DETERMINANTS OF CONTRACEPTION AMONG WOMEN OF REPRODUCTIVE AGE IN THE HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM OF RURAL SIAYA COUNTY, KENYA

BY
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DECLARATION

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DEDICATION

A dedication to all who strive to support reproductive health for a healthy society.

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ABSTRACT

Contraception aims to control child bearing, timing, and spacing. It has been shown to have good maternal and infant health outcome. This effects the achievement of the third Sustainable Developments Goals (SDGs) by reducing child mortality, improving maternal health and universal access to reproductive health. Globally more than 95% of women of reproductive age, (15-49) years are aware of reproductive health services and products; however, unmet need is experienced by 42% of women of reproductive age in developing countries. In Kenya contraception is at 58 %, with a fertility rate of 3.7, unsafe abortions reported by 48/1000 women, all these contributing to pregnancy associated maternal and child morbidities and mortalities. This study sought to identify the contraceptive preferences, demographic and sociological factors that determine contraception practice in the HDSS area, with contraceptive use as the dependent variable. This cross-sectional public health survey, analyzed the reproductive health status of women in the HDSS. Descriptive statistics was used to determine the proportions of women in various categories of explanatory variables. Logistic Regression assessed for possible association between the covariates and contraception. Among the 39,006 participants enrolled, 22,298 (57.17%) reported having ever used contraceptive methods. Hormonal methods were preferred by 14,407 (36.94%) and 21,854 (53.03%)participants from the short term and long term categories respectively, whereas, 7,888 (20.22%) and 382 (0.99%) participants preferred the non- hormonal methods from the short term and long-term categories respectively. Participants aged 15-24 years were 8,428, (21.61%) of the 39,006 participants, where 4,572, (54.24%) of them were not practicing contraception. 69.75% of the participants reported being married, 71.30% had no stable occupation. Ever use of contraception was reported by 75.57 % of those who accessed family planning services information through multi-media sources. Contraception was significantly associated with age, parity and access to information at $P<0.001$. The odds of contraception in married women at 45 years and above was at (OR 0.85,95% CI 0.77 to 0.94) compared to the single women of the same age (OR 1.13,95% CI 0.99 to 1.30). Unmet needs were observed in 16,708 42.83% of the population, where 4,572 54.24% were youths aged 15-24 years. There is evidence of unmet needs in the adolescents and young adults. Implementation of strategic public health integrated policies that focus on the demographical and sociological status will support and promote subsidized access to reproductive health services.

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ABBREVIATIONS AND ACRONYMS

CPR:	Contraceptive Prevalence Rate
EC:	Emergency Contraceptive
FP:	Family Planning
GoK:	Government of Kenya
HDSS:	Health and Demographic Surveillance System
IUCD:	Intra Uterine Contraceptive Device
IUD	Intra uterine Device
KDHS:	Kenya Demographic and Health Survey
KEMRI:	Kenya Medical Research Institute
KNBS:	Kenya National Bureau of Statistics
LAM:	Lactational Amenorrhea Method
MMR:	Maternal Mortality ratio
MoH:	Ministry of Health
NCPD:	National Council for Population and Development
PRB:	Population Reference Bureau
RH:	Reproductive Health
SDGs:	Sustainable Millennium Development Goals
TFR:	Total Fertility Rate
UN:	United Nations
UNDP:	United Nations Development Programme
UNFPA:	United Nations Population Fund
WHO:	World Health Organization

DEFINITION OF OPERATION TERMS

Contraceptive Prevalence Rate (CPR): The proportion of women, or sexual partners, using at least one contraceptive method. It is reported as a percentage referenced to married or women in union. (15-49years.)

Contraception: The deliberate use of artificial methods or other techniques to prevent pregnancy as a consequence of sexual intercourse. This includes use of fertility awareness methods and barrier or hormonal devices which are temporary as well as permanent surgical interventions.

Contraception uptake: An indicator that refers to the number of women or sexual partner currently using at least one modern method of contraceptives as a proportion of the number of women who are using any (modern or natural) method of contraception or having an unmet need for family planning.

Family Planning: The practices of allowing persons in a marriage or in-union relationship to attain the desired number of children and determine the spacing of the pregnancies

Unmet Need for family planning: Refers to proportion of women of reproductive age, willing to prevent or delay conception, but aren't using a contraceptive method.

Parity: This refers to the number of times a woman has given birth to a live or dead baby, above 22 weeks gestation, be it vaginally or through caesarian section.

CHAPTER ONE : INTRODUCTION

1.1. Background of the Study

Women have in a long time, made decisions, as individuals, or in union agreements, to prevent or delay conception naturally or artificially through contraceptive techniques. This being significant health intervention in the 21st century (Bongaarts J *et al.*, 2012; Quinn, 2016). These interventions have enabled individuals in the reproductive age, to achieve spacing, timing and attaining of the desired number of children, using modern or traditional contraceptive methods (Singh *et al.*, 2017). A report by Africa Population Health and Research Center in Nairobi, states that contraception has far-reaching health based, benefits, for individuals, couples, households, communities, and societies as a whole (Izugbara *et al.*, 2018).

Contraceptives are devices or medications used in Reproductive Health management to aid in reducing the likelihood of the fertilization of an ovum and eventual pregnancy, which complement other natural or traditional contraception methods (WHO, 2012). Access and availability of Reproductive health services, has enabled and availed families, a basic empowerment towards a healthy reproductive system, as well as allow decisions on when to have children, the number and spacing of their children (Quinn, 2016). This guides individuals and families to make informed Reproductive Health choices and grants access to effective contraception methods as was enshrined in the Programme of Action of the International Conference on Population and Development, held in Cairo in 1994 (WHO, 1994). The goal of ensuring universal access to sexual and reproductive health-care services, including contraception, information and education, is achievable through promotion of integration of Reproductive Health services into national strategies and programmes as reflected in the Millennium Development Goals and, more recently, in the Sustainable Development Goals (SDGs) (UNDP, 2018).

Universally, the awareness of contraception and contraceptive techniques basically lies at 95% (WHO, 2018). Some of the common known contraceptive methods in use globally include the hormonal methods,(combined oral contraceptives and the progestogen only pills, implants, monthly injectables, vaginal ring), non-hormones;

(intrauterine device (IUCD), condoms), natural;(abstinence, safe days, Lactational Amenorrhea Method-LAM) and the permanent methods i.e. vasectomy in males and tubal ligation in females (WHO, 2018). In the developing countries, 214 million women of reproductive age who want to avoid pregnancy are not practicing contraception (WHO, 2018). This is against a backdrop of benefits that have been associated with contraception that include a reduction in unsafe abortions and related mortalities, unplanned pregnancies, and high parity thus large family size beyond available support (Izugbara *et al*, 2018). Contraception also has other non-contraceptive benefits where the hormonals produce an effect that controls uterine and ovarian cancers, relieves painful and heavy menses, in addition to treatment of acne and polycystic ovarian cysts and other ovarian cysts (Yen *et al.*, 2015). The frequency at which a woman experiences her pregnancies, and parities affects her health both physically and psychosocially. In addition, close birth spacing and larger family size have been linked to poor maternal health and decreased investment at household level. This may influence children's mental and behavioral development and educational achievement (Sonfield *et al.*, 2013).

Contraception also brings economic benefits. For every additional dollar that is invested in contraception, the cost of pregnancy-related care will be reduced by $2.22. In terms of socio-economic benefits, achieving universal access to quality sexual and reproductive health services is estimated to yield returns of $120 for every dollar invested (WHO, 2018). A report by UNFPA showed that in 2016, contraceptives were able to reach 20,900,000 people, averted 11,700,000 unintended pregnancies, 3,680,000 unsafe abortions and 29,000 maternal deaths (WHO, 2018).

A tremendous population growth in Kenya has been noted over the last few decades. The official Kenyan fifth census of 2009 confirmed that 38,601,097 people were living in the country (KNBS, 2016). According to the World Population Review, the population estimates for Kenya is approximately 50.95 million, making Kenya as the 140th densely populated country on earth. (Worldpopulationreview, 2018), A high population in any given country comes with its own challenges and bottlenecks affecting the economy, environment and reproductive health in general (Vikstrom *et al.*, 2016). Among the

setbacks witnessed due to the high population include, unfavorable outcomes on gender and poverty levels (UNFPA, 2012). There is documented evidence in which high population density leads to environmental degradation, climate change and deforestation, poverty, political instability and unemployed young population (Sonawane *et al.*, 2015). Contraception has therefore been key in slowing unsustainable population growth and the resulting negative impacts on the economy, environment, and national and regional development efforts (de Sherbinin *et al.*, 2007; UNFPA, 2012).

Contraception practice is said to be popular in many parts of the world, especially in Asia and Latin America, but continues to be low in sub-Saharan Africa and more so in East Africa (Izugbara *et al*, 2018). Globally, contraception has risen slightly, from 54% in 1990 to 57.4% in 2015 (WHO, 2018). In Kenya, 58 % of married women practice contraception. The most popular modern contraceptive methods used by married women are injectables (26 %), implants (10 %), and the pill (8 %)The use of these methods has increased over the last decade from 32 % in the 2003 KDHS to 58 % in 2014 (KNBS, 2015). In the latest Kenya Demographic and Health Survey (KDHS), maternal deaths accounted for 14% of all deaths for women aged 15-49 years. The maternal mortality ratio (MMR) stood at 362 maternal deaths per 100,000 live births for the seven-year period preceding the survey showing a slight decline from the previous 520 maternal deaths per 100,000 live births from the 2008-09 KDHS (KNBS, 2015).

According to the family planning and reproductive health data sheet of 2016 by Population Reference Bureau (PRB), the average age of first birth in Kenya was 20.8 years while that of Siaya County stood at 15.7 years. Contraception awareness both nationally and at Siaya County was an all- time high of 100%. However contraception practice was 58% nationally, 55% for Siaya County with Kirinyaga County recording the highest at 81% (Population Reference Bureau, 2016).

Unmet contraception needs, where there is a need to delay or prevent conception, but no contraception practice, has been on a steady though slow decline, from 60% to 40% in East Africa especially Kenya and Rwanda (Izugbara *et al*, 2018).

