DETERMINANTS OF DEMAND FOR CERVICAL CANCER SCREENING SERVICES IN RURAL AREAS IN KENYA

BY

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REG NO: X53/67591/2013

A RESEARCH PROJECT SUBMITTED TO THE UNIVERSITY OF NAIROBI, SCHOOL OF ECONOMICS IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN HEALTH ECONOMICS AND POLICY

OCTOBER 2019

DECLARATION

I hereby declare that this research project entitled Determinants of demand for Cervical Cancer Screening in rural areas in Kenya is a bonafide and genuine research work and it has not been presented or submitted to any University for awarding of a degree.

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This research work has been submitted for examination with my approval as the university supervisor.

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DEDICATION

I wish to dedicate this research project to my family, specifically my husband Mr Kevin Bundi Njuki and Mother Mrs Susan Wanjiku Kamau for their unwavering support during the whole study period.

This study is also dedicated to all the cancer survivors in Kenya and their dedicated care givers.

ACKNOWLEDGEMENT

I wish to thank the Almighty God for enabling me to come this far and providing me with good health and resources to complete this Research project.

I also wish to thank my Supervisor Dr Moses Muriithi for his guidance throughout the course work and research project. He gave great insights and inputs that added value in this work.

I also wish to thank the School of Economics for the acceptance into the course and providing the necessary course material and support during the learning period.

Many thanks to my fellow course mates for their invaluable support and Mr Joseph Abuga Orayo who assisted in the analysis of the data.

I am also grateful to my boss Mrs Florence Mwigio who encouraged me to complete the course and contribute to improvement of healthcare in the country.

Special thanks to other relatives and friends for their support.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
CA Cervix	Cervical cancer
CCSS	Cervical Cancer Screening Services
CPG	Clinical Practice Guidelines
HIV	Human Immunodeficiency virus
HPV	Human Papilloma Virus
KDHS	Kenya Demographic Health Survey
SDG	Sustainable Development Goals
VIA	Visual Inspection with Acetic Acid
VILI	Visual inspection with Lugols Iodine
WHO	World Health Organization

ABSTRACT

Cervical cancer is a disease of gender and other inequalities. Research indicates that a woman screened even once between the age of 35 and 40 years has a reduced probability of getting cancer of the cervix in her lifetime by 25 to 36 percent. Kenya is ranked number 16 among the 20 nations with high cervix cancer disease burden. Despite the fact that screening is an effective means, uptake of cervical cancer screening services (CCSS) is low among eligible women especially in rural Kenya. Studies done have showed that between 60 percent and 85 percent of the rural women are aware about cancer of the cervix yet less than 3 percent of them have been screened. This study was mainly conducted to establish the determinants for demand of the CCSS in rural areas of Kenya. The specific objectives were for determination of the general profiles of women using CCSS in rural areas in Kenya, and investigate the effect of socioeconomic factors on demand for cervical cancer screening while holding provider factors constant in rural areas in Kenya. The study made use of the latest 2014 Kenya Demographic Household Survey which is a household-based cross sectional survey data containing general information on all major health care services. The hypothesised relationship was estimated through the use of robust binary probit regression model and tested significance at 1 percent, 5 percent and 10 percent levels. From the findings, there were 19,465 women of reproductive age in rural areas with those using cervical cancer screening services at 16.57 percent. It was revealed that about 20.15 percent of the persons interviewed in urban areas demanded CCSS while only 14.12 percent of the persons interviewed in rural areas demanded CCSS. Estimation results revealed that socioeconomic factors led to a significant increase in demand for CCSS among rural women in Kenya. Specifically, middle and rich wealth indices as well as all education levels were significantly and positively associated with demand for CCSS in Kenya. Based on the study findings, the study suggests that there is a need for the government to lower socioeconomic status disparities in health by developing a policy initiative that addresses the main components of socioeconomic status which include income, education, and occupation as well as the way in which these components affect health seeking behaviour of rural women.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Cancer has been and is still classified as a major public health concern globally (Siegel, Miller & Jemal, 2016; 2019). The World Health Organization (WHO) alludes that cancer is the second primary cause of death internationally (WHO, 2018). For instance, cancer is the second contributor to mortality in United States of America (USA). In the USA, the incidence of cervical cancer in 2017 was projected to 12,820 cases and mortalities were projected to 4,210 cases (American Cancer Society, 2017). A total of 1,762,450 new cases of cancer, as well as 606, 880 deaths are estimated projections to occur in the USA by the end of the year 2019 (American Cancer Society, 2019). According to WHO (2019a), the rise in the cases of cancer is due to the increase in the older populations as well as rise in adoption of risk behaviour.

In United States, the most common cancers include skin, breast and cervical cancer comes third (Smith, Andrews, Brooks, Fedewa, Manasaram-Baptiste, Saslow & Wender, 2018). According to the WHO (2019a), malignancies of the cervix, liver and prostate are very prevalent in Africa. In most Africa countries, cervical cancer comes second in the common cancers affecting women and constitutes up to 25 percent of all female cancers (Parkin, Hämmerl, Ferlay, & Kantelhardt, 2019). In sub Saharan Africa, about 34.8 new incidences of Ca cervix are established per 100,000 females annually and 22.5 of the cases per 100,000 females die from cervical cancer whereas In North America, there are 6.6/100,000 new cases and 2.5/100,000 female deaths annually as a result of Ca Cervix, (Olubodun, Odukoya, & Balogun, 2019).

