's primary focus.

The researchers employed multinomial logistic regression and descriptive statistics as analytical tools to evaluate the indicators associated to modern contraceptive use. The research's findings indicated a high desire of more children by husband's, the educational attainment of the wife, and the stability of the family's financial situation as important factors influencing the extent to which modern methods of contraceptives are used in Mali and Burkina Faso. These factors

played a crucial role in influencing the choices young women made concerning the use of contraceptives.

The study provides robust evidence supporting the importance of empowering women and placing them in leadership roles. It emphasizes that national and regional governments, as well as development organizations, should give priority to programs that empower women and encourage their involvement in decision-making. It is anticipated that by doing this, greater progress can be made in resolving the issues surrounding young women's use of current contraception in Burkina Faso, Mali, and similar contexts.

The study by Jacobs et al., (2017) looked at how media exposure influenced use of modern contraceptives by West African young married adults. The study used data from Senegal's and Burkina Faso's 2010 Demographic and Health Surveys (DHS). Various statistical analyses were employed, including the Pearson Chi-square test to assess demographic disparities in obtaining family planning information from print, radio, and television. The relationship between self-reported exposure to family planning messages and one's knowledge and use of modern contraceptives was examined using propensity scoring matching and multivariate models. As per the study's findings, urban households with higher income quintiles and educational levels demonstrated a greater knowledge of family planning messaging than rural households with lower wealth quintiles and education levels. However, the odds ratio (OR) for modern contraception use among married adolescents in Senegal was positive (OR=2.3) but not statistically significant. Therefore, among married adolescents in Senegal, there was no connection between media exposure and the use of modern contraceptives.

Authors concluded that there is underrepresentation of teenagers and rural women with low incomes in mass media efforts associated to family planning in West Africa. They emphasized the need for implementing massive media campaigns to bridge the gaps identified in the study and ensure that these population groups have access to accurate and comprehensive information about modern contraceptive methods.

Makola et al., (2019) carried out studies in South Africa, concentrating on adolescent girls and young women (AGYW) between the ages of 15 and 24. The aim of the research was to look into the behavioral characteristics and social demographics of this group in relation to their use of contraceptive methods. South African Population-based Household Survey from 2012 was used to examine the behavioral and demographic factors associated with young women's (20–24 years old) and girls' (15–19 years old) use of modern contraceptive methods. Study's findings showed a number of parameters that were closely associated to the uptake of modern methods of contraception. The use of modern contraception was positively associated with completing secondary education (OR=1.8), having a partner within the five-year age range (OR=1.8), and starting a sexual relationship with a partner at age 15 or older (OR=2.5). These variables were found to have a significant influence on the probability that South African adolescent girls and young women (AGYW) will use contraceptive methods.

In order to increase the use of contraceptives, the authors suggested implementing programs that are specifically designed to meet the needs of young women and girls. They also emphasized the importance of initiatives targeting first-time mothers to reduce the incidence of unplanned pregnancies and address other contributing factors. In summary, Makola et al.'s study shed light on the social demographics and behavioral characteristics influencing use of modern contraception by South Africa AGYW, thus provides insights for the development of targeted programs and interventions in this context.

Casey et al., (2020) examined the methods of contraception used by sexually active young women in North and South Kivu, Democratic Republic of the Congo, aged 15 to 24. Cross-sectional population surveys were used in the study's data collection in North Kivu's six rural health zones. To summarize and compare findings across various age groups, the study used chi-square and t-tests. Additionally, logistic regression modeling was used to look into the factors associated with young women in North and South Kivu using modern contraceptive methods. The results were presented as odds ratios (ORs) and 95 percent confidence intervals (CIs). The study's conclusions showed that the use of modern contraceptive methods by young women was positively associated with a number of factors. These factors included being older, having completed secondary school, being single, initiating sexual activity at a younger age, and having

already started having children. However, it is crucial to acknowledge that the insecurity of the location of the study resulted in lower coverage rates and reduced the representativeness of the data.

Based on their findings, the authors concluded that addressing gender and social norms that hinder young women's access to modern contraceptives is crucial. They emphasized the need for interventions and strategies to overcome these barriers and ensure accessibility of modern contraceptives required by young women. To sum up, Casey et al.'s research investigated how young women use contraceptive methods in North and South Kivu, highlighting important factors associated with their use. The study also acknowledged the challenges posed by the study's setting and recommended addressing societal norms to improve accessibility of modern contraception in the region by young women.

Kidayi et al., (2015) conducted a study in Tanzania to determine the factors that influence young women who use modern contraception and are between the ages of 15 and 19. Using information from the 2010 Tanzania Demographic and Health Survey, the researchers examined 6,412 married or cohabiting women in their sample. Both bivariate and multivariate logistic regression analysis were performed using Stata version 22. The study findings revealed that a significant predictor of increased use of modern contraceptives was the age gap between partners. Women who reported either no age difference or an age gap of nine years or less between themselves and their partners had a higher likelihood to use methods of contraception than those who reported a greater age difference. The findings are in line with earlier research from developing nations. The study also identified additional factors that were discovered to be significant predictors of modern contraceptive use, including the desire for another child, the gender-based disparity in ages as well as the impact of the feminist movement.

The research findings highlighted the importance of promoting and supporting women's use of contraceptive methods and other family planning options. These results contribute to the existing knowledge on factors influencing contraceptive use among young women and underscore the importance of targeted interventions to enhance accessibility and use of modern contraception in Tanzania.

Kinaro et al., (2015) carried out a study in Kenya to examine how attitudes and barriers affected adolescent girls' use of contraceptives. Using a mixed study approach, the researchers combined quantitative and qualitative data acquired from various sources in Nairobi. Girls between the ages of 15 and 19 provided quantitative data, and teachers at the schools and parents of teenagers provided qualitative data. To guide their study, the authors utilized a framework on perceptions and barriers to contraceptive use developed by Fishbein & Ajzen, (1977), which served as the basis for defining their study variables. The analysis methods employed in this study included cross-tabulation, logistic regression for quantitative and qualitative data content analysis.

The study's conclusions suggested that factors like parental approval, partner communication, and knowledge on how to use contraceptive methods were all statistically significant in relation to the use of contraceptive methods among adolescent girls. Based on these findings, the study made several recommendations. Firstly, it emphasized the importance of educating teachers and parents on effective communication with adolescent girls regarding sexual matters. Additionally, the study recommended the formulation of programs and regulations aimed at addressing the contextual factors influencing adolescent girls' perceptions and use of contraception. In general, the study advances knowledge on beliefs and impediments that prevent teenage females in Kenya from using contraceptives and emphasizes the significance of focused initiatives and support networks to increase this population's contraceptive use and accessibility.

Kungu et al., (2020) undertook a research to look at patterns in young females' choice of contraceptive methods between the ages of 15 and 24 in Kenya. The researchers examined the trend data from the Kenya Demographic and Health Surveys, conducted in 2003, 2008/09, and 2014. Cross-classification and logistic regression analysis were the main analytical methods used in this research. According to the research's findings, using modern methods for contraception increased significantly between 2003 and 2014 among young girls in Kenya. Furthermore, the study observed a preference among young women for long-term contraceptive methods, although the use varied depending on variables like economic status, education level, wealth, and place of residence. Based on these findings, the authors concluded by recommending strengthening of awareness campaigns that provide accurate information to young girls regarding reproductive

health issues, including contraceptive use. The objective is to give them knowledge and assurance they require to make wise choices about their sexual health.

In conclusion, this research emphasizes the importance of comprehensive reproductive health education to enable young girls to acquire and utilize appropriate contraceptives methods efficiently. It also sheds light on trends in young girls' choice of contraceptive method in Kenya.

Sserwanja et al. (2021) conducted an empirical investigation to ascertain variables linked to teenage girls' use of modern contraceptive methods in Uganda. Using multivariate logistic regression, the researchers examined the variables influencing the use of modern contraceptives based on data from the 2016 Uganda Demographic and Health Survey. The study included both married and unmarried adolescent girls. The overall results indicated that 9 percent of Ugandan adolescents were using modern contraceptives. Numerous factors were found to have a significant influence on the adolescents' use of contraceptive methods. These factors included age at first birth, region, marital status, and wealth status. Adolescents who had a higher age at first birth, resided in the Central region, were in a union (married or cohabiting), and came from households with higher wealth status had a higher likelihood to use modern methods of contraception.

In their conclusion, Sserwanja et al. (2021) recommended that relevant government authorities devise strategies to ensure easy access, availability, and promote the acceptability of modern contraceptives among adolescent females in Uganda. Furthermore, they called upon stakeholders in the reproductive health sector to develop programs specifically targeting adolescents from different contexts, such as different regions, places of residence, marital status, and wealth status. In summary, this study provides insights into the factors influencing Ugandan teenage girls' use of modern contraceptive methods. Results in this study emphasize how crucial it is to address numerous contextual issues and put in place tailored programs to increase this population's access to and acceptance of modern contraception.

Research by Kawuki et al., (2022) evaluated the prevalence of modern methods of contraception amongst sexually active adolescent females and the factors associated to their use. The

researchers extracted information from 539 sexually active adolescents utilizing data from Rwanda's 2020 Demographic and Health Survey (RDHS). Multiple logistic regression and bivariate logistic regression models were used to analyze the relationship between the use of contraceptives and socio-demographic characteristics. The variables included in the study were: age, wealth index, education level, working status, religion, health insurance coverage, history of STI, history of being in a union (married or cohabiting), exposure to newspapers, radio, and television, and size of household. The research identified numerous important variables that affected how frequently teenage girls used contraceptive methods. These variables included age, educational attainment, STI history, being married, employment status, and religion.

Based on these findings, the authors made several recommendations. They pointed out the importance of family planning initiatives that mainly focus on young, unmarried teenagers and those with lower levels of education. They also called for collaboration between the government of Rwanda and stakeholders to enhance accessibility and availability of contraceptive methods among adolescent girls. Additionally, they advocated for the creation of plans that are tailored to the particular requirements of various age groups, communities, and places of living and employment status among adolescent girls. In summary, this research study presents findings regarding the prevalence and risk factors associated with the utilization of modern contraceptive methods among sexually active adolescent females in Rwanda. The findings highlight the importance of targeted interventions and strategies, which take into account the unique requirements of various adolescent groups.