Unmet contraception needs was evident in 20% of women of reproductive age in 2015 (UN, 2015). These evident gaps between contraception practice and need, reflected a significant need of Reproductive Health services implementation support. Interventions to counter the unmet needs improved the RH services demands and access in Kenya and Rwanda between 1995 and 2006, though slow in Ethiopia and Tanzania (UN, 2015; Izugbara *et al*, 2018). Unmet needs were at a high of 34% in Uganda between 2010-2014, mainly among adolescents and young adults aged between 15-19 years, less educated women, and the less empowered (Wegs *et al.*, 2016).

In as much as contraception knowledge is 100% in Siaya County, the practice which stands at 55% which is still below the national target of 66 % (Lagami Christabel, 2018). A stand-alone study to assess contraception in the rural settings of Siaya County has never been carried out. Thus there could be existing unrecorded events of unintended pregnancies, unsafe abortions and maternal deaths, resulting to paucity of data on contraception in the rural areas of Siaya County. Demographic, social and economic factors also account for this 55% low uptake of contraceptives (Ackerson *et al.*, 2017). There is evident paucity of data and information on factors that affect and determine the contraception status in this rural setting of Siaya County, covered by the Health and demographic Surveillance System (HDSS).

This study investigated the prevalence of contraception alongside methods preferred (either short-term or long-term methods) in the HDSS area of rural Siaya County. In addition, the study reflects on the factors (sociological and demographic) that influence contraception in the HDSS among women of reproductive age 15-49 years. The study findings aim to identify enablers and barriers to seeking Reproductive Health services in Siaya, while providing Reproductive Health stakeholders opportunity to optimum compulsive integrated services addressing needs of various ages of reproductive women.

1.2. Statement of the problem

According to the latest Kenya Demographic and Health Survey (KDHS) of 2014, the contraceptive uptake indicator of contraception in Kenya and Siaya stands at 58% and 55% respectively. This is in general contrast of family planning and contraceptives awareness that stands at 100% (Population Reference Bureau, 2016) and the national contraceptive targets of 66% (Lagami Christabel, 2018). Contraceptive uptake as an indicator of contraception is essential in controlling Total Fertility Rate, which is 3.7, reducing maternal mortality and morbidity, which is at 14%, as well as contributing to improved health and welfare of mothers and infants. Abortion cases are still high in East Africa with Kenya leading at 48/1000 women (Undie *et al.*, 2014). Current global fertility rate stands at 2.5 (UNFPA, 2017), with the lowest rates predominant in the developed countries depicting an evident link between a regions developmental status and the populations fertility rate. Kenya, being one of the developing economies, is observed to be having a higher fertility rate compared to developed economies (World Bank, 2012).

Contraception and Reproductive Health services uptake trends in Kenya that seemed quite low are also noted in Turkana (10%), West Pokot (14%) and Migori (45%) Counties proving existence of unmet needs among women of reproductive age (Population Reference Bureau, 2016). Studies in rural Kenya have reflected a low contraceptive uptake as compared to urban area (KNBS, 2015). Despite prudence of contraception among women of child bearing age in Siaya County nearly half of them, 50%, are not using any form of contraception (Population Reference Bureau, 2016). Reasons for the low usage are not well documented, and this information paucity, requires a research to give documentation that will help determine the prevalence and preference and major factors that may account for this population's contraception status.

This study focused on women of reproductive age, residing in rural parts of Siaya County, in the Health and Demographic Surveillance System (HDSS) area, who participated in the cross-sectional health survey on their reproductive health status.

1.3. Broad objective

The study aimed to document the determinants of contraception among women aged 15-49 years of reproductive age in the HDSS of rural Siaya County.

1.4. Specific objectives

1. To identify contraception preferences among reproductive women aged 15-49 years, in the HDSS of rural Siaya County.
2. To determine the sociological factors that influence contraception among reproductive women aged 15-49 years, in the HDSS of rural Siaya County.
3. To establish the demographic factors that influence contraception among reproductive women aged 15-49 years, in the HDSS of rural Siaya County.

1.5. Research questions

This study sought to answer the following questions:

1. What are the contraception preferences among reproductive women aged between 15-49 years, in the HDSS of rural Siaya County?
2. What sociological factors influence contraception among reproductive women aged 15-49 years, in the HDSS of rural Siaya County?
3. What demographic factors influence contraception among reproductive women aged 15-49 years, in the HDSS of rural Siaya County?

1.6. Study Justification

Given the demonstrated benefits of contraception and Reproductive Health services, findings from this study identified the level and influences of contraception practices among reproductive women monitored by the HDSS in rural Siaya County. Apart from demographic and sociological factors, contraception has been associated to health intervention seeking behaviours, accessibility to the facilities offering services as well as commodities, and the partners' approval of contraception in the developed and developing world. In SSA, unmet contraception needs, have been linked to unsafe abortions of unplanned pregnancies, which results to a risk of acute infections, fertility complications and unfortunate maternal death (Kathpalia, 2016). Cases of conceptions in

under 6 months post-natal mothers, have resulted to poor pregnancy outcomes, strained socio-economic status, where families struggle to feed and provide for a large family, as well as child and maternal mortalities and morbidities (Baraka *et al.*, 2015). Thus this study, sought to establish the determinants of contraception among women of reproductive age, in the HDSS of rural Siaya County in Kenya. The HDSS secondary data provided longitudinal information, that served as a platform and denominator that exhaustively covers a district level population. It allows for causal analysis, restricts variable bias, and has high statistical power (Ghosh *et al.*, 2015).

This study also adds to the existing literature on contraception as a focus in Reproductive Health in rural Kenya which also serves as a platform for further research in this region ,as Reproductive Health contributes directly and indirectly to the epidemiological status of the population in a region (Odhiambo *et al.*, 2012). Recommendations from this study go a long way to help strengthen integrated reproductive health program services and guide policies towards control of associated maternal and child morbidities and mortalities so as to enhance the global sustainable development goals agenda whose aim is to improve maternal and child health outcomes.

1.7. Scope of the Study

This study was based on the annual demographic cross-sectional population based public health demographic survey conducted in the HDSS, every April and July through 2016, at Siaya. The study focused on the Reproductive Health status of the population, basically the contraception practices, knowledge and preferences among women aged between 15 years and 49 years.

1.8. Limitation of the Study

Use of Secondary data sometimes poses a limitation in the choice of variables. The cross-sectional health survey was conducted in a rural setting and thus analysis of this data lacks comparison with an urban setting. This limits the generalization of the study to both urban and rural populations. In addition, data from the women was self-reported meaning that there may have been some social desirability factors in play.

1.9. Delimitations of the Study

The findings give an actual picture, as per the respondents, on the determinants of contraception practice in this rural setting. The surveillance system provides a denominator for future public health surveys to be conducted and published. This is room for similar researchers to be conducted in urban settings.

1.10 Significance of the Study

According to WHO, erratic stability of Reproductive Health services and commodity access, puts maternal health status and safety at risk (WHO, 2015), despite the various policies implemented on free maternal health care including accelerated access to Reproductive Health services (GOK, 2015). These family planning policies are aimed at enhancing contraception in the country yet, low Contraceptive Prevalence Rate (CPR) still persists in many notable counties (Population Reference Bureau, 2016), and more so in the rural areas (KNBS, 2015). Currently the country's CPR is at 58% with that of our study setting (Siaya County) being 55% (KNBS, 2015). In addition Kenya's Total Fertility Rate (TFR) is still high (3.7) as compared to the recommended TFR of less than 2.5 recommended by WHO (WHO, 2015).

Past studies across the country have highlighted a number of factors that influence contraception. By establishing the determinants of contraception practice in the HDSS of rural Siaya County, this study contributes to the existing literature on factors that influence utilization of contraceptives in Kenya with emphasis on rural setting. The study findings were aimed at guiding policies, to promote Reproductive Health services, and support community embrace of contraception uptake and practice, to reduce fertility rate and control maternal associated mortalities and morbidities in Siaya County, (Population Reference Bureau, 2016).

1.11 Assumptions of the Study

The study was purely based on the self-reported reproductive health status of women of reproductive age, who participated in the cross-sectional survey, as residents of the HDSS area in Siaya. The findings from the survey assumes a reflection of rural contraception practice.

CHAPTER TWO : LITERATURE REVIEW

2.1. Introduction

A populations' health seeking behavior, subjected as Health intervention service, is determined by the intention to acquire an intervention, which influences the attitude towards the subjective norm. This is as per the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TBP) (Fishbein *et al.*, 1975). This theory explains the relationship between attitudes and behaviors, where by the best predictor of one's behavior, consists of the intention, attitudes, subjective norms and external variables.

Andersen's health belief model, proposes that individual's utilization of health care services may be determined by their geographical location and social status. Urban based health interventions are thus observed to be more often used compared to the rural based interventions. An individual's level in the sociological structure, influences their uptake of health based interventions in that, the higher an individual's sociological status level, the more significantly affordable and logical it was to them to take up a health based intervention. Utilization will also be based on one's beliefs regarding the benefits, whereby, those who believe that health services are beneficial will most likely, and repeatedly use those services (Andersen, 1995). The best predictor of an individual's behavior, is therefore their intention, and their attitude towards the end result of this behavior, in this context being, the outcome of contraception.

2.2. Overview of Contraception

Contraception has been practiced globally by women of reproductive age as protection against unplanned pregnancies. They have over time aided in family planning where women and persons in a union or relationship decide when to get children, the number of children they want and their spacing (Bongaarts J *et al*, 2012). Contraception has contributed to better health outcomes for mother and child (UNDP, 2018), alongside other positive biological effects such as prevention of uterine , polycystic ovarian cysts and cancers, relief of heavy menses and acne treatment (Schindler, 2010).

Contraception has generally provided a platform for control of unsustainable population growth and its impacts on the economy, environment, and national and regional development efforts (Vikstrom *et al*, 2016) . According to the United Nations Population Fund (UNFPA) report of 2016, contraceptive use campaigns to approximately 21 million people, helped averted 11 million unplanned pregnancies, 3.6 million unsafe abortions, 29,000 maternal deaths (UNFPA, 2017).

Worldwide, contraceptive knowledge is at a high level of 95%, due to promotional programs and the mass media in place, though unmet needs are still reflected, where 214 million women are still unable to access a modern contraceptive method (WHO, 2018). The challenges come about due to reasons to include, limited choice of methods in supply, restricted use among Adolescents and Young adults, cultural and religious opposition, poor provider service quality, gender based barriers, and the fear of unexplained or unclear side effects.(Izugbara *et al*, 2018).