Ca cervix incidence rises in females between the age of 20 to 29 years, peaks at 55 to 64 years and drops after 65 years (Baldur-Felskov, Munk, Nielsen, Dehlendorff, Kirschner, Junge, & Kjaer, 2015; Makurirofa et al., 2019)

The body part from where cancer originates accords it the name despite its metastases to other parts of the body (Simms, Steinberg, Caruana, Smith, Lew, Soerjomataram & Canfell, 2019).In this case, the cancer originating from the cervix is referred to as cervical cancer.

Cancerous lesions of the cervix can grow into neighbouring tissue and subsequently destroys it. The growth of cervical cancer has a slow progression occurring approximately for a period of ten to twenty years (Indu, Poothiode, Navamoni, & Prasad, 2018). Predisposing factors to cervical cancer development include: Human Papilloma Virus (HPV) type sixteen (16) and type eighteen (18) infection, many sex partners and Human Immunodeficiency Virus (HIV) /AIDS co-morbidity among other factors. More than thirty types of HPV infect the genital tract whereby the epithelial cells transform into pre-cancerous lesions in the cervix (Herfs, Soong, Delvenne & Crum, 2017). However, HPV type sixteen as well as type eighteen are associated with over seventy percent of the cervical cancer (Arbyn, Xu, Simeons & Martin-Hirrsch, 2018).

A prerequisite to cervical cancer is a treatable premalignant phase that can be identified via screening popularly known as Cervical Cancer Screening (CCS). This comprises of identification of individuals with a disease who are asymptomatic with the use of simple tests across a population (Davies, Chersich, Mullick, Naidoo, Makhoba, Rees, & Schwartz, 2019). All sexually active females are recommended to undertake CCS (Ogunbode, & Ayinde, 2005). Considering the available evidence, WHO, advised the use of Visual Inspection with Acetic Acid (VIA) and Lugols Iodine (VILI) for screening especially in third world countries. Pap Smear is also recommended for screening and where possible, high risk HPV needs to be tested with subsequent treatment (Davies, et al., 2019).

In the world, Ca cervix remains the main root of cancer mortality amongst many women in low and medium regions such as in Sub Saharan Africa, including Central America, South and Southeast Asia (Pilleron, Sarfati, Janssen-Heijnen, Vignat, Ferlay, Bray & Soerjomataram, 2019). The rise in morbidity rates for cancer of the cervix in these states is associated with increased prevalence of HPV infection as well as non-effective CCS programs. Cervical cancer comes fourth in malignancies that affects women followed by breast cancer, cancer of the colon as well as lung cancers. In advanced states the crude coverage of CCS among females between 25 and 64 years stands at 93.6 percent, approximately 44.7 percent in third world nations and an average of 63.7 percent worldwide (Scott, 2019). According to a study by Makurirofa, Mangwiro, James, Milanzi, Mavu, Nyamuranga, & Kamtauni (2019) the crude coverage of CCS among child bearing women is also low at 18.5 percent in developed and developing countries.

The negative seeking behaviour, lack of enough knowledge and high HPV infections rates contribute to the high morbidities noted in developing countries. There's also poor use of CCS services in zones with effective CCS programs (Baldur-Felskov et al., 2015; Glasziou, Strauss, Brownlee, Trevena, Dans, Guyatt & Saini, 2017.)

Most emerging African states haven't yet established nationwide CCSS programs despite the existing Clinical Practice Guidelines (CPGs) for CCS. In these nations, the women are not likely to be screened yet they are at high risk of development of Ca Cervix. (Pilleron, et al., 2019). Literature has shown that CA Cervix is treatable with a good prognosis resulting from early diagnosis however, there's persistently low awareness as well as poor usage of CCS services (Arbyn et al., 2018; Makurirofa et al., 2019; Simms, et al., 2019).

In most developing nations in the world, diagnosis is made in an advanced stage with poor survival rates (WHO, 2019b). In sub Saharan Africa states, there are increased new cases of

the Ca cervix where a huge proportion of patients are diagnosed at late stage. Available information suggest that there are unsuccessful mass programs of screening (Lim & Ojo, 2017). Unfortunately, only 5 percent of females in third world countries especially in sub-Saharan African undergo CCS compared to above 40 percent in advanced states (Lim & Ojo, 2017; Bray, Ferlay, Soerjomataram, Siegel, Torre & Jemal, 2018). Cervical cancer mostly affects younger women compared to other cancers and contributes to significant adverse effects especially on the socioeconomics of families and communities (Sundstrom, Smith, Delay, Luque, Davila, Federr & Brandt, 2019).