Debelew and Habte (2021) carried out a study in Ethiopia to examine the factors influencing young women between the ages of 15 and 24's use of contraception. The researchers utilized household survey data collected in 2018 by the Performance Monitoring for Action. The study included married and unmarried Ethiopian young women in the age range 15-24. Using descriptive statistics, the young women's level of contraceptive use was assessed. The factors influencing the use of contraceptives were identified using a mixed effects multilevel logistic regression model. A 95 percent confidence interval and standardized odds ratios were used to assess the degrees of significance between the predictor and outcome variables.

The findings of the investigation revealed that 55% of young women in Ethiopia used contraceptive methods. Several variables were identified within this cohort that influenced the utilization of contraceptive methods. These variables included religious affiliation, number of children, socioeconomic status, marital status, age, desire for more children, and knowledge of contraceptive methods. Contrary to the prevailing idea, it is noteworthy that the study revealed a different trend: women with a higher number of children had a lower likelihood of using contraception compared to women who had no children. These results agreed with those of another research done in the Southern parts of Ethiopia, Ghana, and Tanzania (Achana et al., 2015; De Vargas Nunes Coll et al., 2019; Endriyas et al., 2017; Nsanya et al., 2019).

Based on the results, the study proposed several recommendations. These included the development of community-specific interventions to address variations in contraceptive utilization across different regions, creating awareness about various contraceptive methods to increase knowledge among young Ethiopian women, improving access to different methods of contraception, and engaging religious leaders as advocates for family planning. In conclusion, Debelew and Habte's study sheds light on the factors that influence young Ethiopian women's use of contraception. The results emphasize the necessity of focused interventions, information sharing, and greater access to contraceptives, as well as the significance of working with religious leaders to advance family planning.

2.3.1 Summary of literature review

The literature review focused on exploring the determinants that influence young women's use of modern contraceptive methods. The review examined various studies that investigated this topic and identified common themes and variables that are very important for this population's contraceptive use. It is crucial to remember that the reviewed studies looked at a variety of factors and presented differing conclusions about how they affected the use of modern contraceptives. Some of the factors that emerged from the literature review include socio-economic status, education level, knowledge and awareness about contraceptives, access to healthcare services, cultural and religious beliefs, partner support, and social norms as well as variables at community level.

The gap identified from the reviewed literature is that most of the studies used the traditional regression analysis to study the influencing factors of modern contraceptive use among young women, and those which used the multilevel analysis were at regional level with none focusing on Kenyan context. Therefore, this study will fill this gap by examining both individual and community level variables using multilevel analysis of 2014 Kenya Demographic and Health Survey within Kenyan context.

2.4 Conceptual Framework

This study was conceptualized using Bongaarts proximate determinants of fertility (Bongaarts, 1978). This framework helps in understanding the underlying causes of changes in fertility rates. In this model, a group of factors known as the proximate determinants affects fertility directly. Indirect determinants include the social, economic, cultural, psychological, health, and environmental aspects that affect fertility indirectly. Other determinants referred to as direct determinants include; natural marital fertility factors, intentional marital fertility control factors, and exposure variables. This study's main topic, modern contraceptive use, fits within Bongaart's paradigm as one of the primary proximate factors affecting fertility. Demographic Transition Theory is linked to the Bongaarts framework, due to their complimentary roles in understanding the complex dynamics of population growth and fertility change. Like the Bongaarts Framework, demographic transition theory shows that demographic, socio-economic, environmental, and cultural changes experienced through the transition period influence modern contraceptive use among women, which will ultimately influence fertility (Lee & Reher, 2011). Other proximate determinants listed in the Bongaarts framework will not be taken into consideration because the sole focus of this study is the use of modern contraceptives. As recommended by earlier research by Kimani et al., (2013), this research will include intervening variables that have a direct impact on young women's use of modern contraceptives. The study presumes that “background socio-economic, cultural, demographic and environmental factors create an environment that, through the intervening factors, either favor or restrain the practice of contraceptives”(Kimani et al., 2013).

Many researchers have used Bongaarts framework (1978), which has been acknowledged in prior studies on the use of contraceptives, to develop indicators for the use of modern

contraceptives. Studies that have made use of this framework include Gichanga (2011), investigation into the variables influencing married women's use of contraceptives in rural Kenya, and Kimani et al. (2013) in their research comparing the Nyanza, Coast, and Central Provinces of Kenya to examine variances in the use of contraception across these regions.

Bongaarts Model

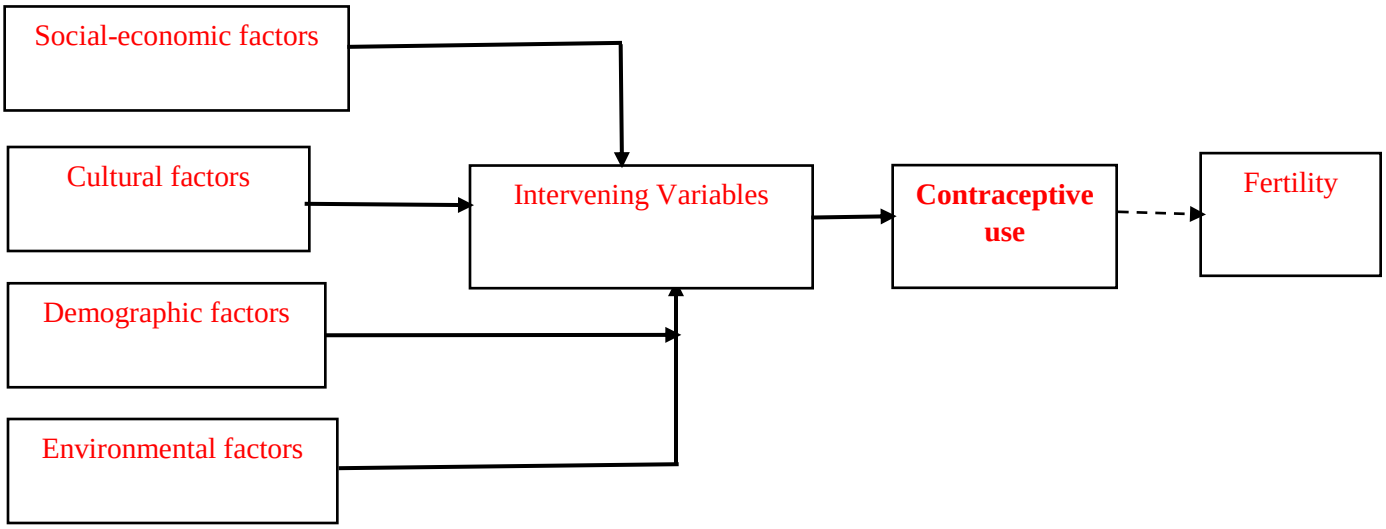

Figure 2.1 Bongaarts Framework
Source: Bongaarts, J, (1978) 'A Framework for Analyzing the proximate Determinants of fertility,' working papers, New York.

2.5 Operational Framework

The operationalization of the study was done using Bongaarts' (1978) framework. It shows how modern use of contraception is influenced by social and-economic, sociocultural, demographic, and community-level variables through influencing variables such as knowledge of modern contraceptive methods, personal experience with child death, media exposure, and the number of children still alive. Socio-economic factors analyzed included: Education level, residential place, wealth status, and employment status; women's age and marital status; and women's sociocultural and religious backgrounds, and lastly community level factors included; community level female education attainment, community level female socio-economic status and community level women's media exposure. Intervening variables included knowledge on modern contraceptives, child death, media exposure, and the number of children still alive. Below is a discussion of the operational definitions of these factors.

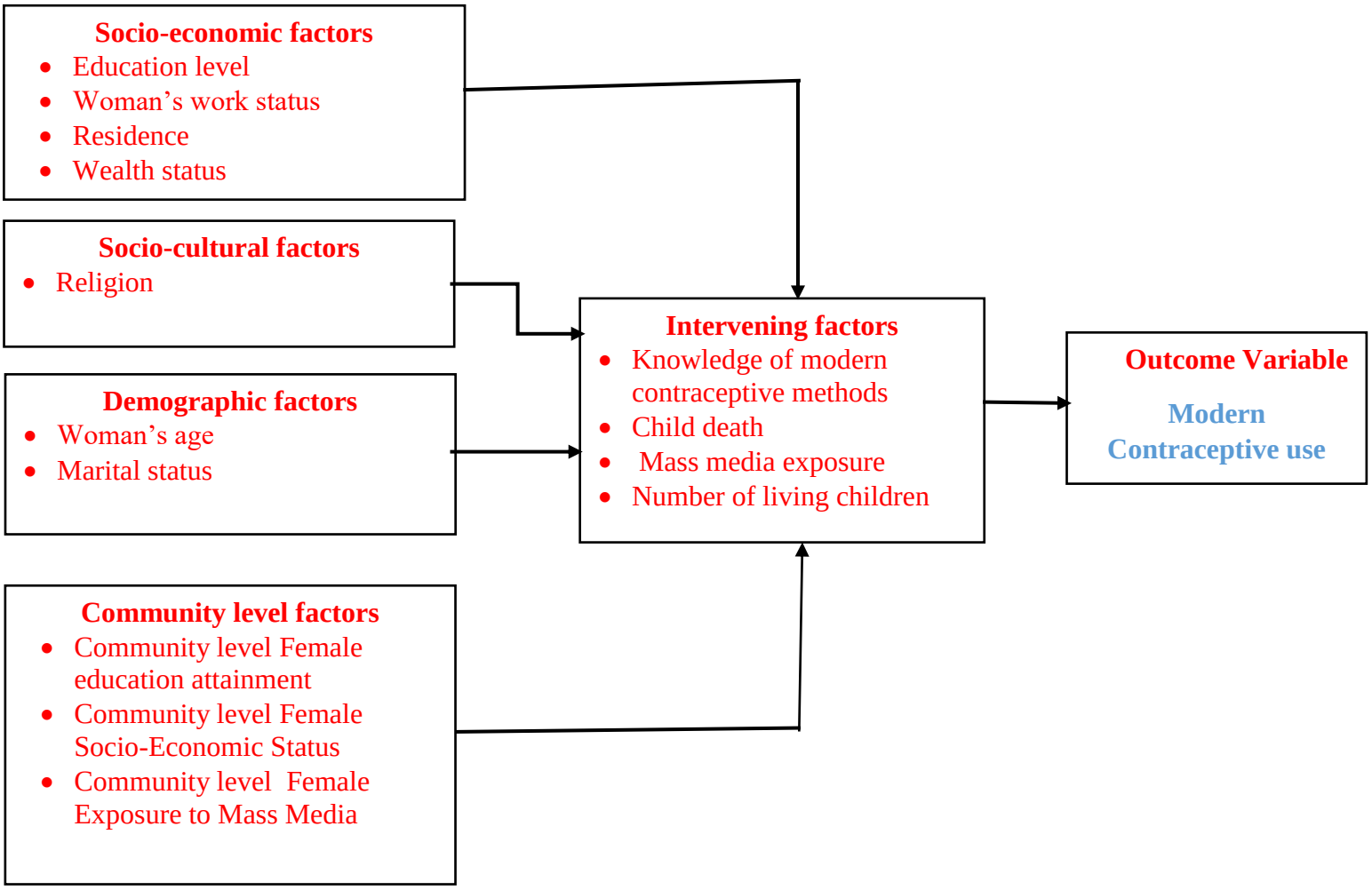

Figure 2.2: Operational Framework
Source: Adopted from Bongaarts Framework (1978)