In Africa as a whole, 24.2% of women in the reproductive age, 15-49 years, have an unmet need of contraception. In East Africa, one in five women had an unmet needs for contraception by 2015 (UN, 2015), thus signaling a gap between demand and access. Common reasons highlighting womens non-contraceptive practice included, logistical and structural problems such as poor access to facilities, and commodities being out of stock. Sociological barriers such as non-approval of contraception practice by partners, families or communities was a major barrier. Other factors contributing to these unmet needs are lack of knowledge, and formal understanding on how the biological cycle functions, how, and where to access reproductive health services, in addition to misleading myths and misconceptions about contraceptive use (UNFPA, 2012).

Many parts of the world have women of reproductive age taking up Reproductive Health services and contraception, more so Asia and Latin America (Gavin *et al.*, 2014). However, the same cannot be said of sub-Saharan Africa. In East Africa some tremendous progress has been made in terms of increasing the uptake of contraceptives, where the 2015 global contraceptive prevalence rate (CPR), the percentage of women or

sexual partner currently using, at least one method of contraception stood at 57.4%, a slight increase by about 3% as was the case in 2010. In Africa, the CPR went from 23.4% to 28.5% (Izugbara *et al*, 2018). .

Efforts to encourage contraception in East Africa have been channeled through integration approach. This is to enable clients to access the reproductive health services alongside other health and prevention services in the maternal and child based clinics, as well as other outpatient and special services. This trend has been clearly detailed by the analysis of the various demographic and health surveys conducted in the sub-Saharan and East African countries (Sauer *et al.*, 2013).

2.3. Contraceptive preferences

Low contraception practice in Africa is reflected in the literature review of the factors influencing use of contraceptives in Sub-Saharan Africa (SSA), stating low utilization of modern contraceptive methods (Ackerson *et al*, 2017). In Kenya, the current CPR based on the Kenya demographic and Health Survey (KDHS) of 2014 was 58%. This is reflected in that, the most popular modern contraceptive methods used by married women in Kenya were injectables (26%), implants (10 %), and the pill (8 %). There is evidence of steady increase from the initial 33% in 1990 to the current 58%, only rivaled by Rwanda (KNBS, 2015) . .

According to the family planning and reproductive health report availed by Population Reference Bureau (PRB), counties in Kenya that have the lowest CPR were Turkana 10%, West Pokot 14%, Baringo 41%, Migori 45% and Homabay 47%. In the same report, the counties with the best performing indicators in terms of contraceptive were Taita Taveta 68%, Nyeri 73%, Kiambu 74%, and Kirinyaga 81%. (Population Reference Bureau, 2016). In as much as records indicate that Siaya county has a 100% contraceptive awareness, the county recorded a 58% CPR (KNBS, 2015), this is way below the recommended CPR target of 66% (Lagami Christabel, 2018). Equally in as much as knowledge and CPR of the entire Siaya County is in the public domain (Population Reference Bureau, 2016), there is paucity of data to account for the villages in rural Siaya

County, that may give an accurate situational analysis of both contraceptive use and knowledge. This study hence used the Health and Demographic Health Survey (HDSS) platform to establish prevalence of contraception, preference and where applicable knowledge in this rural setting.

2.4. Social Factors Affecting Contraception

Many factors have been observed and documented to have an effect on contraception practice globally and more importantly in the low and middle income countries. These include social factors and demographic factors (Ackerson *et al*, 2017).

The main sociological factors reported universally include, level of formal education, marital status where there is influence from spouse, religious beliefs and practices and the need to have more children that would work as security in the near unknown future (Ackerson *et al*, 2017). A mixed methods study in a County hospital in rural Kenya revealed that, over three quarters, 86.3% of women used contraceptives within 1(one) year of their delivery, in the postnatal period, with government facilities being the most common source of the commodity. In this study being married and having a higher education level were significantly associated with contraception (Jalang'o *et al.*, 2017).

Education level and access to information on reproductive health and contraception, was highlighted as the key influence of contraception. Awareness and knowledge about the contraceptive methods encouraged the access of services, information and Sexual Reproductive Health networks leading to proper informed decision-making, as reflected in the study on impact of education and globalization on sexual and reproductive health in Eastern and Southern Africa, (Van Stam *et al.*, 2014). It has also been observed that, contraception use is influenced by an individuals formal educational status, in that, the higher the level of education, the more likely a woman was able to consider contraception (Viswan *et al.*, 2017). Additionally, a woman's sexual autonomy, alongside her formal education status, has been observed to enable her to possibly dominate the partners influence to contraception, a good example being on condom use (Medhanyie *et al.*, 2017).

The CPR among women of reproductive age was 50%. The main barriers to contraception identified included low or null parity, the desire for more children for family growth at (39.5%), partner disapproval of the contraceptive (25.5%) and fear of the contraceptive side-effects (14.6%), whereas the factors identified as having an influence on contraception included individuals education level, occupation or career, marital status and religion, where the least practicing category being traditional worshipers (Durowade *et al.*, 2017).

Additional social factors influencing contraceptive use and non-use among women of advanced reproductive age in Nigeria, included ones level of education alongside the individual desire. As well as the cultural push for more children as family heirs, which was observed to be having a negative impact on the use of contraceptives (Solanke, 2017). A study done among the pastoral communities in Afar region of Eastern Ethiopia, where the CPR was found to be 8.5, also did highlight a number of socio-cultural factors, myths and believes that influenced contraception. The injectable method was mostly preferred (92.2%). None contraception practice was noted to be due to religion (85.3%), desire for more children (75.3%) and partner non-approval (70.1%) (Alemayehu *et al.*, 2016).

Literacy levels have been observed to be significantly associated with the use of family planning methods, as women who reported to have a high level of formal education were more likely to practice contraception, compared to those women who had lower level or no formal kind of education (Alemayehu *et al*, 2016). In a literature review conducted on contraceptive use in Africa, husbands to women and other community members were observed to be a major deterrence to contraceptive use due to myths and misconceptions about contraception, and cultural belief in the continuity sustained by large families, thus the need to sire many children (Ackerson *et al*, 2017). A study conducted in Ghana also highlighted the fact that husbands opposed use of contraception by women, since it would beat the logic of family growth by restricting child bearing, and this played a major role in unmet needs, in addition to the misconceptions about family planning (Apanga *et al.*, 2015).

The analytic report from 37 demographic and health surveys done in SSA and Asia showed that partners education level has a strong effect on the woman's modern contraceptive use, as well as the frequency of antenatal visits and skilled attendance as pointer to positive maternal health outcomes. This study demonstrated the above notion by determining that women whose partners had secondary or higher education were 32% more likely to take up contraception (Adjiwanou *et al.*, 2018).

Another study conducted in Nigeria did show that husbands were the decision makers regarding the size of the family, the choice of the contraceptive and pregnancy timing (Akaba *et al.*, 2016). Exposure to Reproductive Health messages and contraceptive use among men has equally been shown to increase utilization by the couples among this group (Okigbo *et al.*, 2015). A study in Kenya, Nigeria and Senegal that assessed the impact of Urban Reproductive Health Initiative (URHI), was able to show that, women partners to men, and the men who participated in this URHI Programme were four times more likely to use modern contraceptive method as compared to those not in the Programme. Ackerson & Zielinski, 2017 therefore advocated for education of women, their partners and the entire community on contraceptives and creating awareness of the benefits of contraceptives to enhance utilization.

Attitudes towards contraception practice was studied to determine if it is influenced by religion or ethnicity, among women in Western Kenya. The findings revealed no significant effect of ethnicity or religion on contraceptive use and that the most significant factors that play a key role in contraceptive utilization were level of education and knowledge about the benefits of contraception for the mother (Bakibinga *et al.*, 2016), therefore interventions should aim at enhancing women's knowledge and understanding on good reproductive health and contraception practice.

A number of studies conducted have also shown that woman's marital status and age, are the main demographic factors that play a significant role in the use of contraceptives. In a study in South Africa, following the integration of Reproductive Health and HIV care

services showed that an unplanned pregnancy prevalence of 71% of women already on care, which is 18% less compared to 87% of those women newly diagnosed. This slight decline in unplanned pregnancy was as a result of exposure to integrated services (Adeniyi *et al.*, 2018).

A study looking at emergency contraceptive use in Kenya and Nigeria determined that recent users of EC (Emergency Contraceptives) were more likely to be in their 20s, unmarried, and more highly informed than never users or ever users of EC in both countries. This reflects the sociological influence to choice of contraception (Morgan *et al.*, 2014). It is also worth important to note that a study conducted in Ethiopia also supported the fact that younger women were the ones who used contraceptives as compared to those who were in the older ages. This study revealed a negative association between women of older age and contraceptive use, especially with the desire to sire more children (Tiruneh *et al.*, 2016).

A health seeking status assessment report, revealed an 89% Reproductive health services awareness, with only 18% history of contraceptive use, citing parity and educational level of respondents as influential factors. The major reasons for not accessing Reproductive Health services were opposition from husbands and misconceptions about family planning methods (Apanga *et al*, 2015). In other cases, the likelihood of approval of contraceptive methods use, was observed to rise in women with a relatively higher education level status (Hossain *et al.*, 2014).

Socio-cultural expectations and values attached to marriage such as the need to have more children, extending family lineage, and replacement of the dead as cultural beliefs and practices were observed as a hindrance to contraceptive use. (Kabagenyi *et al.*, 2017). In Cameroon, 17.5% of respondents interviewed about their beliefs did not approve of contraceptive use with 16.6% reporting that their partners did not approve contraception (Njotang *et al.*, 2017).

As a result, the Cameroon study reported not more than 58.9% CPR, in women in any union, as well as those aged above 30years.These high rates were observed among couples who discussed their contraceptive options, alongside the approved male partner approval (Njotang *et al*, 2017).

2.5 Demographic Factors Affecting Contraception

Research has shown that other factors such residential area, internal and external migration as well as sociological factors play a critical role in contraception among women of reproductive age. Demographic factors complement sociological factors and proximity to service delivery points and facilities as barriers to access Reproductive health services. Equally in their findings, institutional barriers such as the belief that health care workers were unqualified and disrespect shown by health care providers also deterred use of contraceptives. Other contextual beliefs such as death from contraceptives, side effects and primary infertility contribute to fear of use (Bisits-Bullen *et al.*, 2017).