1.1.1Global Burden of Cervical Cancer

In third world nations, Ca Cervix results in over 80% of new incidences as well as mortalities (WHO, 2019b). The East and Central block of Sub-Saharan Africa bears the major morbidities and mortalities of Ca cervix (Gottlieb, 2018). Ca cervix is also reported as the main cancer in female population across Sub-Saharan Africa with over 200 million female above 15 yrs of age at probable danger of being diagnosed with cervical cancer (Lim & Ojo, 2017; Bray, et al., 2018). In developed countries there has been evidence of a drop in new cases (with a drop of about 27 percent) given the existence of screening protocols that have been put in place (Bray, et al., 2018).

In East Africa for example, mortality in 2019 is projected at 34.6 per 100,000 women-years and age standardized incidence rates for cancer of the cervix are estimated at 42.7 per 100, 000 (Lim & Ojo, 2017; WHO, 2019b).In Uganda for example, cancer of the cervix is the major common cancer among females given a projected age standardized incidence rate of 47.5 per 100,000 given a 33.6 percent prevalence rate of HPV (Nakisige, Schwartz & Ndira, 2017; Bray, et al., 2018).

1.1.2 Overview of the Cervical Cancer Burden and Challenges in Kenya

In Kenya, cervical cancer has a high frequency with an estimated 5250 cases per year and mortality of 3286 cases per year (Bruni, Albero, Mena, Gomez, Munoz,Bosch, de Sanjose 2019). Ca Cervix in Kenya is the principal cause of mortality and the second common reason of reproductive tract cancer among female of reproductive age (Sherman & Okungu, 2018; Nyangasi, Nkonge, Gathitu, Kibachio, Gichangi, Wamai, & Kyobutungi, 2018). In Kenya, the population of women of 15 years and above is estimated at 10,505 million (51.2%) and this populace is at risk of getting cancer of the cervix (Kenya National Bureau of Statistics, 2014).

In 2017, Kenya was ranked number 16 among the 20 high cancer of the cervix disease burden nations given age standardized share of 40.1 for every 100,000 women in the world (Abdikarim, Atieno & Habtu, 2017). In Kenya, the CCS coverage is only at 3.2 percent for women between ages of 18 to 69 despite the high burden and the fact that the disease is preventable through early and timely screening (Lukorito, Wanyoro & Kimani, 2017).

Data from the National Guidelines for Cancer Management in Kenya indicates that an estimated number of 2,454 females are diagnosed with Ca cervix morbidity and 1676 die annually from the same. As women from rural areas of Kenya are not exceptional from low utilization of CCS services, rural women also form part of this high risk population, yet a small percentage of females in Kenya have undergone screening (Orang'o, Wachira, Asirwa, Busakhala, Naanyu, Kisuya, & Inui, 2016, Nyangasi et al., 2019). According to Nzioka, (2017) Papsmear is mainly available in urban areas and is most commonly used in CCS compared to rural areas (Anwar, Tampubolon, Van Hemelrijck, Hutajulu, Watkins & Wulaningsih, 2018). Low demand for CCSS is as well noted in Zimbabwe and Kenya (Makurirofa, et al., 2019; Nyangasi et al., 2019).

It is projected that of the above one million women in the world diagnosed with Ca cervix, most of them have no accessibility to medication that is curative or that would enhance longevity (Tabaac, Sutter, Wall, & Baker, 2018). For example women in East Africa community states, Kenya included are associated with several obstacles on demand for cervical screening. The setbacks include; inadequate knowledge of the indications and advantages of screening, inadequate female clinicians to perform the screening procedure, inconvenience in the set clinic times, anxiety as a result of an abnormal pap smear (Swanson, Ueda, Chen, Huchko, Nakisige, & Namugga, 2018; Nyangasi, et al., 2019).

Cancer patients in Kenya experience several challenges; For example travelling from all over the country, some over 600 kilometres to access medical attention. Diagnostic amenities (laboratory and radiological) are offered majorly in the capital as well as main cities but are limited in capacity. For instance, there are about four radiation centres in the country and all are located in Nairobi. They include; Kenyatta National Referral Hospital (KNH), MP Shah Hospital, The Nairobi Hospital, as well as Aga Khan University Hospital covering a population of over 40 million (Reddy & Kimani, 2018; Munoru, Gitonga, & Muraya, 2019). From this observation, other modalities of treatment for example surgery, chemotherapy may be accessible but limited and at times absent in rural parts of the country.

The existing radiotherapy centres handle about 3,800 patients annually, a number that is far away below the needs for the country (MOH, 2018; Munoru, Gitonga, & Muraya, 2019). Majority of cancer patients in Kenya at times present themselves while at the late stage. It is argued that data availability is scanty and is mainly hospital based. Therefore the true burden of the disease is unclear which has consequently, hindered resource allocation (Munoru, Gitonga, & Muraya, 2019).For example, the recent 2017/2018 budget allocated 700 million Kenya shillings to cancer which was an improvement since previous budgets had no monetary

allocation to cancer (National Health Accounts, 2018). However, the budget is considered inadequate as the cancer burden is big and soon is likely to top in mortality rate after infectious diseases and cardiovascular diseases (Mukuna, 2019).