2.5.1 Definition of variables

Modern contraceptive use is the study's dependent variable, derived from KDHS woman survey. Women between the ages of 15 and 24 who said they used modern methods was coded 1, while those who said they used traditional or folkloric was coded 0.

Five independent variables were put together: Socio-economic, socio-cultural, demographic, intervening, and community level variables. The variables are described below;

Education level: refers to the respondent's level of education attainment among young woman. Three dummy variables were used to classify it: 1 for no education, 2 for primary education, and 3 for secondary education and higher. Category of no education is the reference category.

Woman's work status: is the employment status of young women in terms of whether they are working or not working, categorized as 0=Not working, and 1=Working. Not working is the reference category.

Wealth status: refers to a cumulative measure of a household standard of living, with 1 denoting the poorest conditions, 2 the poorer, 3 the middle, 4 the richer, and 5 the richest. The benchmark category is the poorest group.

Residence: This is the respondents' present residence as of the survey's execution. This variable was categorized as 1 =Rural and 2=Urban. Reference category is rural.

Religion: This refers to the religious faiths to which the respondent (young woman) belonged. In this study, religion was categorized as 0=No religion/Other 1=Christian and 2=Muslim. No religion/other is the reference category.

Woman's age: This is the respondent's age (young woman) as of the interview date, expressed in complete years. In this study, age was classified as 1=15-19 and 2=20-24. Those aged 15-19 is the reference category.

Marital status: This refers to the respondents' marital status at the time of the survey. It was coded as 1=Not married/Divorced/Separated 2=Married. Not married is the reference category.

Knowledge of modern contraceptives: This refers to whether the respondent knows various modern methods of contraceptives. In this study, this variable was coded 0=knows no method, 1= knows at most five modern methods, and 2=Knows at least six modern methods. Category knows no method is the reference category.

Child death: refers to whether the respondent (young woman) experienced child death. It was coded as 0=Yes and 1=No. Reference category are those who experienced child death.

Exposure to mass Media: This relates to how often the respondent engages in one of the three media activities asked about: newspaper reading, radio listening, and television viewing. The responses of young women were categorized as 1 exposed for those who responded yes read newspapers or magazines, tuned in to the radio or viewed television on a weekly basis, and 0 for Not exposed for those in all of the activities that is read newspaper, listened radio and watched TV. Reference category is Not exposed.

The number of living children: The total number of children still alive at the time of the survey and borne to young mothers in the sample. It was categorized as 0=None, 1=1-2, 2=3-4, and 3=5+. None is the reference category.

Community-level variables

To calculate the community-level variables, this study used the identifiers for the primary sampling units or clusters used in the representative communities of each respondent's residence taken from the Kenya Demographic and Health Survey of 2014. The individual-level factors of all women aged 15-49 years in each community (primary sampling unit or cluster) were therefore averaged to create all community-level variables. The aggregated numbers were subsequently categorized as either low or high, based on whether the cluster means or proportions fell below or exceeded the national average.

Community level of women's educational attainment: This refers to the average educational level achieved by women within a specific community or geographical area. It represents the overall educational status of women in that community and is typically measured by aggregating individual-level data in each cluster on educational attainment (Ejembi et al., 2015). The national average was used to categorize community education attainment into low and high, that is those below the national average were coded 0=Low and those above the national average were coded 1=High.

Community level of women's socioeconomic status: refers to the total assessment of women's economic status or wealth in a given locality or region. It provides insights into the overall economic well-being and wealth distribution among women in that community. This was computed by aggregating wealth quintile index at national level for all individual women then the aggregated clusters were categorized as 0=Low for those below the national average and 1=High for those above the national average (Abate & Tareke, 2019).

Community level of women's mass media exposure: refers to the overall degree of access and exposure that women within a given community have to different forms of mass media, like television, radio, and newspapers. It was calculated using the three factors that make up mass media exposure: The frequency of radio listening, television watching, and newspaper reading. The values were combined and classified as follows: 0=low exposure and 1=high exposure based on the national average (Mutumba et al., 2018).

Table 2.1: Summary description of operational variables

Variables	Description	Measures
Dependent Variable		
Modern contraceptive use	Use of current modern contraceptive by young women	0= Not using 1= Using modern method
Independent variables		
Socio-economic		
Education Level	Respondent's highest level of education attained	1=No education 2=primary level 3=Secondary/higher level
Woman's work status	Status of woman'semployment in terms of whether she had any work	0=Not working, 1=Working
Wealth Status	The cumulative measure of a household standard of living	1= Poorest 2=Poor 3= Middle 4=Richer 5=Richest
Residence	Respondents' current address at the time of the survey.	1=Rural 2=Urban
Socio-cultural		
Religion	Self-reported Religious Group	0=No religion/Other 1= Christian 2=Muslim
Demographic		
Woman's age	Respondent's age as self-reported during the interview.	1=15-19 2=20-24
Marital status	Respondents (young woman) marital status	1Not married/divorced/separated 2=Married
Intervening		
Knowledge of modern contraceptive	Respondent's knowledge of various modern methods of family planning	0=Knows no method 1=Knows at most five modern methods 2= Knows at least six modern methods
Child death	Refers to whether a respondent experienced a child death	0=Yes 1=No
Exposure to Mass Media	The proportion of respondents who regularly watch TV, listen to the radio, or	0=Not exposed 1=Exposed

	read newspaper.	
Number of living children	The total number of live births to young women at the time of the survey.	0=None 1=1-2 2=3+

Table 2.1: Continued..

Variables	Description	Measures
Community level		
Community level of women's educational attainment	The percentage of women within the community who have achieved at least a secondary education.	0=Low 1=High
Community level of women's socioeconomic status	The percentage of women from households in the highest wealth quintile.	0=Low 1=High
Community level of women's exposure to mass media	Proportion of women in the community with contact with mass media	0=Low 1=High

CHAPTER THREE
METHODOLOGY

3.1 Introduction

An overview of the data sources and research methodologies employed are provided in this chapter. Section 3.2 present the data sources, while Section 3.3 presents the analysis methods.

3.2 Data Source and Sample

This study's data came from the Kenya Demographic and Health Survey (KDHS) 2014, carried out by the Kenya National Bureau of Statistics (KNBS) in collaboration with the Ministry of Health and a number of other institutions/organizations. As part of the global Demographic and Health Surveys Program, the KDHS provides thorough data on a range of health-associated subjects, such as family planning and reproductive health.

Data from a nationally representative sample of households were gathered for the 2014 KDHS using a stratified two-stage sampling design. The first stage involved selecting enumeration areas, and the second involved selecting randomly a set number of households within each cluster. To collect information on various health indicators, such as contraceptive use, face-to-face interviews were conducted with eligible women aged 15 to 49 years. The study utilized data from KDHS survey conducted between January and December 2014. The KDHS data from 2014 includes information on family planning, reproductive health, maternal and child health, and other demographic statistics. The study evaluated the factors influencing how young women, both married and single, aged 15 to 24, who had engaged in sexual activity but were not pregnant when the survey was conducted, utilized modern contraception. The study excluded young women who were older than 25 years old, pregnant, or not sexually active. As a result, 6,467 young women who met the criteria formed the final sample and data of these respondents were analyzed. The 2014 KDHS used a rigorous sampling design to ensure the sample's representativeness at the national, county and regional levels. Therefore, the results of this study can be generalized to the population of young, married and single women in Kenya who are sexually active but not pregnant and aged between 15 and 24 years.

3.4 Methods of Data Analysis

The study utilized bivariate and a three level mixed effects multi-level binary logistic regression as the primary data analysis methods. Distribution of respondents by background characteristics was done using descriptive statistics. It was presented using frequencies, and percentages to provide an overview of how the respondents were distributed. The methods of analysis used are described below.

3.4.1 Cross Tabulation

A cross-tab was used to ascertain the relationship between the independent and dependent variables. The statistical significance of these associations was determined by testing their independence at a P-value less than 0.05 using Pearson's chi-square. When the calculated probability value (p-value) is equal to or less than the predetermined significance level (0.05), it shows that the dependent and independent variables have a strong statistical relationship. Conversely, if the estimated probability value is greater than 0.05, there may not be a statistically significant correlation between the dependent and independent variables. The chi-square test statistic formula is as follows (White & Korotayev, (2004):

$$\chi^2 = \frac{\sum_{i=1}^{r}\sum_{j=1}^{c}(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where,

i=1 ----------, r

j=1 ----------, c

O_{ij} -frequency as observed.

E_{ij} -Expected frequency assuming independence.

r - The row number of categories of the independent variables.

c - The column number of categories of the dependent variable.