In Tigray, North Ethiopia, knowledge on contraception is 95% whereas Contraceptive Prevalence Rate among all women of reproductive age is 35.6%, and the Contraceptive Prevalence Rate among only married women stands at 41.0%, showing marital status influence on contraceptive use (Medhanyie *et al*, 2017). Demographic Region also influenced contraception since the odds of contraception practice by women living in urban areas, was two times more than those women living in the rural areas (Medhanyie *et al*, 2017). Studies also determined that staying in a rural setup was deterrence to contraceptive use. Equally, the unmet need for contraceptive use has also been demonstrated to be higher in the rural areas as compared to the urban settings (Genet *et al.*, 2015).

A study analysis done in Kenya, of the KDHS data of 2008-2009 highlighted that migration of women influenced use of contraceptives. Internal migration, whether within rural areas or from rural to urban among Kenyan women was observed to trigger a higher likelihood of contraception compared to non-migration. This could be as a result of

adaptation and disruption effects that are likely to promote use of contraceptives. The phenomenon appears to be due to selection, adaption and disruption effects (Ochako *et al.*, 2016).

A study done in Burkina Faso was able to determine that women from a good household wealth were more likely to use contraceptives (Wulifan *et al.*, 2017). Another study conducted in Malawi was able to determine that woman's empowerment and being in the richest wealth quantile had a positive correlation with contraceptive use (Palamuleni *et al.*, 2014). In addition, living in a wealthy community significantly influences the use of contraceptives for family planning (Cau, 2016).

Alemayehu *et al* (2016) looked at utilization factors among pastoral communities determined that the odds of contraception among women of higher income was higher compared to women earning a lower category of monthly income. A study done in Burkina Faso found out that only 12% of the women used contraceptives. Household wealth did also influence contraceptive utilization in this study (Wulifan *et al,* 2017).

A study in Ethiopia found a high rate of unintended and mistimed pregnancies where 32% pregnancies were unintended and about 33% births being mistimed. Equally, the burden of unintended births fell on the young, unmarried, those with higher wealth, those with less than secondary education and with a high parity with a large household size (Tebekaw *et al.*, 2014). This study is contrary to other studies that depicted a high wealth level as being a predictor to contraceptive use (Palamuleni *et al*, 2014; Asaolu *et al.*, 2017).

In an analysis of the demographic health survey data among women in Tanzania, Kenya and Rwanda, who had experienced mistimed pregnancies, there was a higher likelihood of contraceptive use compared to those with no such experience. This, in addition to , desire to have more children, parity, household wealth, maternal education and information access via multimedia sources are noted as correlates to contraception practice (Bakibinga *et al*, 2016).

A study in Ghana revealed positive influences on contraceptive use among adolescents to include marital status and residential place. The study revealed that urban residents were more likely to use contraceptives compared to rural residents. It was also evident that unmarried women were more likely to use contraceptives compared to the married women (Marrone *et al.*, 2014).

In this empirical literature review, it is evident that women in the rural areas are less likely to use contraceptives as compared to their urban counterparts. This study has a limitation in that it will focus its analysis on the rural women of reproductive age and therefore comparison with an urban setup won't be possible. However, other sociological and demographic factors have been singled out as possible predictors and bottlenecks to contraceptive use. This study also analyzes data to determine whether these factors have a bearing in determining contraception practice in this region. Results from this analysis adds into knowledge on the sociological and demographical influence on contraception practice among women of reproductive age within a rural context.

2.6. Summary of the empirical studies

Across the globe the urge to have women of reproductive age (either in marriage or in-union) to adopt and use family planning contraceptive strategies is of paramount importance (WHO, 2018). This is because of documented evidence of improved health outcomes associated with use of contraceptives for family planning for both mothers, new born babies and the general population (de Sherbinin *et al*, 2007; Schindler, 2010; UNFPA, 2017; UNDP, 2018). Studies have identified a number of factors ranging from socio-cultural, socio-economic and demographic that have a positive bearing on the use of contraceptives (Ackerson *et al*, 2017).

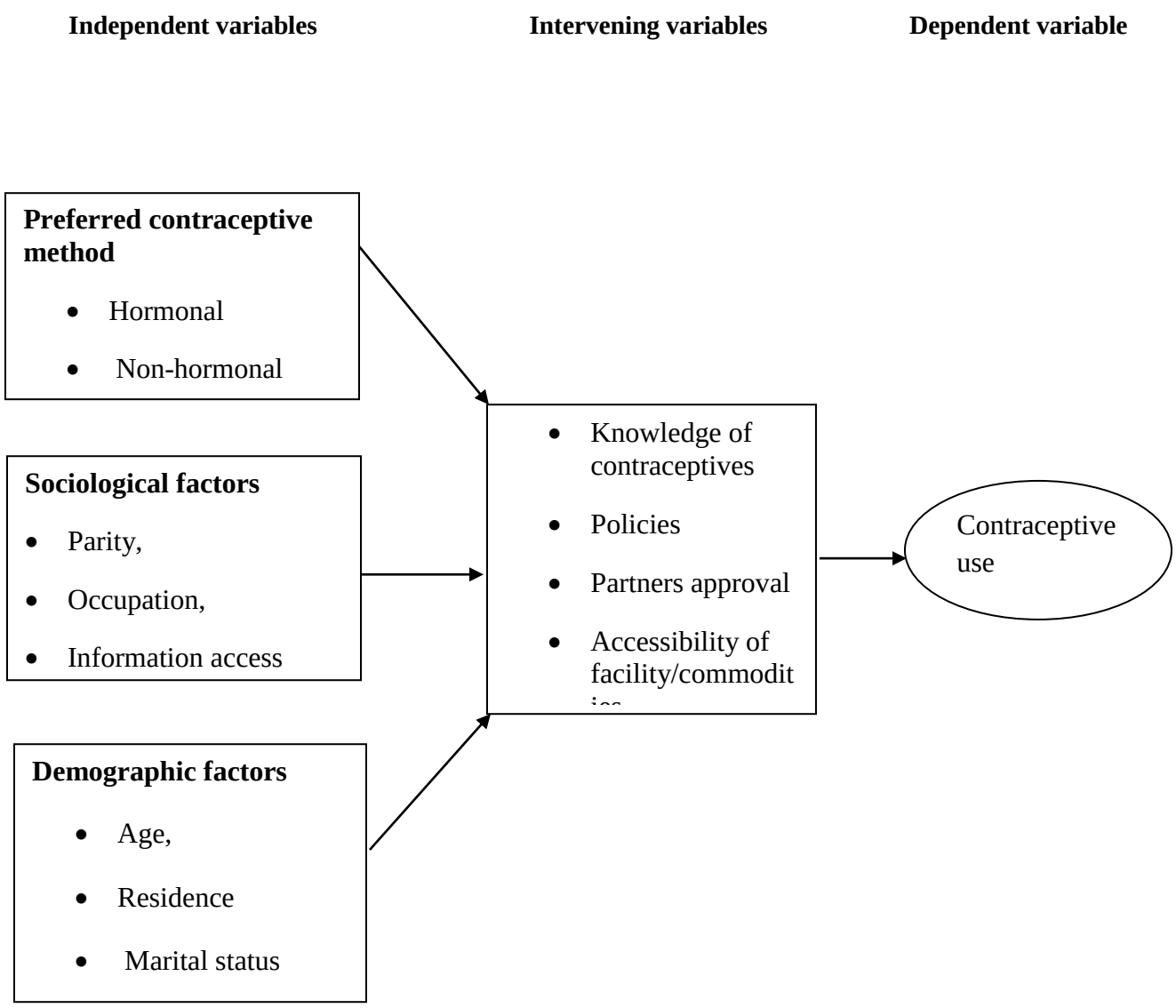
In Kenya, documented evidence of low use of contraceptives and unmet need still persists (KNBS, 2015; Izugbara *et al*, 2018). This study was conducted in the rural set up of Siaya County covered by the HDSS. The study gives situational analysis on contraception, preferences and equally attempts to look into the factors that are likely to influence use of family planning methods. The importance of this study is based on its

ability to give impetus to the Siaya County Government and other reproductive health players to put measures to advocate for the use of contraceptives that is generally below the country's national target of 66% (Lagami Christabel, 2018). Findings from this study further contribute to the extension of knowledge on factors that influence contraception in both Kenya and East Africa's rural settings (few studies have focused on rural areas of Kenya). These findings will also have aimed at guiding policies to promote contraception uptake, control fertility rate as well as maternal morbidities and mortalities.

2.7. Conceptual Framework

The conceptual framework in **Figure 2.7.1**, reflects the interaction of independent variables that influence contraceptive use which is the dependent variable. The 'contraceptive use' variable which is a binary variable is attributed to the independent variables as well as the intervening variables. This information was extracted from the data set, and categorized into Yes/No, thus a binary variable.

Contraception practice in this study area, appears to be determined by factors in this population to include; parity, occupation and access to information, as well as contraceptive method of preference that encompasses the contraceptive of choice. The demographic factors which include the age; assessed in categories and marital status, which portrayed the partner influence to contraceptive use by an individual. Other factors may possibly influence contraceptive use other than the preference, demographical and social factors to include policies, awareness, partners influence and commodity availability and facility access.



**conceptual framework of determinants of contraceptive use,source: Author's development*

Figure 2.7.1: *Conceptual framework*

Knowledge, partners' approval and accessibility, observed to influence the relationship between the independent and dependent variables Theoretically the demographic, socio-economic factors complement each other to create a need for conception control, thus decision to use contraception. This need then calls for choice of the most convenient method to use to achieve contraception, and thus result on a specific method of preference. The three then result to the dependent variable of family planning method use.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This chapter outlines the research methodological procedures, to include the description of research design, study setting, the target population and the techniques used in sampling the study population.

3.2. Research Design

This was an observational, descriptive, cross-sectional study which used Reproductive Health status information of the women of reproductive age. It was nested in the HDSS longitudinal biannual enumeration, and utilized the data using an abstraction tool, to get the data with the specifically required Independent and dependent variables indicators for analysis The population involved were women of reproductive age, residing in the HDSS, between 15 to 49 years.

3.3. Study setting

The Health and Demographic Surveillance System(HDSS) is based in a study area in Siaya county, that serves as a provisional denominator for the cross-sectional public health based surveys. Siaya County boarders Kakamega County to the North, Lake Victoria to the South, Busia County to the West and Kisumu County to the East. Total population count in 2016 was estimated to be 932,754 people comprising of 431,865 males (46.3%) and 500,889 females (53.7%) with an annual population growth rate of 1.7% (KNBS, 2012).