1.1.3 Understanding Cervical Cancer and Screening Practices in Kenya

Ca Cervix is primarily caused by HPV with type 16 and 18 being mainly accountable for invasive cervical cancer (WHO, 2019a). Cervical cancer has a slow progression rate and thus early detection and screening increases chances of successful treatment (Ministry of Health, 2018). The American society of cancer has also set out guidelines whereby women below 21yrs are not screened for cervical cancer. However Pap smear is recommended once in three years for females between 21years and 65years. HPV DNA test and Pap smear otherwise known as co-testing is required once in every 5years for women who are above 30 years of age (American Society of Cancer, 2017).

Cervical cancer screening in Kenya is through (VIA), (VILI), Pap smear and HPV testing with a 5year cycle. Annual CCS is only suggested for HIV positive women, women undergoing treatment or those who have had an abnormal test result (Joshi, Muwonge, Kulkarni, Deodhar, Mandolkar, Lucas, & Sankaranarayanan, 2019). Screening is also advised for women of the age 25 to 50 years (Ministry of Health, 2018).

Despite the fact that screening is an effective means, Nyangasi et al. (2018) concluded that uptake of CCS services is low among eligible women in Kenya. Screening in low resource environments like rural areas is also mainly carried out by VIA/VILI which is cheaper and has a fair sensitivity (Njiru, 2016; Nessa, Anwar, & Begum, 2019). Similarly, pap smear though having good specificity is not mainly used in rural areas as its expensive requiring infrastructure and well trained personnel who may not be readily available (Njiru, 2016;

Ministry of Health, 2018). Thus increased uptake of early screening among rural populations is important as they may not be excused from underutilization and yet they could be more susceptible to HPV infection compared to their counterparts in urban areas.

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1.2 Statement of the Problem

Like HIV, Ca cervix is a disease of gender and other inequalities (Batra, Gupta, & Mukhopadhyay, 2018; Corrigan, Wall, Bartlett, & Suneja, 2019). More than 75 percent of females in the developed nations are estimated to have had ca cervix screening in the past five years compared to those in developing countries who are estimated at less than 5percent. (Bray, et al., 2018).In Kenya, 51.2% of women in reproductive age who are estimated at 11 million are at risk of Ca Cervix development (KDHS, 2014). Ca cervix is classified as a common malignancy among females with an incidence of 5250 diagnosed and approximate mortality of 3286 lives in Kenya. Research indicates that the probability of getting Ca cervix is reduced by 25 to 36 percent if a woman screened even once between the age of 35 and 40 years (Nzioka, Nyagetiria and Karanja, 2018; Nyangasi, et al., 2019). Though CCS exist in Kenya, unfortunately increased mortality rate remain due to Ca cervix.

The Kenya National Cancer Control Strategic Plan 2011-2016 proposed Ca cervix screening integration into available Maternal, and Child Health (MCH) or family planning services, comprehensive care services and routine gynaecology services to facilitate reaching the 70 percent screening coverage (Ministry of Health, 2018), but despite the efforts that has not been achieved yet. It is estimated that Kenyan women with Ca cervix knowledge is high at 76 percent yet only 14 percent of these women have undertaken CCSS (KDHS, 2014). Studies done have showed that between 60 percent and 85 percent of the rural women have heard about cancer of

the cervix yet less than 3 percent of them have had any of a CCS (Abdikarim, Atieno & Habtu, 2017; Nzioka, Nyagetiria & Karanja, 2018; Nyangasi, et al., 2018).

Further, some other studies (Walker, 2016; Moodley, 2017; Sweet, 2018; Wells, Thompson, Ross, Yeakey, & Notaro, 2018; Munoru, Gitonga, & Muraya, 2019) established that lack thereof of aggressive CCS especially rural areas is unfortunately resulting in mortalities yet with preventable intervention. Gatumo, Gacheri, Sayed, & Scheibe (2018) made the same conclusion after examining women's knowledge as well as attitudes linked to cancer of the cervix and CCS in Tharaka Nithi and Isiolo counties. This study is thus conducted with a clear understanding that early diagnosis and pre-cancerous lesions clinical management improves length and quality of life of the women in rural areas of Kenya, besides being cost effective. This study is thus undertaken to investigate determinants of demand for CCSS in rural Kenya.

1.3 Research Questions

i. What are the general profiles of women using the cervical cancer screening services in remote areas of Kenya?
ii. What is the effect of socio-economic factors on demand for cervical cancer screening services holding provider factors constant in rural areas in Kenya?
iii. What are the policy inferences based on results of the study?

1.4 Objectives of the Study

1.4.1General Objective

The main aim of this study was to examine the determinants for demand of the cervical cancer screening services in rural areas of Kenya.

1.4.2 Specific Objectives were in three fold

i. To explore general profiles of women using cervical cancer screening services in rural areas in Kenya.

ii. To determine the effect of socio-economic factors on demand for cervical cancer screening while holding provider factors constant in rural areas in Kenya.

iii. To develop policy based on results of the study.