3.4.2 Multilevel logistic regression

A three-level, multilevel binary logistic regression model was used to examine the association between young women's use of modern contraceptives and a range of factors, including socioeconomic, cultural, demographic, intervening, and community influences. The Kenya

Demographic and Health Survey dataset's hierarchical structure led to the selection of this analysis method. In the context of this research, organization of the data was done in a layered manner, where individual respondents (young women) were grouped within primary sampling units (clusters), and these clusters were further nested within geographic units called counties. This arrangement reflects a multilevel or nested data structure that acknowledges the existence of different levels of grouping or clustering, allowing for the examination of both individual-level characteristics and contextual factors at the cluster and county levels. The fixed and random effects sub models make up the multilevel mixed-effect logistic model (Fielding & Goldstein, 2003). It is represented as indicated below:

$$Log\left[\frac{\pi_{ijk}}{1-\pi_{ijk}}\right] = \beta_0 + \beta_1 X_{1ijk} + ...\beta_n X_{nij} + u_{jk} + v_k$$

Where,

π_{ij}represents the proportion of young women (15–24 years) who use modern contraceptive methods.

$(1-\pi_{ij})$ the proportion of women who do not use a modern contraceptive method.

β_0 represents the "intercept coefficient".

$\beta_1 \ldots\ldots \beta_n$ are the determinants at the individual, community, and county levels

$X_{1ij} \ldots\ldots X_{nij}$ Constitute independent variables for both individuals and counties.

U_{jk} are cluster-level random errors

v_k are random errors at county levels

Odds ratios were used to evaluate the influence of the fixed portion of the model, and was attained by running logistic regression while controlling for confounders. On the other hand, the impact of the random component of the model (cluster and county variation, ujk) was assessed using intra-cluster correlation coefficients (ICC). The proportion of variance between clusters to total variance (inter- and intra-cluster) is known as the intra-cluster correlation coefficient (ICC), and it varies from 0 to 1. When the ICC value is 0, it means that individuals in clusters are less similar to one another than individuals in other clusters. This indicates that there is not much variation among clusters. On the other hand, an ICC score of 1 demonstrates strong

homogeneity within clusters and suggests that people within the same cluster share similar results (Killip et al., 2004). It is represented mathematically as rho (ρ):

$$\rho = \frac{\sigma\mu^2}{(\sigma\mu^2 + \frac{\pi^2}{3})}$$

Where $\sigma\mu^2$ is the difference between clusters i and $\pi^2/3$ is the difference within clusters. It is presumed that variation among young women within a cluster (i.e., within-cluster variation) is constant, estimated at $\pi^2/3$. Variance's proportional change (PCV) was also used to measure the contribution of cluster and county effect on use of contraception by young women. It was computed using the "empty" or "null" model as a base. It is computed mathematically as:

$$PVC = \left(\frac{V_e - V_{mi}}{V_e} \right)$$

Where;

V_e"is the variation in young women's contraception use in the null model".

V_{mi} is the difference between "young women's contraceptive use in model MI" (or subsequent model).

Four models were analyzed as follows;

Model 1: This model included the null model without explanatory variables. This model tested the random effect variance between counties and clusters in modern contraceptive methods used by young women.

Model 2: This model contained null, socio-economic, socio-cultural, and demographic variables.

Model 3: This model contained null, socio-economic, socio-cultural, demographic variables and community level.

Model 4: This model contained null, socio-economic, demographic, socio-cultural, community, and intervening variables.

AICs and log-likelihood were used to determine which of the four models best fit the data. The most suitable model was determined to be the one with the highest log likelihood value and the lowest Akaike's criterion information value. An indication that the model could better explain the variation in use of recent contraceptives by Kenyan young women. This does not exclude other

adapted models; rather, it simply illustrates the most appropriate model for capturing the differences in modern contraceptive method use among young women in different counties and clusters/communities.

The analysis in this study was conducted using SPSS version 25, a statistical program for social scientists. To assess fixed and random effects, a Generalized Linear Mixed Models (GLMM) at multivariate level was fitted. The fixed effects provided the strength of association in each of the variables while the random effects provided the extent of variation across Counties and clusters/communities. The use of multilevel modelling provided the estimation of variation across counties and communities on how modern approaches of contraception are used by young women. Additionally, it adjusts the predicted standard errors to account for observed clustering within and between communities as well as within and between counties (Goldstein, 2011) compared to the regression analysis method hence reducing the errors that could arise from misestimating of odds ratios among variables.

To assess multicollinearity between the independent and dependent variables, regression analysis was performed using the variance inflation factor (VIF). Results did not show the existence of multi-collinearity among variables. For each variable, the tolerance was greater than 0.2 and the variance inflation factor (VIF) was less than five. To analyze and interpret the results of multilevel mixed-effects binary logistic regression, one must understand how various factors contribute to the probability of an event occurring. In this type of analysis:

Coefficients and Odds Ratios: Coefficients associated with independent variables in the model provide insight into the direction and strength of their relationship with the dependent variable (modern contraceptive use). These coefficients are used to calculate odds ratios, which show how the odds of an event change with a one-unit increase in the independent variable.

Fixed Effects: The fixed effects portion of the model deals with individual-level predictors. Positive coefficients suggest a higher likelihood of the event (and odds ratios greater than 1), whereas negative coefficients indicate a decreased probability (and odds ratios less than 1).

Random Effects: The random effects account for variations across different levels of grouping, such as clusters or counties. These effects capture unobserved factors that contribute to the variability within these groups.

Intra-Cluster Correlation (ICC): The ICC shows the proportion of the total variance of the dependent variable that can be attributed to cluster variability. A higher ICC suggests that group membership (cluster) significantly influences the outcome.

Significance Levels: The p-values associated with coefficients indicate whether the effect of a predictor is statistically significant. A significant relationship is indicated by a p-value that is below the selected significance level, which is usually 0.05.

The following statistical hypotheses were tested in the study;

1) There is no statistical significance between socioeconomic, sociocultural, demographic, or intervening factors and the adoption of modern contraceptive methods by young Kenyan women.
2) There is statistical significance between factors at community level and the use of modern contraceptives by young Kenyan women.
3) There is no widespread variance in the use of modern contraceptive methods by young women in Kenyan counties and clusters.

3.5 Ethical Considerations

This study used secondary data from the 2014 KDHS; hence, no further approval was required since the data is available in the public domain and can be accessed through official request from MEASURE DHS website. The DHS also maintains the norms necessary to safeguard the respondent's confidentiality. To protect respondents' privacy, U.S. Department of Health and Human Services guidelines were followed. The research obtained the dataset from MEASREDHS for subsequent analysis using a formal access request.

CHAPTER FOUR
FACTORS INFLUENCING MODERN CONTRACEPTIVE USE AMONG YOUNG WOMEN IN KENYA

4.1 Introduction

The study findings are presented in this chapter. Section 4.2 describes the background and community-level characteristics, while section 4.3 presents findings of the relations between modern contraceptive use by young women and background and attributes at community-level. The results of the multivariate analysis are presented in Section 4.4.

4.2 Distribution of Young Women by Background and Community-Level Characteristics

In this study, the sample included 6,467 Kenyan young women aged 15 to 24 years who were sexually active but were not pregnant at the time the survey was conducted. The distribution of these women by their characteristics at the community level is shown in Table 4.1.

Results show that 42 percent of young women who had engaged in sexual activity but were not pregnant used modern methods of contraception. In terms of educational level, half of the respondents (50 percent) had achieved a secondary or university degree, and 45 percent had completed primary school. Most young women (78 percent) were not working, and only 22 percent reported working. Slightly above a quarter (26 percent) of the young women were from households of high wealth status, while 16 percent were from households of low wealthstatus. Fifty-five percent of the participants were residing in rural areas, and the remaining 45 percent were in urban areas. Nearly all young women (93 percent) in the sample were Christians, and only five percent were Muslims.

Most young women (71 percent) were aged 20-24. The proportion of those who were not married was slightly higher (51 percent) compared to those who were married (49 percent). Knowledge of modern contraceptive methods was high, with those who knew at least six methods being 82 percent, and 17 percent knew at most five modern contraceptive methods. About 63 percent of the young women had not experienced an infant death when the survey was conducted, while 37 percent had experienced an infant death. In terms of media exposure, nine out of ten young women had been exposed to mass media. More than half of young women (56 percent) had 1-2 living children.

Results associated to community-level characteristics showed that 67 percent of young women lived in clusters/communities where the majority of young women had at least secondary education. Nearly all of the young women (78 percent) lived in clusters/communities with high exposure to mass media. Additionally, about half of young women (49 percent) lived in communities with the highest socioeconomic status.

Table 4.1: Percent distribution of young women by background and community-level characteristics in Kenya

Characteristic	Percent	Number of Women
Dependent Variable		
Modern Contraceptive Use		
Using modern method	42.5	2745
Not using	57.5	3722
Socio-Economic		
Education level		
No education*	4.5	291
Primary	45.3	2932
Secondary/Higher	50.2	3244
Woman's Work Status		
Not Working*	78.2	5055
Working	21.8	1412
Wealth index		
Poorest*	15.5	1000
Poorer	18.1	1170
Middle	19.2	1242
Richer	21.6	1400
Richest	25.6	1655
Residence		
Rural*	55.3	3576
Urban	44.7	2891
Socio-cultural		
Religion		
No religion/Other*	1.8	118
Christian	93.0	6013
Muslim	5.2	336
Demographic		
Woman's Age		
15-19*	29.4	1902
20-24	70.6	4565

Table 4.1.- Continued

Characteristics	Percent	Number of Women
Current Marital status		
Not married/separated/divorced*	51.0	3300
Married	49.0	3167
Intervening		
Knowledge of Modern Contraceptive methods		
Does not Knowany modern methods*	1.2	75
Knows at most five modern methods	16.7	1082
Knows at least six modern methods	82.1	5310
Experience of Child Death		
Yes*	36.6	2368
No	63.4	4099
Mass media exposure		
Not exposed*	10.2	660
Exposed	89.8	5807
Number of Living Children		
None	36.6	2368
1-2	55.8	3610
3+	7.6	489
Community Level Characteristic		
Community Female Education attainment		
Low*	33.0	2136
High	67.0	4331
Community Female exposure to mass media		
Low*	21.6	1398
High	78.4	5069
Community Female Socio-economic status		
Low*	50.8	3282
High	49.2	3185
Total	**100.0**	**6467**

*** - reference category**
Source: Analysis of 2014 KDHS

4.3Associations between Individual and Community Level Factors and the Use of Modern Contraceptives Among Young Women in Kenya

The goal of the study was to determine whether there was a correlation between the use of modern contraceptives by young women in Kenya and selected individual (socio-cultural, socio-economic, demographic, and interpersonal) and community characteristics. The results are

presented in Table 4.2. The Chi-square test statistic was employed to assess the statistical significance of the observed relationship.