Population dynamics are monitored annually by the KEMRI-HDSS department in 385 villages of Asembo, Gem and Karemo; rural Siaya County, through bi-annual surveys and enumerations. (Odhiambo *et al*, 2012). This provides a denominator platform for other surveys, including this cross-sectional retrospective study on contraceptive use. (KEMRI, 2017). These services are available both in the community as supported in the different health levels facilities distributed in the study areas as reflected in the Map of the HDSS study area in **Appendix 4**

3.4. Study Population

The HDDS has a population size of approximately 240,000 people who are predominantly of Luo tribe and whose major economic activity is subsistence farming. This region is characterized by a high disease burden of Malaria, TB and HIV (Odhiambo *et al*; 2012; GoK., 2014). In this database, the proportion of women to men is 3:2, with a majority of the population inclined towards persons aged between 20-39 years (30 %) (KEMRI, 2017). This longitudinal surveillance platform makes the HDSS a ready standard area for population health based studies, for the support of public health policy strategies and decisions.

The target population were all women aged 15-49 years of reproductive age found within this HDSS platform that participated in this descriptive cross-sectional health survey and responded to questions in the contraceptive module.

3.5. Data Sources

Data for this reproductive health status analysis were extracted from the cross-sectional health survey that was conducted in the HDSS bi-annually through 2016.

3.6. Sampling and sample size calculation

3.6.1. Sampling Frame

These targeted women aged 15-49yrs participated in this cross-sectional Public Health based survey imbedded in the biannual enumeration that is conducted in the HDSS between January to April, then July to October of each year. The biannual enumeration helps capture most of the residents, as they may have moved within or without the study area of HDSS, as either old or newly captured residents.

3.6.2. Sample Size Determination

Purposive sampling strategy was used, to include all the women, who are under the continuous demographic monitoring, with the required Reproductive Health indicators, since the HDSS covers a real life population in a specific geographical area. The HDSS area is in itself a demographically characterized sampling frame that provides a platform

as a denominator for analysis of the survey. It exhaustively covers a district-level population, overruling the sampling rules, properly cited to reflect the original work, as per the principles of conditional generalization that best apply to the HDSS (Ghosh *et al*, 2015). In this case the targeted population is drawn from a 'universe', which is usually the national population, and the sampled units taken as a whole represent the universe well. The study analyzed data from all women of reproductive age(15-49yrs) who participated in the cross-sectional health survey and consented to respond to questions in the Reproductive Health status module section.

3.6.3. Inclusion criteria

- Female residents in the HDSS at Siaya and having a HDSS Personal Identification number.
- Females who consented to take part in the cross-sectional health survey, and aged between 15-49 years. This is the reproductive age for women.

3.7. Exclusion criteria

- Females less than 15 years and more than 49 years.
- Females who had not consented to take part in the cross-sectional health survey

3.8. Data Collection and Management

Structured questionnaires were used to collect data during the biannual population health surveys. The participants were individually consented, and then guided by the interviewer to answer questions regarding demographic and socio-economic status, and also gave information regarding their health seeking behavior. The participants also gave information regarding their reproductive health status. Once filled on completion of the interviews, the questionnaires were checked for appropriateness, completeness and accuracy as per the required fields. Thereafter they were transcribed into softcopy in an appropriate system (access or excel) for analysis purposes. A data abstraction tool based on the contraception survey, was then used to extract data from information collected during the bi-annual surveys. (Appendix 2). All the data documents were well secured

and all the soft copies were encrypted and password protected to deter unauthorized access.

3.9. Validity and reliability

3.9.1 Validity

To maintain the validity of the study instrument, all contents selected and included in its tools had to be relevant to the variables being investigated. While appreciating the fact that it is almost impossible to safeguard a research instrument against bias and random errors, careful planning at all stages of the project, while putting in place all the quality assurances at the design of the study was importantly considered. During questionnaire design, careful review the questions for simplicity of comprehension and void of ambiguity was mandatory. For the cross-sectional health survey, the questionnaires were pre-tested through a pilot study to ensure high level of validity.

3.9.2. Reliability

The reliability of data abstracted from this study was assured by the researchers in the main cross-sectional health survey, who pre-tested the survey questionnaires, and ascertained internal consistency of the survey instruments. The language used was simple, clear, easily understood and free from any technical jargon. Test-retest reliability method was used, where the abstraction tool was piloted twice on 50 clients on two different dates at the Reproductive health clinic in Akala health centre, to ascertain internal consistency of the tools by administering them twice to the sampled population.

3.10. Data Analysis

3.10.1 Quantitative data analysis

Analysis was completed using STATA version 14.1 (STATA Corporation, College Station, Texas, USA). General cleaning of the data was done to make it viable enough for further analysis so as to tell the story on contraception in this community. This included confirmation of coding and transcription of all data into software application to enable further analysis. We characterized the outcome variable, of ‘contraceptive use’, and examined its association with categorical explanatory variables (age, occupation, marital

status, contraceptive method preference, parity and whether or not the participants had access to information). Frequencies, confidence intervals and proportions were computed using descriptive statistics. Chi-square/Fisher's exact test was used to determine the association between categorical variables and ever-used family planning method. P values <0.05 were considered statistically significant.

Logistic Regression analysis was performed to assess for possible association between the covariates and contraception. Modeling of occurrence of ever-used contraceptive method was done, and compared among categories of explanatory variables using crude and multivariable-adjusted prevalence ratios (PR) and 95% confidence interval (Mercier *et al.*). Variables significant at <0.01 level in univariable analysis underwent further examination using multivariable regression model. Examination of the potential confounding effect of each covariate and two-way interactions was done, to obtain final variable selection by applying backward elimination and retaining predictors significant at 0.05 level. There was a combined effect of age and marital status on ever-used family planning method with a significant interaction term ($p<0.001$). Therefore, a stratified analysis by marital status was performed (that is a separate table for the unmarried and married).

3.11 Ethical Considerations

Authority to extract and analyse information on the populations' reproductive health status was obtained from the principal investigator (PI) of the cross-sectional health survey that was conducted included in the bi-annual population surveillance. Data collection for this survey was approved by the KEMRI Scientific and Ethics Unit (SERU) via SSC NO 1801 (see attached appendix 1). Ethical authority to conduct this study was obtained from Jaramogi Oginga Odinga University of Science and Technology Board of Postgraduate Studies. (attached appendix II).

The researchers ensured that all target respondents were consented before administering the survey data collection tools. While administering the data collection tools, the respondents were assured of both confidentiality and privacy by keeping their identities anonymous at all stages of the exercise.

CHAPTER FOUR: RESULTS

4.1. Demographic Characteristics of Study Population

Overall, 22,289 (57.17%) out of 39,006 of the women of reproductive age in the survey reported contraception. 8,428 (21.61%) of the 39,006 participants were aged 15-24 years, where 4,572 (54.24%) of them not practicing contraception.

Parity status observed in the 22,298 participants with contraceptive history reflected 2,685 (12.04%) having 0 births, and 19,613 (87.96%) had 1-5 and above births. The 16,708 non- contraceptive active participants had a parity status of 0 births by 2,586 (15.48%) against 1-5 and above births by 14,122 (84.27 %) participants. Of the 39,006 participants,69.75% were observed as married. Ever use of contraception was reported by 75.57 % of those who accessed family planning services information through mass media.

Contraception was reported by 3, 856 (17.29%) females in the 15-24 years' age category, and 16,783 (75.27%) females in the 25-45 years' age category. Family planning methods use was observed in 15,553 out of 25,093 married participants at 61.9 %, and in 6,745 (30.25%) unmarried women. Contraception was also observed in 15,876 (71.10%) participants who practiced farming, or were housewives or had no specific occupation, against 6,422 (28.80%) running businesses or on salaried jobs.

Information access was reported by a total of 28,917 participants, of which 16,851 (75.57 %) participants who were practicing contraception, and 12,066 (72.22%) of the participants not practicing contraception. Out of the 10,089 participants who reported not to access information on Reproductive Health from mass media, 5,447 were observed to be practicing contraception, while 4,642 were observed not to be practicing contraception, 24.43% and 27.78% respectively.

Table 4.1.1: *Demographic characteristics of the study population* **(N=39,006)**

Variable/Factor	Total(N=39,006)	No (n=16,708)42.8%	Yes (n=22,298)57.17%	p-value
Age categories				< 0.001
15 – 24 yrs.	8428(21.61)	4572(27.36)	3856(17.29)	
25 – 34 yrs.	14128(36.22)	4805(28.76)	9323(41.81)	
35 - 45 yrs.	12801(32.82)	5341(31.97)	7460(33.46)	
Above 45 yrs.	3649(9.35)	1990(11.91)	1659(7.44)	
Marital status				<0.001
Single	13,913 (35.67)	7,168 (42.90)	6,745 (30.25)	
Married	25,093 (64.33)	9,540 (57.10)	15,553 (69.75)	
Parity				<0.001
0 births	5,271 (13.51)	2,586 (15.48)	2,685(12.04)	
1 birth	2,071 (5.31)	1,196 (7.16)	876(3.92)	
2-4 births	12,495 (32.03)	4,885(29.24)	7,610(34.13)	
5< births	19,169 (49.14)	8,041 (48.13)	11,128 (49.91)	
Occupation				<0.001
Farmer/Fisher	23,022 (59.02)	10,250 (61.35)	12,772 (57.28)	
Business owner	8,288 (21.25)	3,299 (19.75)	4,989 (22.37)	
Housewife/others	4,320 (11.08)	1,807(10.82)	2,513(11.27)	
Skilled/salaried	2,354 (6.03)	921 (5.51)	1,433 (6.43)	
None	1,022 (2.62)	431 (2.58)	591 (2.65)	
Access to information?				<0.001
No	10,089(25.87)	4,642(27.78)	5,447(24.43)	
Yes	28,917(74.13)	12,066(72.22)	16,851(75.57)	

4.2. Contraception Preferences

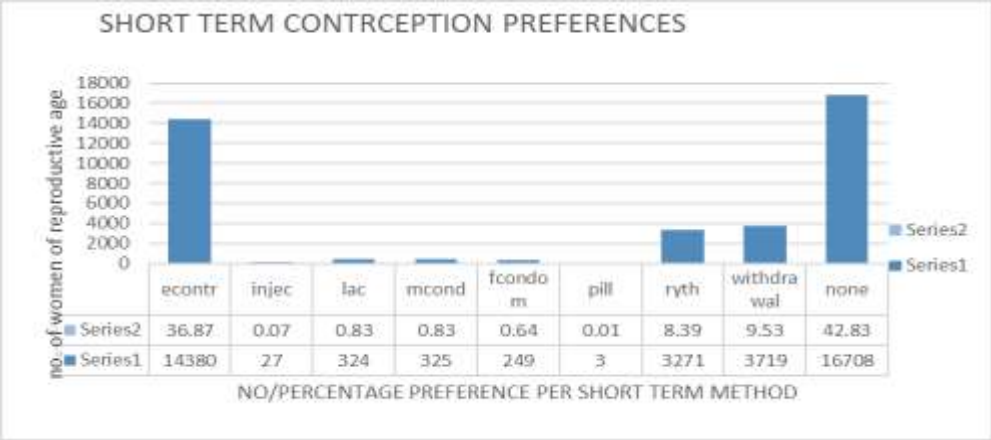
The populations' contraception practice was observed according to their preferences, as per the hormonal and non-hormonal categories. Preferences were observed to vary between women who preferred short-term and long-term contraceptive methods.