1.5 Justification of the Study

Screening programs can effectively reduce the burden of cancer if they make sure that women get the tests that they require and are executed perfectly and suitable way. Over the world, Ca Cervix is ranked top among the major popular reproduction cancers between females and the number one root of cancer mortalities in females in 3rd world nations (WHO, 2019b). In the America, from1975 to 2012, incidence of cancer of the cervix reduced by half that is 14.8 per 100,000 to 6.5 per 100,000 due to the universal CCS (The American Cancer Society in 2016). In Kenya the occurrence of cancer of the cervix is still high at 40.1 per 100, 000. Women in rural areas of Kenya unfortunately have low ca cervix screening practice in contrast to their town/city fellows. Since most of those discovered cancer of the cervix die from it, there is need for an urgent and appropriate interventions in order to curb the increased morbidity and mortality rate. This study is undertaken with an understanding that CCS plays a part in achievement of the Sustainable Development Goals (SDGs) of decline of early death from non -infectious diseases by one third by prevention, medication and promoting mental health and wellbeing. Therefore, this study focuses at examining determinants of the demand for CCS in remote areas of Kenya. The findings may aid policy makers in curbing cervical cancer in rural areas where infrastructures including social amenities and women's level of education is low

based on KDHS (2014). Secondly, the study may be significant to scholars who want to advance the subject matter as well as academicians in the higher institutions of learning.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section evaluates the existing theoretical and actual literature on demand for health services. A broad review of relevant theories is presented by the theoretical literature review while empirical literature review entails a review of previous studies on the subject matter.

2.2 Theoretical Literature Review

2.2.1 Grossman Model of Human Capital by Grossman (1972)

The Grossman model illustrates health as a capital good which does not depreciate instantly. Every individual receives an initial health stock which can increase with investment, depreciate with age or remain constant overtime (Grossman, 1972). The stock of health of capital provides the output of fine healthy days which decides the overall quantity of time one can take in production. Health is demanded as a consumption good whereby health makes people feel better and sickness is a source of disutility. It is also demanded as a good of investment whereby it decides the overall quantity of time present for commercial and non- commercial activities (Grossman, Wineburg & Woolworth, 2001). A unit change in the stock of health decreases the period lost in tasks and the expensiveness of this decline is an index of the benefit to an investment in health.

The Grossman model views an individual as a producer of his or her own health as individuals can choose their life-length by engaging in various health intakes such as proper diet, exercise, smoking of cigarette and drinking of alcohol (Grossman, Wineburg & Woolworth, 2001). This has an influence on health stock over time and subsequent health outputs in regard to mental wellbeing, physical health and activity limitation.

Demand for health increases with income whereby returns of best health are more for high income earners so they desire higher maximal stock of health (Mushkin, 1962). Demand for health also increases with education as it's less costly to generate health as the individuals are more aware thus resulting in high optimal health stock. Maximal stock of health also decreases with age if the health rate of depreciation increases as a person grows old.

The Grossman model hence explains the demand for health as dependent on factors including; age, income, education, and health status as well as other factors. In this study, the said variables determine the use of cervical screening of cancer and thus having an overall effect on the health stock of an individual. The individuals being producers of health can also engage in healthy practises such as cervical cancer screening as an investment on their health to enable them maintain a healthy stock overtime. In rural areas, most of the women may be un-educated, have low income thus may not engage in preventive actions such as CCS as there may be competing needs such food ,shelter and clothing.

2.2.2 Health Service Utilization Theory by Andersen (1968)

The theory states that the access of a person to and use of the services of health is a function of 3 attributes (Andersen, 1968; 1995): firstly, the liable aspects which contains socio-attributes of

persons that come before sickness; Social formation (education, employment, ethnicity, social networks, interactions as well as culture); Human fictions factors such as stances, values, perceptions, and demographic aspects like age and sex. Secondly, enabling factors including logistical facets of acquiring care (that is as personal, family, health insurance, regular source of care); community; present health man-power, health amenities, waiting time; possible ingredients like genetic aspects. Thirdly, need aspects including reviewed need (helps to understand care finding and upholding to a nursing regimen); assessed need that is a judgement that is professional about the health condition of persons and purpose for medical attention.

The theory in this context shows how socio characteristics, logistical factors of acquiring care and need aspects can also explain demand for CCS for females in rural regions. Aspects such us knowledge of cervical cancer, perceptions on it, coupled with availability of health facilities with trained health personnel to do screening influences an individual's choice of cervical cancer screening. Note that information relayed to the population also influences the ability of individuals to assess the need for cervical cancer screening.

2.2 Empirical Literature Review

In Sub-Saharan countries, inappropriate understanding of cancer of the cervix, insufficient finances, long distance from the health amenities, and long waiting times for pap smear appointments are highlighted as the main habitual obstacles to cancer of the cervix screening initiatives (Ebu, Mupepi, Siakwa & Sampselle, 2015; Lim & Ojo, 2016; McFarland, Gueldner, & Mogobe, 2016). High level of education, white-collar jobs and access to information are positively connected with uptake of CCS services (Kadam, 2016; Muthoni, Ochieng, Mburugu, Samson,

Taratisio& Gacheri, 2016; Feyisa, & Temesgen, 2019). In addition, other researchers showed that females autonomy in decision making, health insurance and gaining entry into information databases through platforms of education and social media are powerfully and indisputably connected with experiences of screening (Cunningham, Skrastins, Fitzpatrick, Jindal, Oneko, Yeates, & Aronson, 2015;Melvin, Jefferson, Rice, Cartmell, Halbert, 2016; Jenkins, Minh, Anh, Ngan, Tuan, Giang, & Murray, 2018). These researches established that females' autonomy making decisions enhanced demand for CCS.