The data shows that all socioeconomic characteristics relate to young women's use of modern contraceptives at a level of significance of $p<0.005$. Use of contraceptive methods among young women is higher among those who have attained primary education level (46 percent), compared to young women without formal education, 42 percent of those with at least a secondary school education used modern contraceptives. Young women's employment status and their use of modern birth control were significantly associated ($p < 0.000$). Forty-eight percent of young women who reported working used modern contraception in comparison to 41 percent of those not working. The percentage of young women who reported using a modern method of contraceptives ranged from 42 percent in the highest-wealth status households to 28 percent in the lowest-wealth status households. There was a significant correlation between where a young woman lives and her use of modern contraceptives: Forty six percent of young women in urban regions and 39 percent of young women in rural areas used contraceptives. Modern contraceptive use among young women was substantially associated with sociocultural characteristics. Young Christian women are more likely to use contraceptives than young Muslim women, 44 percent and 27 percent, respectively. All demographic factors were found to be significantly associated with young women's use of modern contraceptives. The probability of a woman using modern contraceptive methods increased with age, from 28 percent among 15- to 19-year-old women to 48 percent among 20- to 24-year-old women. The probability of women using modern contraceptives also associated with marital status. Table 4.2 reveals that the percentage of married young women using contraception was 57 percent of the population, while the proportion of single women was 28 percent. All intervening variables were significantly associated with modern contraceptive use. The use of modern contraceptives was associated to increased media exposure among young women, as shown in Table 4.2. The number of children alive was also associated with the use of modern contraceptives, with contraceptive use increasing as the number of children born to young women increased. Likewise, young women's use of modern contraceptives was associated with their experience of infant death.

The results showed that compared to women who had experienced infant loss (21.3 percent), those who had not experienced infant death were more likely to use modern contraceptives (54.7 percent). Young women's contraceptive use was significantly influenced by all community-level factors (P < 000). An indication that the environment where a young woman lives influences her contraceptive behavior. The percentage of young women in communities/clusters with higher educational attainment equivalent to at least secondary school had a higher chance of using modern methods of contraception (46 percent), compared to their peers from communities with low educational attainment at primary level and below (36 percent). On the other hand, young women living in communities with greater media exposure were more likely to use modern contraceptive approaches compared to their peers in communities with lower socioeconomic status and lower media exposure.

Table 4.2: Percent distribution of young women age 15-24 who have ever had sex and not pregnant by modern contraceptive use according to individual and community level characteristics

INDIVIDUAL CHARACTERISTICS	Modern Contraceptive Use		Chi-squared test		Total(N)
	Not using (%)	Using modern method (%)	χ^2 Value	P-Value	
SOCIO-ECONOMIC					
Education level					
No education	87.6	12.4	126.118	0.000	291
Primary	53.7	46.3			2932
Secondary/Higher	58.3	41.7			3244
Woman's Work Status					
Not Working	59.2	40.8	25.284	0.000	5055
Working	51.7	48.3			1412
Wealth index					
Poorest	71.8	28.2	106.422	0.000	1000
Poorer	54	46			1170
Middle	53.8	46.2			1242
Richer	53.4	46.6			1400
Richest	57.8	42.2			1655
Residence					
Rural	60.7	39.3	33.635	0.000	3576
Urban	53.6	46.4			2891
SOCIO-CULTURAL					
Religion					
No religion	73.7	26.3	48.555	0.000	118
Christian	56.4	43.6			6013
Muslim	72.9	27.1			336

Table 4.2.- Continued.

INDIVIDUAL CHARACTERISTICS	Modern Contraceptive use		Chi-squared test		Total (N)
	Not using (%)	Using modern method (%)	χ^2 Value	P-Value	
DEMOGRAPHIC					
Woman's age					
15-19	71.6	28.4	218.344	0.000	1902
20-24	51.7	48.3			4565
Current marital status					
Not married	71.8	28.2	563.793	0.000	3299
Married	42.6	57.4			3168
INTERVENING					
Knowledge of modern contraceptive methods					
Does not know	89.3	10.7	200.091	0.000	75
Knows at most 5 methods	75	25			1082
Knows at least 6 methods	53.5	46.5			5310
Child death					
Yes	78.7	21.3	682.645	0.000	2368
No	45.3	54.7			4099
Exposure to mass media					
Not Exposed	70.2	29.8	47.750	0.000	660
Exposed	56.1	43.9			5807
Number of Living Children					
None	78.7	21.3	682.655	0.000	2368
1-2	45.3	54.7			3609
3+	45.7	54.3			488
COMMUNITY LEVEL CHARACTERISTICS					
Community Female Education attainment					
Low	62	38	36.412	0.000	2623
High	54.5	45.5			3844
Community Female exposure to mass media					
Low	69.6	30.4	105.935	0.000	1398
High	54.2	45.8			5069
Community Female Socio-economic status					
Low	61.6	38.4	44.333	0.000	3282
High	53.4	46.6			3185
TOTAL					**6467**

Source: Analysis of 2014-KDHS.

4.4 Multilevel Logistic Regression Analysis of Factors Influencing Modern Contraceptive Use among Young Women in Kenya

In this section, results of the multilevel analysis are presented, along with how the odds ratio and level of significance were used to either confirm or reject the study's hypothesis with respect to the objectives. This was accomplished by fitting four regression models to determine the random and fixed effects of modern contraceptive use or nonuse by young women in different counties and communities. Due to the hierarchical structure of the dataset, multilevel modeling was used to determine the effect of community and county-level factors on young Kenyan women's use of modern contraceptives. Additionally, this approach reduces anticipated standard errors for the grouping individuals into communities or clusters (Goldstein, 2011). Furthermore, multilevel regression modeling helps in estimating variation in modern contraceptive use across communities (clusters/PSUs) and counties. The differences illustrate that even after considering the criteria, modern contraceptive use still varied.

The four regression models were fitted using the SPSS version 25. Model 1; the null model, included no predictors and assessed differences in use of modern contraceptive methods between counties and clusters through analysis of intercepts and random variances. Model 2 contained socioeconomic, sociocultural, and demographic factors, while Model 3 included variables at the community, socioeconomic, and cultural levels. All variables associated to communities, demographics, socioeconomics, sociocultural, and intervening were integrated into the final model 4 (Table 4.3).

Findings on the estimates of random intercept variance across counties and clusters/communities presented in Model 1 shows significant variations in use of modern contraception by young women within counties and clusters. However, high variations are observed mainly at the County level compared to the clusters/communities. The findings showed a variance of 0.579 at County level and 0.123 at cluster level. This suggests that the overall variance in young women's likelihood of using modern contraceptives varied by 15% (ICC=0.15) and 4% (ICC=0.036) by county and cluster/municipality, respectively.

Model 2 included socioeconomic, sociocultural, and demographic variables to investigate their effects on use of modern contraceptives by young women. This model took into account employment status, religion, woman's age, wealth index, education level, place of residence, and marital status at the time of analysis. Statistically significant variables included the woman's age, marital status, wealth index, work status, education level, and place of residence. Level of education also had an impact on the likelihood of using contraception.

Compared to young women with secondary and higher education (OR=4.190), women with only primary school education were more likely to use modern contraception (OR=4.563). Young women's use of modern contraceptives was also significantly influenced by their employment status, with employed women being more likely to use modern contraceptives (OR=1.3) than unemployed women. Women's socioeconomic status was positively associated with modern contraceptive use. Compared to women in low-income households, women from middle-income households (OR=1.683) and wealthier households (OR=1.391) were more likely to use modern contraceptive methods. Modern contraceptive use was strongly linked to where one lived. However, modern contraceptive use was lower (OR = 0.756) among young urban women than among women living in rural regions, which is contrary to the usual pattern. The results also showed statistical significance between age of the woman and use of modern contraception. Compared to women aged 15 to 19, women in the 20 to 24 age group were 1.9 times more likely to use modern contraceptives. Marital status increases the likelihood of using modern contraceptives. Compared to married and single young women, married women were three times more likely to use modern contraceptives. Regarding random variability, this model explained 62 percent of the variances in the county-level use of modern contraceptive and 13 percent at the community or cluster level. This indicates that the variables incorporated in model 2 are essential for comprehending the reasons behind the adoption of modern contraception methods by young women in Kenya. The disparity in contraceptive utilization decreased from 0.579 to 0.219 at the county level and from 0.123 to 0.107 at the cluster level, indicating the significance of socioeconomic, sociocultural, and demographic factors in comprehending Kenya's contraception use trends.

Model 3 examined how community factors influence young women's use of modern contraceptives. In this study, three community-level factors were examined, which included the educational accomplishment of women in the society, their exposure to media, and their socio-economic status. Of the three variables, the only variable found to be associated with young women's use of modern contraception was women's level of media exposure at the community level. According to the results, young women residing in communities where the highest proportion of their peers were exposed to media through radio, newspaper reading, and television watching had a 1.5 times greater likelihood to use modern contraceptives than young women who lived in communities where the lowest percentage of young women had no exposure to media at all. The random effects both at the cluster and county levels are also observed to decline from 0.219 to 0.158 at county level and from 0.107 to 0.106 at cluster level, a sign that community level factors play a significant role in explaining the variations in young women's contraceptive adoption at the county and cluster levels.