The hormonal contraceptive was preferred by a total of 36,261 participants. Contraception choice observation revealed 14,407 (36.94%) preferred the short term hormone methods, while 21,854 (53.03%) of the participants preferred the long term hormonal categories respectively.

Contraception practice in the non-hormonal methods category was observed to be preferred by 8,270 participants, where the short term methods were preferred by 7,888 (20.22%) participants. Evidently, the long-term methods were preferred by 382 (0.99%) participants respectively in this non- hormonal category.

Emergency contraception was also observed to preferred by 14,380 (36.87) participants despite their access to the other hormonal contraceptives.
Contraceptive preference as per short-term and long-term methods was reported by 22298(57.17%) and 22236(57.0%) respectively.

The hormonals in the short-term methods had low preferences of 0.07% and 0.01% for the injectables and pills respectively, while in the long-term methods high preference was observed of 56.03% for the implant method.

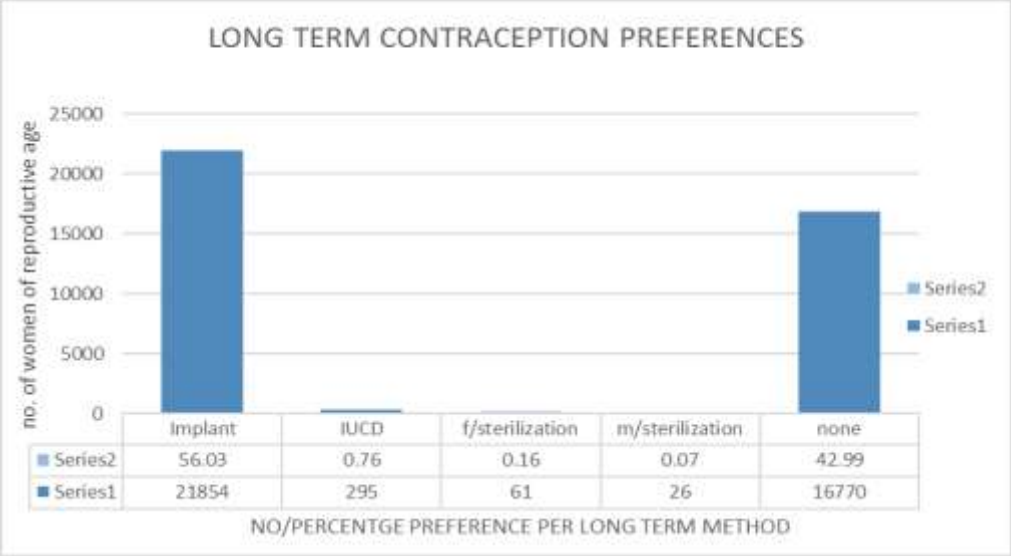


	econtr	injec	lac	mcond	fcondom	pill	ryth	withdrawal	none
Series2	36.87	0.07	0.83	0.83	0.64	0.01	8.39	9.53	42.83
Series1	14380	27	324	325	249	3	3271	3719	16708

Series 1 : number of women who preferred short term contraceptives

Series 2: percentage of women who preferred short term contraceptives

Figure 4.2.1: *Short term contraception preferences*



**Series 1 : number of women who preferred long term contraceptives*

Series 2: percentage of women who preferred long term contraceptives

Figure 4.2.2: *Long- term contraception preferences*

4.3. Social Determinants of Contraception Practice

Contraception practice was observed alongside the unique social statuses of the women of reproductive age, to include age, marital status, occupation, and access to information. This analysis was based in two main social groups of the population, namely married and unmarried women of reproductive age. Married and unmarried categorization allowed for bivariate and multivariate analysis of sociological determinants of contraception in the 39,006 women of reproductive age. Of the 39006 participants of the study group, 25,093 (64%) were observed as married, including those co-habiting, while 13,913 women, 36% as unmarried, to include the widowed, separated and single.

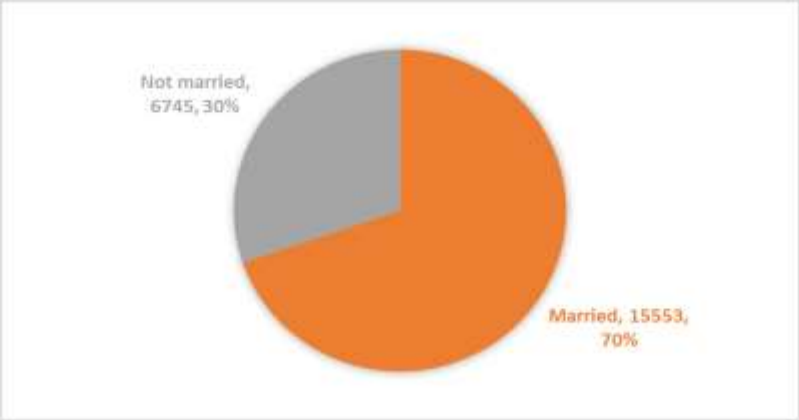


Figure 4.3.1: *Contraception practice per marital status*

A regression analysis model in married women, showed age to statistically and significantly predict contraceptive use at P -value <0.001. The likelihood of contraception at 25-34 years was (OR1.89, 95% CI 1.75 to 2.03), and (OR0.85, 95% CI 0.77 to 0.94) above 45 years for married women, while unmarried women had the odds of (OR2.45, 95% CI 2.24 to2.68) and (OR1.13, 95% CI 0.99 to1.30) respectively.

Parity and access to social media information showed a statistically significant prediction of contraceptive use at P-value<0. 001.The odds of contraception in parity was (OR 0.71, 95% CI 0.60 to 0.81) for 1 birth, and (OR 1.15, 95% CI 1.07 to 1.25) for above 5 births in married women, (Table 4.1.3), and observed to be (OR 0.88, 95% CI 0.74 to 1.05) for 1 birth and (OR1.32, 95% CI 1.19 to 1.47) for above 5 births in single women.

The fishing or farming occupation was observed to have an interesting statistical significant association to contraception at P<0.001, odds of (OR 0.89, 95% CI 0.84 to 0.95) and (OR 0.83, 95% CI 0.76 to 0.91) for married and single women respectively. Salaried jobs, not working and being a house wife was observed to have no significant association to contraceptive use.

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In the multivariate analysis, there was statistical significant prediction of contraception practice in age, parity, occupation and access to information at a P- value <0.05.

Table 4.1.2; *Contraceptive Use In Married Women Of Reproductive Age* **(N=39,006)**

VARIABLES		Univariate analysis OR(95%CI)	P	Multivariate analysis OR(95%CI)	P
AGE					
15-24yrs	1			1	
25-34yrs		1.98(1.84 to 2.18)	0.000	1.89(1.75 to 2.03)	<0.001
35-45yrs		1.49(1.38 to 1.60)	0.000	1.43(1.33 to 1.54)	<0.001
>45yrs		0.85(0.78 to 0.94)	0.002	0.85(0.77 to 0.94)	<0.001
PARITY					
0 births	1			1	
1 birth		0.66(0.57 to 0.75)	0.000	0.71(0.62 to 0.81)	<0.001
2-4 births		1.30(1.19 to 1.41)	0.000	1.18(1.08 to 1.29)	<0.001
5 and above births		1.22(1.12 to 1.32)	0.000	1.15(1.07 to 1.25)	<0.001
OCCUPATION					
Business person	1			1	
Farmer/Fisher		0.85(0.80 to 0.91)	0.000	0.89(0.84 to 0.95)	<0.001
H/w and other		0.97(0.88 to 1.07)	0.596	0.98(0.89 to 1.08)	0.783
Not working//NA		0.91(0.77 to 1.07)	0.286	1.01(0.85 to 1.20)	0.895
salaried worker		1.01(0.91 to 1.14)	0.805	1.01(0.91 to 1.14)	0.746
NO	1				
YES		0.85(0.80 to 0.90)	0.000	0.85(0.80 to 0.90)	<0.001

There was a statistically significant prediction of contraceptive use reflected in the bivariate analysis in unmarried women. Contraceptive use was predicted at P<0.001, by age, parity and access to information, in unmarried women, as in the married women

Unmarried women reporting 1 birth, reflected a unique statistical value of P=0.175, while those reporting 2-4 births and 5 and above births reflected a P<0.001 significance like the married women. Farming/fishing and house wife as an occupation had a statistical significant association to contraceptive use at P<0001 and P=0.005 respectively, compared to being salaried worker or not working, with no significant association to contraception observed, at P=0.426 and P=0.506 respectively.

The multivariable model showed, age, parity and access to information, independently predict contraception use in this population, P< 0.001, in both unmarried and married

women. The unmarried women aged 25-34 years reflected the odds of (OR 2.45, 95% CI 2.24 to2.68) of contraception while those above 45years had odds of (OR1.13, 95% CI 0.99 to1.30) of contraception. Occupationally, being a salaried worker and not working was not significantly associated to contraception use, P-value=0.426 and P-value=0.506, respectively.