Kileo, Michael, Neke and Moshiro, (2015) investigated usage of CCS services, and its connected attributes among women teachers of primary schools in Ilala Municipality, in Tanzania. They carried out a cross-sectional study involving 110 schools of the primary level in Ilala Municipality in Dar es Salaam. Data on usage of cancer of the cervix and risk aspects were collected through questionnaire(s) that were self-administered. Equivalent usage of services of CCS was pointed out via a self-report. Risk aspects for services usage were examined through logistic regression analyses. Utilization of CCS services was assessed based on age, marital status and education level. Females had more chances of using the services of screening cancer if they were multiparous, described more than one lifetime sexual partner, or didn't include their partners in making health related decisions. They concluded that there was minimum consumption of screening services of Ca cervix among female school teachers at the primary level in Ilala-municipality. Female teachers at the primary level who had been pregnant more than once previously and those who have had more than one sexual partner were more likely to report use of the service.

In Nigeria, a study done between healthcare personnel, medicine students and medical practitioners, showed a minimum level of usage than non-healthcare workers (Ayinde &

Omigbodun, 2003). Similar research showed that nursing staff did not use the services of screening in an effective way (Ruffin, & Gorenflo, 2004). Similar studies done in Tanzania, Uganda and India reported low usage of cervical services of screening cancer .It was indicated that there was minimum use of CCS services among workers in healthcare sector (Goyal, Vaishnav, Shrivastava, Verma, & Modi, 2013).

In situations where fruitful screening initiatives are present, inappropriate knowledge and poor health seeking behaviour in the population has resulted to inappropriate usage of CCS services (Parfenov, 2018). Other researchers showed mixing findings where either low or higher socio-economic status contributes to minimum use of CCS services and medication (Denny, Jemal, Schubauer-Berigan, Islami, Vilahur, Fidler, & Vaccarella, 2019). In related studies in many third world nations, gender empowerment and values influence usage of reproductive health services. According to Kamiya (2011); Melvin et al (2016) and Jenkins et al., (2018) gender empowerment can affect a female's mobility and strength in making a decision to gain entry into services of health care. It was established that the empowerment of females within the surroundings of their family and connections with their spouse can play a strong role in their usage of services of health of the reproductive system (Rawl, Dickinson, Lee, Roberts, Teal, Baker & Haggstrom, 2019).

In related studies, Halle-Ekane, Nembulefack, Orock, Fon,Tazinya & Tebeu, (2018)in Cameroon revealed that absence of information about Ca cervix in the populace and between staff workers in the medical sector is a chief obstacle towards finding the cure for cancer of the cervix. In Tanzania, a research carried out between healthcare workers established the below obstacles to CCSS, females' level of education, knowledge on the malignancy, its treatment/cure, stigmatization, screening pain, gender of the medical services giver and spouse approval (Yeates,

Sleeth, Hopman, Ginsburg, Heus, Andrews & Oneko, 2016). Further, Darj, Chalise & Shakya, (2019) revealed other obstacles to cervical screening of cancer usage as beliefs concerning sickness at the cultural level, economic aspects, and hostile services of health care.

Morema, Atieli, Onyango, Omondi, & Ouma (2014) undertook a study to assess the key aspects of CCS uptake for females who are between 18 and 49 years old especially those who sought for services at the Jaramogi Oginga Odinga Teaching and Referral Hospital in Kisumu County. They conducted a cross-sectional research, whereby comprehension, views and indications for action connected with personally-reported screening of the cervix intake were looked into detail. Data on socio-status of demography (age, education level, marital status, employment status, as well as level of income), understanding concerning cancer of the cervix, views on the seriousness and sensitivity to the disease were assembled using structured questionnaire(s). Personal-reported intake of screening was 17.5 per cent. A strong as well as a positive correlation was established among age, income and education levels with the service intake. Level of understanding concerning the signs and symptoms of Ca cervix was a significant quantifier for undergoing screening for the same. In addition to that, participants that claimed to be not aware concerning cancer or weren't aware about its signs had a higher chance of not undergoing screening.

Mwangi (2015) carried out a research to determine the factors that influence use of the visual inspection method of CCSS in Kitui Central. It evaluated the awareness level of respondents concerning cancer of the cervix prevention, their attributes of demography, economy, cultural socially and aspects of health care amenities as the variables correlated with usage of the aided tests of screening of the cervix. The cancer of the cervix awareness level prevention between qualified respondents in study area was low, compared to the national target while the universality

of usage of VIA/VILI services was also minimum in response to the suggested coverage rate for the initiative to have an effect. There was a significant correlation statistically among usage of VIA/VILI for CCSS and realization on Ca Cervix and its prevention, education level, main income source, average income per month, core decision maker in the household. Public amenities of health were not staffed well and supplied to substantially give the VIA/VILI services of screening fruitfully.