Final model, Model Four, included all independent variables, including socioeconomic, demographic, sociocultural, community, and intervening variables. A number of intervening factors were statistically significant in relation to young Kenyan women who use modern contraception, including knowledge of contraceptive methods, exposure to family planning messages from newspapers and television, and the total number of living children. As young women became more knowledgeable about a wider range of modern contraceptive methods, their use of modern contraceptives increased. The results showed that young women who had knowledge of at least six modern methods were five times more likely to use modern methods than those who had no knowledge of any modern method. Exposure to family planning messages in the media increased the likelihood that young women would use contraceptives. Compared to their peers who did not have access to the media, young women who did have access were 1.2 times more likely to use modern contraception. It was found that the number of live births among young women was statistically significant with the use of modern contraceptives. Compared to childless women, young women with more than three living children were five times more likely to use modern contraception. The variation at county and cluster level continued to decline and stood at 0.127 at county level and 0.099 at cluster level. An indication that awareness of modern contraceptives, media exposure and the number of live births are significant factors contributing

to the variation in contraceptive acceptance among young Kenyan women at both cluster/community and county levels. This is confirmed by the proportional change in variance (PCV) observed at the county and cluster levels, which suggests that the addition of intervening variables such as awareness of modern contraceptives, exposure to mass media and the number of children still alive could account for 20 percent and 7 percent of the variance in young women's use of modern contraceptives. This shows that intervening variables are important predictors of modern contraceptive use among young women across counties, clusters and communities in Kenya. The socioeconomic, demographic, sociocultural, and communal components exhibited a constant direction of relationship, despite a decrease in the intensity of correlation. The drop in the variances at the county and cluster levels suggests that intervening factors have an impact on community-level, demographic, socio-cultural, and socio-economic factors, which in turn have an impact on young women's perceptions on contraception use.

To evaluate the goodness of fit, the model with the highest log likelihood and lowest Akaike information criterion was determined to be the best fitting model. With a log-likelihood of -14106.69 and an AIC of 28217.38, model 2 was chosen as the ideal model in this study. This implies that model 2 was superior to the other models in predicting the variables that affect young women in Kenya who use modern contraception. However, this does not render other models meaningless, but it only shows that the community level factor fitted explains the greatest variations observed.

Table 4.3: Multilevel regression results assessing the influence of individual and community characteristics on Modern contraceptive use among young women in Kenya, 2014 DHS

Variables	Model 1		Model 2		Model 3		Model 4	
	Coefficients		Coefficients		Coefficients		Coefficients	
	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio
Intercept	-0.602(0.1157)	0.548	-3.633(0.2980)	0.026	-3.934(0.3002)	0.020	-5.708(0.5243)	0.003
Random Variance								
County Variance	0.579(0.147)		0.219(0.070)		0.158(0.053)		0.127(0.043)	
Cluster Variance	0.123(0.041)		0.107(0.045)		0.106(0.045)		0.099(0.047)	
County PCV (%)	Reference		62.2		27.9		19.6	
Cluster PCV (%)	Reference		13.0		0.9		6.6	
Goodness of Fit								
Log-likelihood	-13556.16		-14106.687		-14120.250		-14476.136	
AIC	27116.32		28217.376		28244.501		28956.274	
Socio-Economic Characteristics								
Education level								
No education (ref)			-	-	-	-	-	
Primary			1.518(0.1689)	4.563**	1.466(0.1692)	3.893**	1.233(0.1751)	3.432**
Secondary/Higher			1.433(0.1771)	4.190**	1.359(0.1780)	4.332**	1.295(0.1871)	3.650**
Woman's Work Status								
Not Working (ref)			-	-	-	-	-	
Working			0.250(0.0714)	1.284**	0.250(0.0715)	1.284**	0.186(0.0735)	1.205**
Wealth index								
Poorest (ref)			-	-	-	-	-	
Poorer			0.434(0.1021)	1.543**	0.352(0.1034)	1.422**	0.323(0.1058)	1.381**
Middle			0.520(0.1050)	1.683**	0.389(0.1082)	1.476**	0.373(0.1123)	1.452**
Richer			0.330(0.1114)	1.391**	0.135(0.1204)	1.144	0.195(0.1251)	1.216
Richest			0.136(0.1256)	1.146	-0.098(0.1368)	0.907	0.030(0.1427)	1.031

(Continued...)

Table 4.3.-Continued.

Variables	Model 1		Model 2		Model 3		Model 4	
	Coefficients		Coefficients		Coefficients		Coefficients	
	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio
Residence								
Rural (ref)			-	-	-	-	-	
Urban			-0.280(0.0756)	0.756**	-0.164(0.0825)	0.849*	-0.155(0.0845)	0.856
Socio-cultural Characteristics								
Religion								
No religion (ref)			-	-	-	-	-	
Christian			0.468(0.2353)	1.597*	0.466(0.2357)	1.594*	0.479(0.2403)	1.615*
Muslim			-0.078(0.2690)	0.925	-0.056(0.2682)	0.945	-0.028(0.2724)	0.973
Demographic Characteristics								
Woman's Age								
15-19 (ref)			-	-	-	-	-	
20-24			0.628(0.0696)	1.873**	0.623(0.0698)	1.864**	0.262(0.0750)	1.300*
Current Marital status								
Not married (ref)			-	-	-	-	-	
Married			1.267(0.0647)	3.551**	1.281(0.0649)	3.602**	0.792(0.0705)	2.207**
Intervening Factors								
Knowledge of Modern contraceptive methods								
Knows No method (ref)							-	
Knows at most 5 methods							0.824(0.4507)	2.280**
Knows at least 6 methods							1.408(0.4485)	4.086**

(Continued...)

Table 4.3.-Continued

Variables	Model 1		Model 2		Model 3		Model 4	
	Coefficients		Coefficients		Coefficients		Coefficients	
	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio	β(SE)	Odds ratio
Mass media exposure								
Not Exposed (ref)							-	
Exposed							0.188(0.1105)	1.207**
Number of Living Children								
None (ref)							-	-
1-2							1.367(0.0818)	3.925**
3+							1.646(0.1345)	5.185**
Community Level Characteristic								
Community Female Education attainment								
Low (ref)					-		-	
High					0.108(0.0817)	1.114	0.149(0.0838)	1.160
Community Female Socio-Economic Status								
Low (ref)					-		-	
High					0.121(0.0991)	1.129	0.120(0.1015)	1.127
Community Female Exposure to Mass Media								
Low (ref)					-		-	
High					0.429(0.0898)	1.536**	0.379(0.0932)	1.461**

Source: Analysis of 2014 KDHS

Key

P<0.05*, P<0.01**

PCV= Proportional Change in Variance

AIC=Akaikes Information Criterion

4.5 Discussion

This study assessed the factors that influence modern contraceptive use among Kenyan young women who were sexually active but not pregnant at the time of the survey. Modern contraceptive use among young women in Kenya was hypothesized to be influenced by socioeconomic, sociocultural, demographic, intervening, and community factors. Additionally, it was predicted that there would be variations in the way women use modern contraceptives across different counties and clusters. The results of this study supported these hypotheses as all socio-cultural, socioeconomic, intervening, demographic and community factors showed a significant relationship with contraceptive use by young Kenyan women at the bivariate level. Nevertheless, multilevel analysis revealed that some of the factors did not exhibit statistical significance. These included religion particularly those who were affiliated to Muslim religion and wealth status more so women from richer and wealthiest households as well as community female level of education attainment and socio-economic status. As previously hypothesized, the results of the multilevel analysis confirmed the existence of variance between counties and communities in the use of modern contraceptives.

Modern contraceptive use among young women in Kenya was established to be statistically associated with women's education level, employment status and place of residence in both bivariate and multilevel models. These results are in line with those of an earlier study conducted in Mali by Ahinkorah (2020), which aimed to identify the factors influencing the use of modern contraceptives by young women. The Mali study found that individual characteristics such as education level, employment status, wealth quintile and place of residence were associated with the use of modern contraceptives by teenage girls and young women. Similar results have been observed in other studies on young women's use of modern contraceptives, including those by Ngome & Odimegwu (2014), Ejembi et al. (2015) and Ahinkorah (2020).

According to the results of this study, there appeared to be no significant relationship between the use of modern contraceptives and religion. These outcomes agree with a study by Ngome and Odimegwu (2014), who found that religion had no significant impact on the uptake of modern contraceptives by teenage girls in Zimbabwe. It's important to remember that other research has

shown that religious affiliation is a significant factor in how often women use contraception (Ahinkorah, 2020; Rosenberg et al., 2009).

According to this study, age and marital status of women are demographic characteristics that influence how frequently young women in Kenya use modern contraception. The results suggest that a woman's likelihood of using modern contraceptives depends largely on her age and marital status. In particular, married women aged 20 to 24 showed a higher propensity to use modern contraceptives. These findings are consistent with Ngome and Odimegwu's (2014) research in Zimbabwe, who examined the social setting of young women's use of modern contraceptives. The Zimbabwean study found a link between marital status and a higher probability of using modern contraceptives. Another study by Ahinkorah (2020), which examined factors predicting modern contraceptive use among young women and girls in sub-Saharan Africa, confirmed these results. Ahinkorah's study found that teenage girls aged 15 to 19 were less likely to use modern contraceptives than young women aged 20 to 24. To explain this age-associated disparity, Ahinkorah suggested that women between the ages of 20 and 24 might be more aware of the risks of having sex without contraception than women between the ages of 15 and 19.

The results of the study showed that exposure to mass media, number of children still alive, and knowledge of modern contraceptive methods had a significant impact on young women's use of modern contraceptives in Kenya. Young women were 4.1 times more likely to use modern contraceptives among those who knew at least six methods than those who didn’t know modern methods. In addition, an increase in the number of children was associated with an increased likelihood of young women using modern contraceptives. Likewise, exposure to mass media increased the probability that young women would use modern contraceptives. These results agree with a study conducted in Nepal by Sharma et al., (2011), which noted that women were more probable to use modern contraceptives when they obtained family planning information from television, radio, and medical facilities. Researchers have found that women are more likely to use modern contraceptives as the number of children increases (Almalik et al., 2018; Bulto et al., 2014; Withers et al., 2010).

Finally, researchers have demonstrated that familiarity with modern contraceptive methods increases women's likelihood of contraceptive use, as shown in studies by Ahinkorah et al. (2020) and Nsanya et al. (2019).