Table 4.1.3; *Contraceptive Use In Unmarried Women Of Reproductive Age (***N=39,006)**

VARIABLES		Bivariate analysis OR(95%CI)	P	Multivariate analysis OR(95%CI)	P
AGE					
15-24yrs	1			1	
25-34yrs		2.61(2.38 to 2.85)	0.000	2.45(2.24 to 2.68)	<0.001
35-45yrs		1.67(1.52 to 1.82)	0.000	1.67(1.52 to 1.82)	<0.001
>45yrs		1.08(0.85 to 1.23)	0.240	1.13(0.99 to 1.30)	0.080
PARITY					
0 births	1			1	
1 birth		0.78(0.65 to 0.92)	0.004	0.88(0.74 to 1.05)	0.175
2-4 births		1.85(1.66 to 2.05)	0.000	1.63(1.45 to 1.82)	<0.001
5 and above births		1.46(1.32 to 1.62)	0.000	1.32(1.19 to 1.47)	<0.001
OCCUPATION					
Business person	1			1	
Farmer/Fisher		0.81(0.74 to 0.88)	0.000	0.83(0.76 to 0.91)	<0.001
H/w and other		0.84(0.74 to 0.86)	0.011	0.83(0.73 to 0.94)	0.005
Not working//NA		0.92(0.73 to 1.14)	0.460	1.08(0.86 to 1.36)	0.506
salaried worker		1.06(0.91 to 1.25)	0.415	1.06(0.91 to1.25)	0.426
INFORMATION					
NO	1			1	
YES		0.83(0.77 to 0.89)	0.000	0.81(0.75 to 0.88)	<0.001

CHAPTER FIVE: DISCUSSION

This study observed the determinants of contraception, among women of reproductive age, in the HDSS of Siaya County, Kenya. The analysis revealed the populations'

contraceptive use to be slightly more than 50% (57.16%). These are positive progressive results, based on Kenyan contraception projections, which estimate that, by the year 2030, 66% of women of reproductive age, will take up contraception, and this would have risen to 70%, by 2050 (Lagami Christabel, 2018). Equally, current statistics from KNBS also show, contraceptive use of 58%. WHO and UNFPA current uptake stands at 57.4% (WHO, 2018).

Other studies in Africa, have shown varying degrees of contraception in different sociological status. The study population's contraception equally reflected differently in their sociological characteristics. Out of the 22,298 women who reported contraception, 15,553 (67.75%) were married while 6,745 (30.75%) were unmarried, 2,685 (12.04%) had no births while 19,613 (87.96%) had at least one delivery, and 16,851 (75.57%) had access to information, while 5,447 (24.43%) didn't. Overall analysis in SSA has shown since 1990, that contraception practice by women of reproductive age is attributed to continuous access to Reproductive Health information and accelerated programs that promote contraception (Bongaarts J. *et al.,* 2018) . A more recent study that looked at trends in use of long-term hormonal contraceptives in countries in the SSA also depicted a 3% slow but steady rise in their use (Adedini *et al.,* 2019) .

A study done in Kenya, on post-natal contraception, showed women of reproductive age who were in their post-partum period had a high contraceptive uptake of 87% (Jalang'o *et al*, 2017). In Burundi the uptake was 3%, beyond the 66% current WHO statistics. However, most studies show uptake of contraceptives ranging between 43-57% (Shabiby *et al.,* 2015). Another cross sectional study done in Cameroon ,showed that contraceptive use among women of reproductive age was relatively at a high of 58% (Njotang *et al*, 2017) . Therefore, our study's' contraception status observed in the HDSS is within the current SSA projections when compared with other studies, and relatively high, and not far from the Kenyan projection of 60% by 2030.

Hormonal methods were most preferred by 14,407 (36.94%) and 21,854 (53.03%) participants from the short term and long term categories respectively, whereas, non-

hormonals were least preferred by 7,888 (20.22%) and 382 (0.99%) participants from the short term and long-term categories respectively. Only 36.87% of them showed preference to emergency contraception. This falls in line with a study in Uganda, that showed preference of hormonal long acting methods among women residing in the rural areas (Nakayiza *et al.*, 2014)

The study was also anchored on the occurrence model, to determining the factors that predict contraceptive use among women of reproductive age in this community. Its ability to independently investigate these contraception predictors both for married and unmarried women, was based on the fact that an individual's decision on contraception may be influenced by the presence or absence of a partner or spouse. It is for this reason that we stratified the analysis by marital status.

Among the married women, age parity and access to contraceptive information predicted high contraceptive use compared to the unmarried women, while occupation played no significant role. A similar study in the Ugandan HDSS, a site with low uptake of contraception services, investigators set out to determine contraception predicators. The key results in their findings just like this current study showed that women of lower age and equally those who accessed information on reproductive age reported using contraceptives (Kabagenyi *et al*, 2017).

A number of studies have been done across Africa to look at predictors of contraception and in essence enable recommendations to both public and private policy makers. The study on uptake and determinants of contraception in SSA, revealed, age parity and exposure to mass media as significant determinants to contraception (Adedini *et al*, 2019) . In Kenya a study done in one of the rural referral hospitals determined that women of lower age and those who had attained higher education levels were the ones with a higher likelihood of using contraceptives (Jalang'o *et al*, 2017) . This study equally revealed a higher likelihood of contraceptive use by unmarried and married women respectively, aged 25-34 years, as opposed to those aged 35 years and above. This highlighted that, among sexually active adolescent girls in Ghana, the odds of using contraception was higher among the unmarried women and those who reside in the urban areas.

Studies done on contraceptive use among married women generally gave mixed results in terms of predictors of contraceptive use. This highlighted a woman's education status, and partners influence as a predictor of inter-birth contraception (Begna *et al.*, 2013) . In Ethiopia, the low contraceptive uptake of 29%, is associated with being educated, and having information on contraceptive use (Tiruneh *et al*, 2016) . Additionally, by contrast, old age is negatively associated with contraceptive use, where the older the woman's age, the lower the likelihood of contraceptive use, and this output was observed in the contraception prediction analysis in our HDSS study. The same sentiment on contraception by Njotang, reflects that the older the woman, the less likely they are to use contraceptives (Njotang *et al*, 2017) .

In Ethiopia, a study on Long acting Contraceptive Methods(LACM), which is similar to long-term contraceptive methods, in women living with HIV, showed the odds for demand and use of contraceptives was higher among women with elementary, education, as well as access to information on Reproductive Health, compared to those with no education (Gelagay *et al.*, 2015) .

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

There is evidence of unmet contraceptive need reflected by the high awareness of the rural population, at 100%, about reproductive health services against the low 57.17%, contraceptive practice. Demographically, the adolescents and young adults are observed to be most affected population, that require reproductive health interventional services and youth supportive reproductive health and contraceptive policies to control the early sex debut impacts on their lives.

Hormonal contraceptives are the most preferred, especially the implant which is among the long term methods alongside the male and female condoms, which also double as dual barrier methods against sexually transmitted diseases. Use of these main methods can be maximized by encouraging correct use, subsidized supply and community follow up, to clear doubts, myths and supply constraints that could deter supply and access.

Contraceptive use, in the sociological concept, is quite low in the young adult, observed to experience high parity in their early sexual debut. This linked with low contraception prediction rate of an average 13% in unmarried women compared to 15% in married women continues to expose the young population to the dangers associated with early and unplanned pregnancies. A populations health epidemiological status, ranging from minimal disease outbreaks to larger pandemics could easily shift their social economic activity and thus the need to always integrate reproductive health plan to larger public health programs

Access to information about contraceptives through phones and radios or television which is observed to influence and increase the demand for contraceptive use alongside the sociological, demographic and economic characteristics of the individual, should motivate use of social media to pass basic selective reproductive health information to the public.

The women of ages between 15-24 years were observed to have a higher contraception need compared to those of 35yrs and above, which is the population of focus when implementing reproductive health and contraception practice programmes. This can be a focus target for subsidized reproductive health and contraception outreach programs.

Contraceptive practice and parity seemed to complement each other from the low prevalence observed among women reporting zero parity. Interestingly, contraceptive prevalence was observed to increase with parity, which would relate to a possible use of short term contraceptive use to allow for frequent conception, thus high parity in in the population of who reported contraceptive use compared to those who did not. These findings reflect the African social norms regarding fertility expectation, and its influence on contraceptive choice, which should always be considered and discussed during reproductive health programs implementation.

6.2. Recommendation for action

This study recommends that, the Ministry of Health in Kenya, should support the County government of Siaya, as well as the other counties, to ensure improvement of Reproductive Health systems and infrastructure functions, to complement contraception preferences, as predicted. This will strengthen implementation of Reproductive Health services in the rural areas, to facilitate knowledge and access to contraceptives. Targeting the sexually active age group of 15-24yrs through information technology on reproductive health issues, will guide them on where to visit for all comprehensive services for their consumption.

There is need, considering the sociological factors, to introduce and diversify the implementation of youth friendly services which would be comprehensive enough to include the reproductive health services, as well as perinatal period counselling which will capture the population of that age category. Integrating such services in the already available health care facilities on the ground will encourage access by the youth at the ground level. Deploying skilled service providers, and facilitating progressive capacitation, will support uptake of these services by the youth who make up a good percentage of the target population.

Global efforts on prevention of unintended pregnancies, alongside maternal morbidities and mortalities in adolescents should consider social norms in marriage and fertility expectations in the community, so as to ensure that family planning strategies can be universally accessible and acceptable in the society. It would be of good public health benefit to focus on the reproductive health element of health systems management support because it is progressively a significant indicator of any epidemiological status, that cuts across all demographic characteristics, and shift in the public health status.

6.2.1. Recommendation for further research

This study recommends further research in similarities and differences between use and preferences of contraceptive use between married and non-married couples and individuals in the rural areas.

Conducting a similar research on Reproductive Health status in the same population in the urban areas, with a comparative analysis to the rural area, will help to inform policy on the steps to take so as to curb the morbidities and mortalities due to unmet needs.

A feasible clinical study on acceptance of reproductive health services and contraception by males should be done, as they are contributing to reproduction, and decision making when it comes to having children in the society.