Nzioka, Nyagetiria and Karanja (2018) did a study that attempted to establish the usage of CCSS by healthcare workers (HCWs) in chosen health amenities within County of Machakos. Data was collected through questionnaires that were self-administered and a facility evaluation tool. Regression was put through the binary logistic analysis. Only 25 per cent of HCWs had made use of the CCS services. HCWs who were certificate, diploma and degrees holders had low chances of using CCSS in contrast to HCWs who had reached the graduate level of studies or higher. Again workers of health with 30 years of age or below along with those who are in 31-40 age bracket of years had minimum chances of using CCSS in contrast to healthcare workers who were 50 years and more.

In a study conducted by Tiruneh, Chuang, Ntenda, and Chuang, (2017) by analysing data from the KDHS of 2014, concentrated on 9016 females who had spouses with their age of reproduction being 15 to 49 years. They undertook a multilevel analyses utilizing the general linear mixed models with the log-binomial function to analyse concurrently the correlation of personal as well as society-level aspects with screening of cancer of the cervix. Based on their findings, approximately 72.1% of females were aware of cancer of the cervix. Out of this percentage, only 19.4 per cent had gone through the CCSS. From estimation, results showed that CCSS was optimal

amongst females aged between 35 and 49 years more than females with the age between 15 and 24 years. Screening was also optimal between females staying at Nairobi , Nyanza, and Central areas than females staying at the Coast of Kenya. The screening of cancer of the cervix was more universal between females who had an exposure to social media, had optimal family wealth index, were on a payroll, had insurance cover, and had visited a health amenity in a year than their fellow counterparts. History of the pap smear test was 19 per cent more between females who had autonomy sexually than females who didn't have autonomy sexually.

2.3 Overview of the Literature Review

From the literature, some few researches have explored the likely causes of minimal attendance rates of females in cancer of the cervix screening initiatives globally, regionally and nationally (Ayinde, et al, 2003; Goyal, et al, 2013). Both demographic factors, socioeconomic and environmental aspects have always been correlated with minimal demand of CCS services (Morema et al., 2014). Studies about what decides CCSS in sub-Saharan region of Africa have stressed commonly on attributes level individually of CCS services (Arulogun et al, 2012; Kileo, et al., 2015; McFarland, Gueldner, & Mogobe, 2016).

On the other hand, most of the reviewed studies including Arulogun et al., (2012); Morema et al., (2014), and Nzioka, Nyagetiria and Karanja, (2018) were either hospital based or covered a specific location or cadres of women for example health care workers and little was done to determine demand for these services by rural women making their study not generalizable for a wider population. Also their findings were mostly descriptively and thus not useful in developing policy. Though the status of economy socially can be a crucial aspect that decides the capability to cater for services of prevention, some studies however discovered contrary findings with regard

to socioeconomic status. For example Anwar, Tampubolon, Van Hemelrijck, Hutajulu, Watkins,&Wulaningsih, (2018) discovered that females with higher levels of income had low chances of participating in the visual inspection that is based on screening whereas Denny, et al., (2019) revealed otherwise making the subject inconclusive. This study used a recent national data set to attain the set study goals. Further, many of the studies have focused on the entire population of women with others keen to explore factors associated with usage of these services in urban areas for example Nzioka, et al., (2018) leaving a gap for rural population which this study explores. Despite use of binary regression models, some studies have purely adopted descriptive form of analysis. This study employed probit model in establishing the determinants of need for the CCS services in remote regions of Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

The techniques applied in the study are presented in this section. It begins with the conceptual framework, the identification and estimation of the model, definition and measurement of variables, data issues and concludes with the data sources.

3.2 Conceptual Framework

Health care services utilization in Kenya may be compared to the behavioural model of health services use (Valluri, Mammen, & Lass, 2015). This model explains the role played by the environmental, individual and need aspects in the ascertainment of certain health service use that is the use of various services of health like services CCS (Kietzman, Toy, Bravo, Duru, & Wallace, 2019). The environmental factors entail all the elements of the external surrounding including the health systems for example the type of place of residence and insurance coverage. The individual factors are those that are inherent to specific individuals such as education levels, employment status among others. The aspects of need, which are related to deduced and assessed need, have the type of provider, presence of chronic problem and rating of one's health as the proximate variables. The diagram below demonstrates these relationships with government regulations moderating the relationship;