Regarding community-level variables, the study established a significant relationship between women's media exposure in the community and modern contraceptive use. This shows that women's media exposure in the community has a significant impact on young women's reproductive behavior. These results are in line with earlier research that showed an association between media exposure to reproductive health messages at the community level and women's likelihood of using contraceptives (Elfstrom& Stephenson, 2012; Stephenson et al., 2008).

The study found no evidence of an association between young women's use of modern contraceptives and women's educational attainment in the community. This finding is consistent with Ngome and Odimegwu's findings on the association between women's educational level in the community and adolescent contraceptive use. Due to the quantitative nature of the data, the study cannot provide concrete evidence to justify the observed correlation. However, Ngome and Odimegwu argue that education may not have a significant influence on pronatalist customs because young women are typically required to demonstrate their fertility potential by raising children once they join a union, and after the birth of a child, contraceptives become necessary. To fully understand how women's education in the community influences young women's reproductive behavior, further research is needed.

Findings from random intercept variance estimates at the county and cluster/community levels, showed a decline in variance across all models. In model 1, the variance was 0.579 (ICC=15%) at the county level and 0.123 (ICC=3.6%) at the cluster level. Similarly, in model 4, the variance decreased to 0.127 (ICC=3.7%) at the county level and 0.099 (ICC=2.9%) at cluster level. It is crucial to remember that most of the variations were observed at the county level, where the variances were higher compared to the clusters. The variations between counties can be attributed to technological advancements, such as the digitization of health services, as well as socio-economic differences across counties. These factors may affect the use of modern contraceptive methods, as suggested by classic transition theory (Landry, 1987). On the other

hand, the lower variation between clusters/communities may be due to the homogeneity in terms of cultural beliefs and practices within these communities. These findings align with other studies that have conducted multi-level analysis on variables that affect young women's use of modern contraception. Additionally, these investigations have noted a decline in the variances across different models (Mutumba et al. 2018, Ahinkorah et al. 2020; Debelew& Habte, 2021).

CHAPTER FIVE
SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1. Introduction

This chapter presents a summary, conclusion and recommendations based on the results of the study. The summary of the study findings are outlined in Section 5.2 below, and Section 5.3 presents the conclusion of the study. The study's recommendations are in Section 5.4.

5.2. Summary of the Study Findings

This study used a multilevel analysis of data from the 2014 Kenya Demographic and Health Survey to determine factors influencing young Kenyan women's use of modern contraceptive methods. The random effect results showed differences in the use of modern contraceptives between counties and clusters. The variation is attributed to the difference in socioeconomic status, socio-cultural, and developments across various counties and communities. Greater variation in modern contraceptive use was observed between counties, unlike between communities where the variations were less.

According to the study, young women in Kenya who have favorable socioeconomic status—including those associated to education, employment, and residence—are more likely to use modern contraceptive methods. At the bivariate level, young woman’s religious affiliation was significant; however, at the multilevel analysis, the strength of the association declined, and religion was deemed insignificant. Women's age and marital status were associated to modern contraceptive use. Young women's use of modern contraceptives was also influenced by intervening factors. There was a statistically significant relationship found between a woman's media exposure, the number of children she has, and her familiarity with modern contraceptive methods. These findings are consistent with other research on the variables affecting young women's use of modern contraceptives (Ngome & Odimegwu, 2014; Nsanya et al., 2019; Sserwanja et al., 2021).

5.3 Conclusion

According to the findings of this study, community level, socioeconomic, demographic, intervening, and demographic factors are the main factors influencing modern contraception use among Kenyan young women. Education level, woman's employment status, wealth index, place of residence, woman's age, marital status, media exposure, knowledge of contraceptive methods, the number of living children, and community-level media exposure among women were discovered to be significantly associated to modern contraceptive use. The use of modern contraceptive methods increased as young women grew older and more educated. Women who were working, married, and had more than three living children were more likely to use modern contraception than women who were jobless, unmarried, and had two or fewer children. Additionally, young women who were familiar with at least six modern methods of contraception were more likely to use them, an indication that awareness campaigns on family planning methods should target young women. These results are in line with those of other studies on the factors influencing young women's use of modern contraceptives (Kistiana et al., 2020; Mandiwa et al., 2018; Mutumba et al., 2018). The results are further consistent with the classic demographic transition theory underlying this study, which suggests changes observed at each stage of the transition, such as socioeconomic changes, which necessitated a decline in birth and death rates (R. D. Lee & Reher, 2011).

It can also be deduced that the differences observed among the young women within clusters and counties can be accounted for by factors at the community level, socio-cultural factors, socio-economic conditions, demographics, and intervening variables.

5.4 Recommendations

5.4.1 Recommendations for Policy and Programme

The study's findings indicated a statistically significant correlation between socioeconomic variables (such as educational achievement, employment status, and place of residence), demographic variables (including age and marital status), and intervening variables (such as familiarity with contraceptive methods, exposure to media, and number of living children) with the use of modern contraceptive methods among young females. The study examined the relative fluctuations in variance to assess the disparities in the utilization of modern contraceptive

methods among young women in various counties and communities in Kenya. Consequently, the research proposes the following recommendations:

The Government of Kenya, in collaboration with the Ministry of Health (MOH) and several development partners, should enhance mass education efforts to address the existing disparities in the use of modern contraceptive methods. The implementation of such educational initiatives should consider many factors that pertain to both the individual and community levels within the target demographic. Several factors should be considered, including the age, place of residence, education level, marital status, employment status, and total number of children alive.

It is recommended that the Government of Kenya to promote access to education among young women through scholarships and enforcing laws on barriers that hinder enrollment in order to enhance the multiplier effect of education on the use of modern contraceptives among young women. This is due to the positive correlation observed between individual women's educational achievement and their uptake of modern contraceptive methods.

Considering the statistical significance of exposure to mass media in relation to the utilization of modern contraceptives, the study recommends program implementers to undertake targeted family planning messaging through mass media channels, specifically radio, television, and newspapers.

5.4.2 Recommendation for further research

The research suggests that additional studies employing a qualitative approach should be conducted to obtain a deeper understanding of how factors like experiencing child loss, community-level education, and socioeconomic status influences the reproductive behaviors of young women.

References

Abate, M. G., & Tareke, A. A. (2019). Individual and community level associates of contraceptive use in Ethiopia: A multilevel mixed effects analysis. *Archives of Public Health*, *77*(1), 1–12.

Achana, F. S., Bawah, A. A., Jackson, E. F., Welaga, P., Awine, T., Asuo-Mante, E., Oduro, A., Awoonor-Williams, J. K., & Phillips, J. F. (2015). Spatial and socio-demographic determinants of contraceptive use in the Upper East region of Ghana. *Reproductive Health*, *12*(1), 29. https://doi.org/10.1186/s12978-015-0017-8

Ahinkorah, B. O. (2020). Individual and contextual factors associated with mistimed and unwanted pregnancies among adolescent girls and young women in selected high fertility countries in sub-Saharan Africa: A multilevel mixed effects analysis. *Plos One*, *15*(10), e0241050.

Ahinkorah, B. O., Seidu, A.-A., Appiah, F., Budu, E., Adu, C., Aderoju, Y. B. G., Adoboi, F., & Ajayi, A. I. (2020). Individual and community-level factors associated with modern contraceptive use among adolescent girls and young women in Mali: A mixed effects multilevel analysis of the 2018 Mali demographic and health survey. *Contraception and Reproductive Medicine*, *5*(1), 1–12.

Almalik, M., Mosleh, S., & Almasarweh, I. (2018). Are users of modern and traditional contraceptive methods in Jordan different. *Eastern Mediterranean Health Journal*, *24*(4), 377–384.

Appiah, F., Seidu, A.-A., Ahinkorah, B. O., Baatiema, L., & Ameyaw, E. K. (2020). Trends and determinants of contraceptive use among female adolescents in Ghana: Analysis of 2003–2014 demographic and health surveys. *SSM-Population Health*, *10*, 100554.

Asiimwe, J. B., Ndugga, P., Mushomi, J., & Manyenye Ntozi, J. P. (2014). Factors associated with modern contraceptive use among young and older women in Uganda; a comparative analysis. *BMC Public Health*, *14*(1), 926. https://doi.org/10.1186/1471-2458-14-926

Audu, B., Yahya, S., Geidam, A., Abdussalam, H., Takai, I., & Kyari, O. (2008). Polygamy and the use of contraceptives. *International Journal of Gynecology & Obstetrics*, *101*(1), 88–92.

Bongaarts, J. (1978). A framework for analyzing the proximate determinants of fertility. *Population and Development Review*, 105–132.

Bulto, G. A., Zewdie, T. A., & Beyen, T. K. (2014). Demand for long acting and permanent contraceptive methods and associated factors among married women of reproductive age group in Debre Markos Town, North West Ethiopia. *BMC Women's Health*, *14*(1), 46. https://doi.org/10.1186/1472-6874-14-46

Casey, S. E., Gallagher, M. C., Kakesa, J., Kalyanpur, A., Muselemu, J.-B., Rafanoharana, R. V., & Spilotros, N. (2020). Contraceptive use among adolescent and young women in North and South Kivu, Democratic Republic of the Congo: A cross-sectional population-based survey. *PLoS Medicine*, *17*(3), e1003086.

Cleland, J., Conde-Agudelo, A., Peterson, H., Ross, J., & Tsui, A. (2012). Contraception and health. *The Lancet*, *380*(9837), 149–156.

De Vargas Nunes Coll, C., Ewerling, F., Hellwig, F., & De Barros, A. J. D. (2019). Contraception in adolescence: The influence of parity and marital status on contraceptive use in 73 low-and middle-income countries. *Reproductive Health*, *16*(1), 21. https://doi.org/10.1186/s12978-019-0686-9

Debelew, G. T., & Habte, M. B. (2021). Contraceptive method utilization and determinant factors among young women (15-24) in ethiopia: A mixed-effects multilevel logistic regression analysis of the performance monitoring for action 2018 household survey. *BioMed Research International*, *2021*.

DESA, U. (2021). United Nations Department of Economic and Social Affairs/Population Division: World Population Prospects: The 2008 Revision. 2009b. *Reference Source*.