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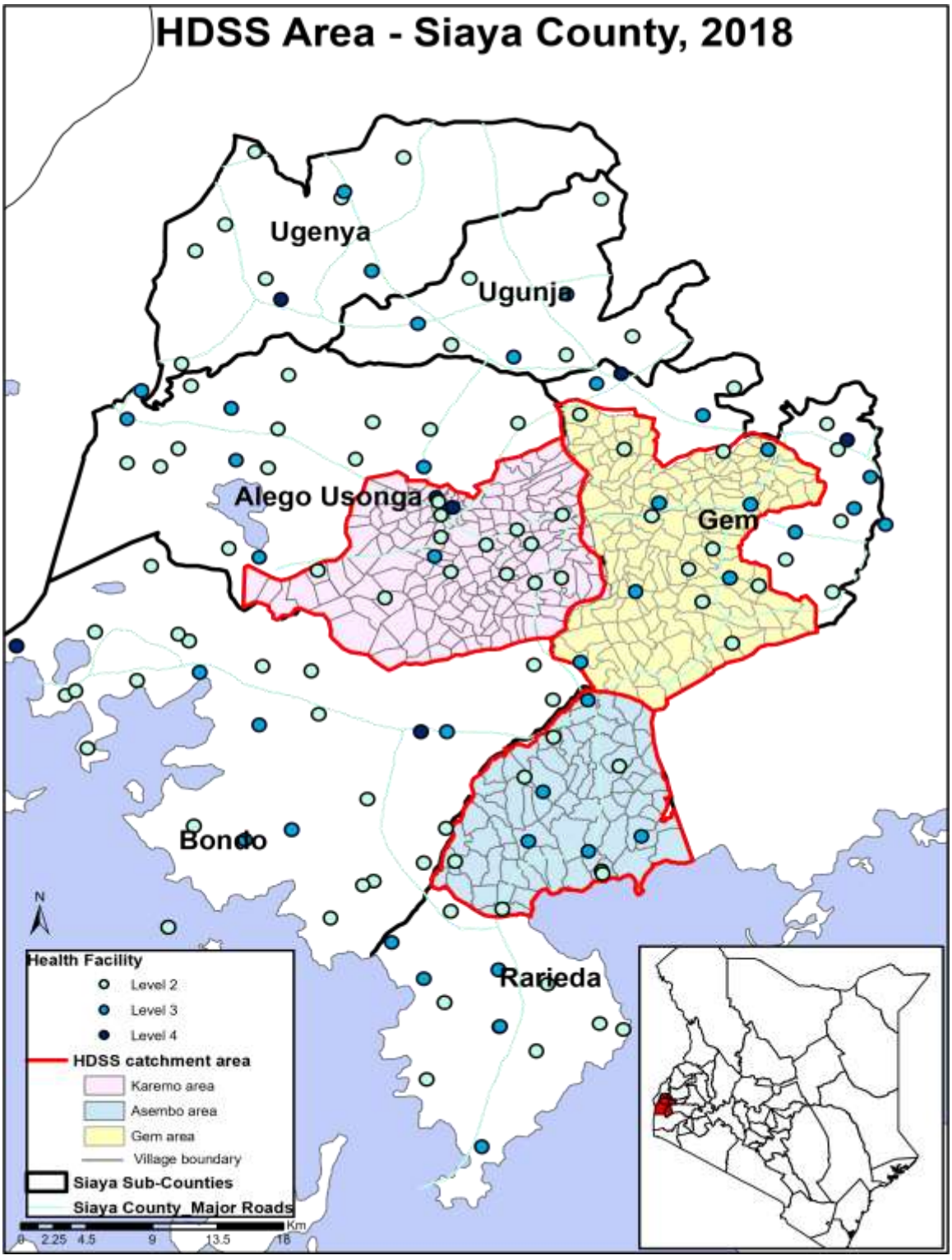
APPENDICES

Appendix 1: Map of the HDSS study area



Appendix2: Data abstraction tool for secondary analysis

DATA ABTRACTION FORM FOR DETERMINANTS OF CONTRACEPTION AMONG WOMEN OF REPRODUCTIVE AGE IN THE HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM OF RURAL SIAYA COUNTY, KENYA.

PARTICIPANT PID NO:

A. DEMOGRAPHIC FACTORS

1: Age in years……..

2: SEX : male female

3. Marital status

 Married

 Single

 Divorced

 Widowed

FAMILY PLANNING METHOD KNOWLEDGE AND USE

1. Ever heard of family planning : Yes No

2. Family planning method preference and use :

	FAMILY PLANNING METHOD	PREFERED	USE
TYPE:	SHORT TERM		
METHOD:	Emergency contraceptive		
	Daily pills		
	Female condoms		
	Male condoms		
	Injectable		
	NONE		
TYPE	LONG TERM		
METHOD	Intra-Uterine Device (COIL)		
	Implant		
	BTL (FEMALE)		
	VASECTOMY (MALES)		
	NONE		

B. SOCI-ECONOMIC DETERMINNTS OF CONTRACEPTION

1. OCCUPATION

□ self-employed □ employed

□ skilled labour(carpenter/tailor) □ unskilled labour (shamba/construction)

□business owner □commercial farming (selling maize)

□Subsistence farming □ house wife

□not working □ salaried worker (teacher/nurse/office)

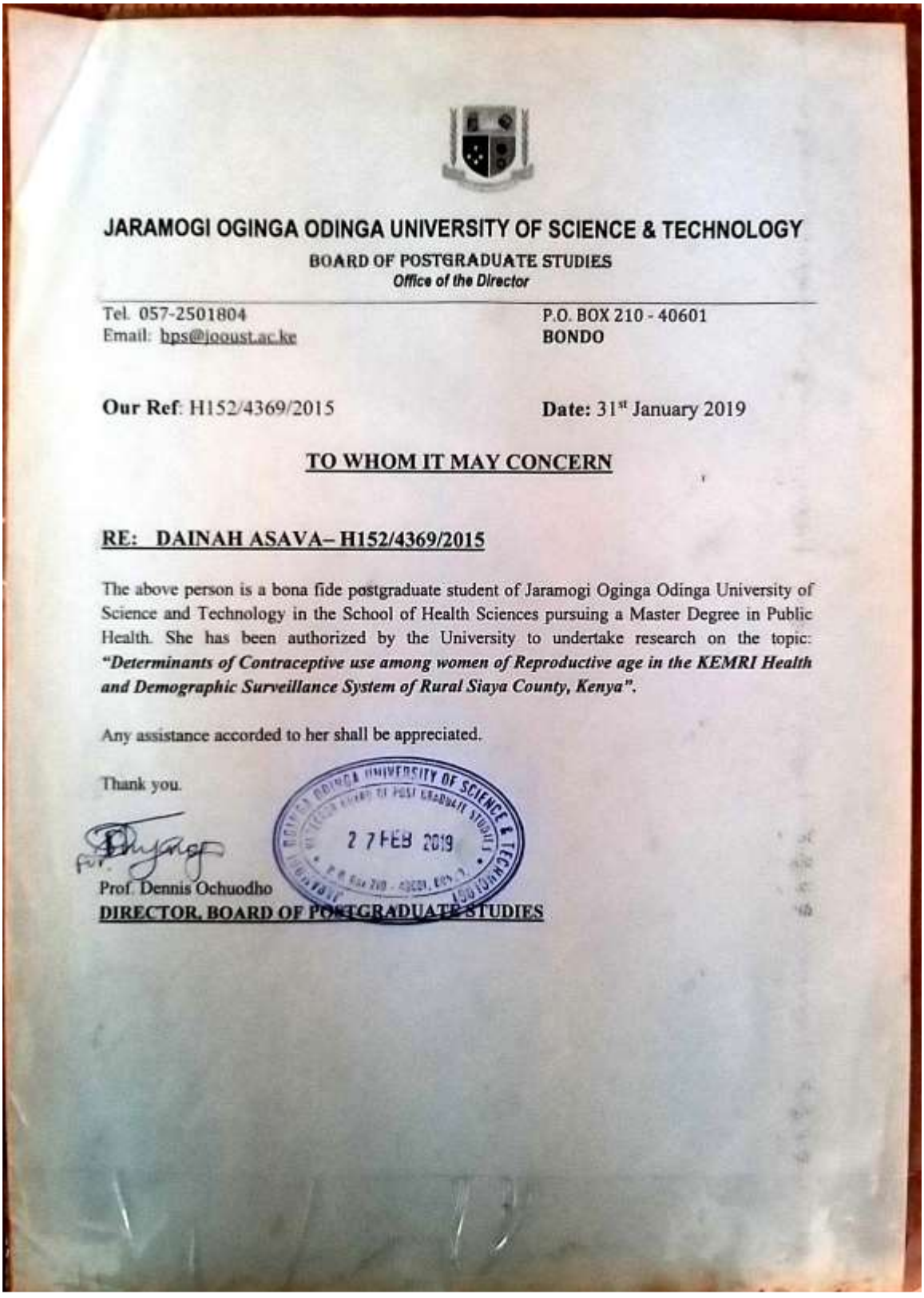
□ fisher □small business

□ other

2. Number of births ……..
3. Means of communication/information and entertainment owned (tick all that apply)

□ Phone □ radio □ television

Appendix 3: JOOUST Board Of Post Graduates Approval



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

BOARD OF POSTGRADUATE STUDIES
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P.O. BOX 210 - 40601
BONDO

Our Ref: H152/4369/2015

Date: 31st January 2019

TO WHOM IT MAY CONCERN

RE: DAINAH ASAVA– H152/4369/2015

The above person is a bona fide postgraduate student of Jaramogi Oginga Odinga University of Science and Technology in the School of Health Sciences pursuing a Master Degree in Public Health. She has been authorized by the University to undertake research on the topic: ***"Determinants of Contraceptive use among women of Reproductive age in the KEMRI Health and Demographic Surveillance System of Rural Siaya County, Kenya".***

Any assistance accorded to her shall be appreciated.

Thank you.

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY
27 FEB 2019

Prof. Dennis Ochuodho
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Appendix 4: SSC protocol approval by KEMRI SERU

KENYA MEDICAL RESEARCH INSTITUTE

Centre for Global Health Research, P.O. Box 1578-40100, KISUMU-KENYA
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THE KEMRI Scientific and Ethics Review Unit
Nairobi

Thro'
The Director,
Centre for Global Health Research

19th June 2018

RE: USE OF HDSS DATA TO EXAMINE DETERMINANTS OF CONTRACEPTIVE USE AMONG WOMEN OF REPRODUCTIVE AGE IN SIAYA COUNTY; A MASTERS PROJECT FOR DAINAH ASAVA

This is to confirm to SERU that Dainah Asava who is a staff working in KEMRI-CGHR has been granted permission by the investigators to use data collected under protocol no. **SSC 1801** titled, **Health, Demographic, Socioeconomic, and Health Facility Surveillance in western Kenya**.

Dainah's proposed project seeks to characterize determinants of contraceptive use among rural women in Siaya County. The proposed analysis is part of the objectives of this project, and appropriate consent had been obtained from study participants as evidenced in the attached copy. On behalf of the Investigators, I approve her use of these data for her Masters project.

Sincerely,

Godfrey Bigogo, PhD

HDSS Lead

In Search of Better Health