Ejembi, C. L., Dahiru, T., & Aliyu, A. A. (2015). Contextual factors influencing modern contraceptive use in Nigeria. *DHS Working Papers*, *120*.

Ekani-Bessala, M.-M., Carre, N., Calvez, T., & Thonneau, P. (1998). Prevalence and determinants of current contraceptive method use in a palm oil company in Cameroon. *Contraception*, *58*(1), 29–34.

Elfstrom, K. M., & Stephenson, R. (2012). The role of place in shaping contraceptive use among women in Africa. *PloS One*, *7*(7), e40670.

Endriyas, M., Eshete, A., Mekonnen, E., Misganaw, T., Shiferaw, M., & Ayele, S. (2017). Contraceptive utilization and associated factors among women of reproductive age group in Southern Nations Nationalities and Peoples' Region, Ethiopia: Cross-sectional survey, mixed-methods. *Contraception and Reproductive Medicine*, *2*(1), 10. https://doi.org/10.1186/s40834-016-0036-z

Fishbein, M., & Ajzen, I. (1977). *Belief, attitude, intention, and behavior: An introduction to theory and research*. https://philarchive.org/archive/FISBAI

Gayatri, M., & Utomo, B. (2019). Contraceptive method use in Indonesia: Trends and Determinants between 2007, 2012 and 2017. *Indian Journal of Public Health Research & Development*, *10*(12), 1818–1823.

Gichanga, F. (2011). *Factors influencing contraceptive use among married women in rural Kenya* [PhD Thesis, University of Nairobi, Kenya]. http://erepository.uonbi.ac.ke/handle/11295/6773

Goldstein, H. (2011). *Multilevel statistical models*. John Wiley & Sons.

Graff, M., & Bremner, J. (2014). *A practical guide to population and development*. Population Reference Bureau Washington, DC.

Heck, R. H., Thomas, S. L., & Tabata, L. N. (2013). *Multilevel and longitudinal modeling with IBM SPSS*. Routledge. https://books.google.com/books?hl=en&lr=&id=YQSCAAAAQBAJ&oi=fnd&pg=PP1&dq=Heck+et+al.,+2013.&ots=5PIWseBwP2&sig=on7VitBS2hebVAe6F0TtDZ8fOXU

Islam, A. Z., Mondal, M. N. I., Khatun, M. L., Rahman, M. M., Islam, M. R., Mostofa, M. G., & Hoque, M. N. (2016). Prevalence and determinants of contraceptive use among employed and unemployed women in Bangladesh. *International Journal of MCH and AIDS*, *5*(2), 92.

Jacobs, J., Marino, M., Edelman, A., Jensen, J., & Darney, B. (2017). Mass media exposure and modern contraceptive use among married West African adolescents. *The European Journal of Contraception & Reproductive Health Care*, *22*(6), 439–449. https://doi.org/10.1080/13625187.2017.1409889

Kafle, R. B. (2018). Dynamics of contraceptive use among young women in Nepal. *Nepal Population Journal*, *18*(17), 33–42.

Kawuki, J., Gatasi, G., Sserwanja, Q., Mukunya, D., & Musaba, M. W. (2022). Utilisation of modern contraceptives by sexually active adolescent girls in Rwanda: A nationwide

cross-sectional study. *BMC Women's Health*, *22*(1), 369. https://doi.org/10.1186/s12905-022-01956-y

Kidayi, P. L., Msuya, S., Todd, J., Mtuya, C. C., Mtuy, T., & Mahande, M. J. (2015). Determinants of modern contraceptive use among women of reproductive age in Tanzania: Evidence from Tanzania demographic and health survey data. *Advances in Sexual Medicine*, *5*(03), 43–52.

Kimani, M., Njeru, M., & Ndirangu, G. (2013). Regional variations in contraceptive use in Kenya: Comparison of Nyanza, Coast and Central Provinces. *African Population Studies*, *27*(1). http://aps.journals.ac.za/pub/article/view/6

Kinaro, J., Kimani, M., Ikamari, L., & Ayiemba, E. H. (2015). *Perceptions and barriers to contraceptive use among adolescents aged 15-19 years in Kenya: A case study of Nairobi*. http://erepository.uonbi.ac.ke/handle/11295/84421

Kistiana, S., Gayatri, M., & Sari, D. P. (2020). Determinants of modern contraceptive use among young married women (age 15-24) in Indonesia. *Global Journal of Health Science*, *12*(13), 1–37.

KNBS, (2015). *Kenya Demographic and Health Survey 2014. Kenya National Bureau of Statistics and ICF Macro.*

KNBS, (2020). *Kenya Population and Housing Census, 2019 Report. Kenya National Bureau of Statistics.*

Landry, A. (1987). Adolphe Landry on the demographic revolution. *Population and Development Review*, *13*(4), 731–740.

Lee, C.-S. (2003). Law and labour–management relations in South Korea: Advancing industrial democratisation. In *Law and Labour Market Regulation in East Asia* (pp. 231–261). Routledge.

Lee, R. D., & Reher, D. S. (2011). *Demographic transition and its consequences*.

Li, Z., Patton, G., Sabet, F., Zhou, Z., Subramanian, S. V., & Lu, C. (2020). Contraceptive use in adolescent girls and adult women in low-and middle-income countries. *JAMA Network Open*, *3*(2), e1921437–e1921437.

Makola, L., Mlangeni, L., Mabaso, M., Chibi, B., Sokhela, Z., Silimfe, Z., Seutlwadi, L., Naidoo, D., Khumalo, S., Mncadi, A., & Zuma, K. (2019). Predictors of contraceptive use among adolescent girls and young women (AGYW) aged 15 to 24 years in South Africa: Results from the 2012 national population-based household survey. *BMC Women's Health*, *19*(1), 158. https://doi.org/10.1186/s12905-019-0861-8

Mandiwa, C., Namondwe, B., Makwinja, A., & Zamawe, C. (2018). Factors associated with contraceptive use among young women in Malawi: Analysis of the 2015–16 Malawi demographic and health survey data. *Contraception and Reproductive Medicine*, *3*(1), 1–8.

Mutumba, M., Wekesa, E., & Stephenson, R. (2018). Community influences on modern contraceptive use among young women in low and middle-income countries: A cross-sectional multi-country analysis. *BMC Public Health*, *18*(1), 1–9.

National Research Council, N. R. (2011). *The science of adolescent risk-taking: Workshop report*. National Academies Press.

Ngome, E., & Odimegwu, C. (2014). The social context of adolescent women's use of modern contraceptives in Zimbabwe: A multilevel analysis. *Reproductive Health*, *11*(1), 64. https://doi.org/10.1186/1742-4755-11-64

Nsanya, M. K., Atchison, C. J., Bottomley, C., Doyle, A. M., & Kapiga, S. H. (2019). Modern contraceptive use among sexually active women aged 15–19 years in North-Western Tanzania: Results from the Adolescent 360 (A360) baseline survey. *BMJ Open*, *9*(8), e030485.

Obare, F., Birungi, H., Undie, C.-C., Wanjiru, M., Liambila, W., & Askew, I. (2011). *Levels, trends and determinants of contraceptive use among adolescent girls in Kenya*. https://knowledgecommons.popcouncil.org/departments_sbsr-rh/172/

O'Regan, A., & Thompson, G. (2017). Indicators of young women's modern contraceptive use in Burkina Faso and Mali from Demographic and Health Survey data. *Contraception and Reproductive Medicine*, *2*(1), 26. https://doi.org/10.1186/s40834-017-0053-6

Oye-Adeniran, B. A., Adewole, I. F., Umoh, A. V., Oladokun, A., Gbadegesin, A., & Ekanem, E. E. (2006). Community-based study of contraceptive behaviour in Nigeria. *African Journal of Reproductive Health*, *10*(2), 90–104.

Reher, D. (1995). Wasted investments: Some economic implications of childhood mortality patterns. *Population Studies*, *49*(3), 519–536.

Reher, D. S. (2007). Towards long-term population decline: A discussion of relevant issues. *European Journal of Population/Revue Europeenne de Demographie*, *23*(2), 189–207.

Reher, D. S., & Sanz-Gimeno, A. (2007). Rethinking historical reproductive change: Insights from longitudinal data for a Spanish town. *Population and Development Review*, *33*(4), 703–727.

Rosenberg, L., Zhang, Y., Coogan, P. F., Strom, B. L., & Palmer, J. R. (2009). A case-control study of oral contraceptive use and incident breast cancer. *American Journal of Epidemiology*, *169*(4), 473–479.

Saleem, S., & Bobak, M. (2005). Women's autonomy, education and contraception use in Pakistan: A national study. *Reproductive Health*, *2*(1), 8. https://doi.org/10.1186/1742-4755-2-8

Sharma, S. K., Pratap, N., & Ghimire, D. R. (2011). Ethnic differentials of the impact of Family Planning Program on contraceptive use in Nepal. *Demographic Research*, *25*, 837–868.

Sserwanja, Q., Musaba, M. W., & Mukunya, D. (2021). Prevalence and factors associated with modern contraceptives utilization among female adolescents in Uganda. *BMC Women's Health*, *21*(1), 1–7.

Stephenson, R., Beke, A., & Tshibangu, D. (2008). Contextual influences on contraceptive use in the Eastern Cape, South Africa. *Health & Place*, *14*(4), 841–852.

Subedi, R., Jahan, I., & Baatsen, P. (2018). Factors influencing modern contraceptive use among adolescents in Nepal. *Journal of Nepal Health Research Council*, *16*(3), 251–256.

Thornton, A., & Filipov, D. (2007). *Developmental idealism and family and demographic change in Central and Eastern Europe*. Vienna Institute of Demography Wien.

Trussell, J., & Menken, J. (1978). Early childbearing and subsequent fertility. *Family Planning Perspectives*, *10*(4), 209–218.

White, D., & Korotayev, A. (2004). Statistical analysis of cross-tabs. Anthrosciences. org

Withers, M., Kano, M., & Pinatih, G. N. I. (2010). Desire for more children, contraceptive use and unmet need for family planning in a remote area of Bali, Indonesia. *Journal of Biosocial Science*, *42*(4), 549–562.