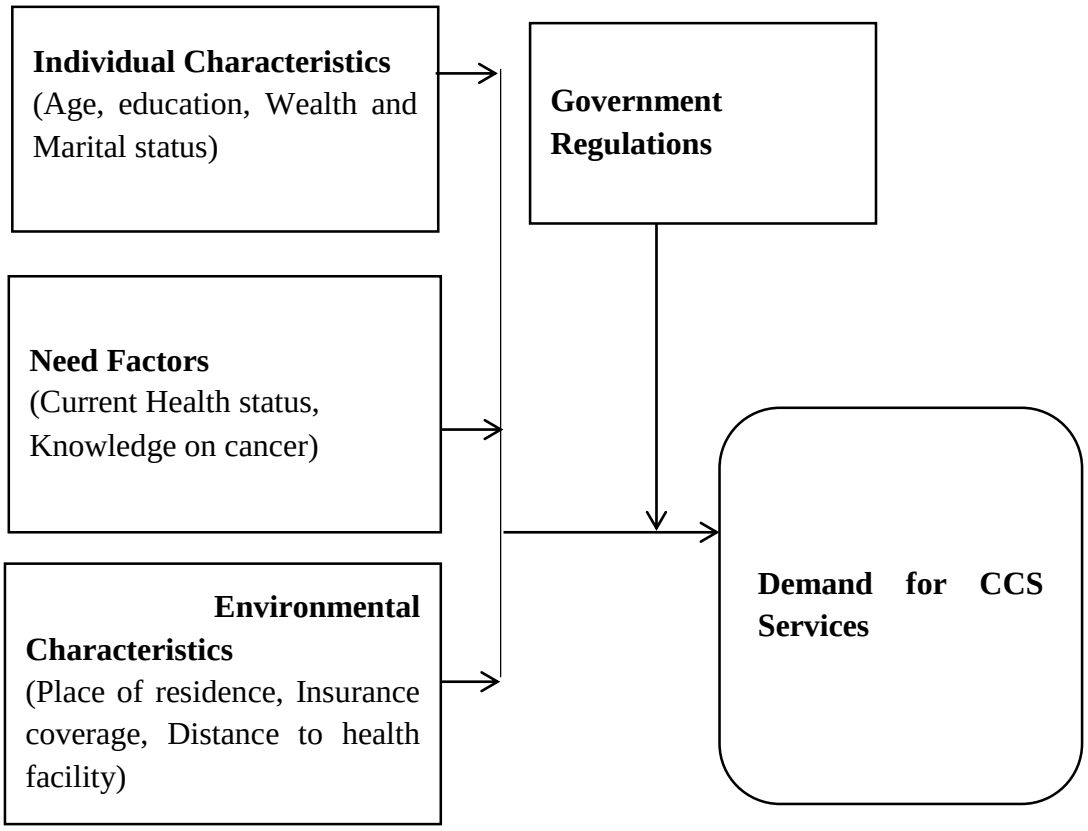

Figure 3.1: The Conceptual Framework

3.3 Model Specification and Estimation

The approximation of the model is specified upon the binary outcome of the form of binary probit model which has the ability to report the probability of observing a certain outcome using maximum likelihood estimation. The probit link function follows a more stringent standard normal distribution (Semykina, & Wooldridge, 2018). This study considers this model to be appropriate since it incorporates the inverse of the cumulative normal distribution as a component in its link function and do not make assumptions on linearity as well as constant variance (Orayo, 2014).

According to Cox (2018), due to the fact that cumulative normal distribution produces a probability number between 0 and 1 for any given value, the probit model is robust in providing probabilities for binary outcomes as the line of best fit captures all the values between 0 and 1 without producing spurious probabilities. Following Cox (2018) the utilization of screening services by a woman, was modelled as binary variable as shown in the following equation;

$y^* = x'\beta' + \varepsilon$……..3.1

Where y^* is assumed to be an unobserved reliant variable, x' is a vector of independent variables (including socioeconomic aspects like education, wealth, residing area among others and community characteristics, vector for demographic factors and child characteristics including age of the woman, gender of household head and birth order); β is a estimators' vector and ε is the residual.

Here, the dependent observed variable 'y' can only be observed if $y^* > 0$ and $y^* \leq 0$ otherwise. Therefore, given that the reliant variable y which is binary and can be regressed on a number of independent variables (Orayo, 2014), the probit model can be presented as:

$\text{Prob}(\text{Y} = 1 \text{ given that } \text{X} = \text{F}(\text{X}'\beta)$……3.2

Where Pr = probability

F = Cumulative Distribution Function (CDF) of the standard normal distribution

β = vector of estimates to be approximated.

The probit model is approximated through the use of the method of maximum likelihood and a positive unit change in X leads to a positive/negative change in the chances of observing an event

(Cox, 2018; Semykina, & Wooldridge, 2018). The cumulative density function results into probabilities interpreted as predicted probabilities (ME). The ME shall be clarified as the change in the probability of utilizing services of screening cancer by rural woman in Kenya, for a unit change of any of the independent variable other factors held constant.

In specifying the model, the study used a binary probit model to determine usage of services of screening cancer in Kenya. The general model is as shown below;

$$y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \beta_5 X5 + \beta_6 X6 + \beta_7 X7 + \varepsilon \ldots\ldots\ldots\ldots\ldots 3.3$$

With **y** being the dummy of the use of cancer services of screening, X1=age of the mother, X2= maternal education, X3=marital status, X4=wealth index, X5=Distance to the nearest health facility, X6= health insurance, X7=access to information (exposure to mass media). The expected signs of the model are as shown in table 3.1.

3.4 Description of Variables and Measurement

Table 3.1: Definition and Measurement of Variables

Variables	**Measurement**	**Expected signs and Source**
Dependent Variable Demand for cancer screening services in rural Kenya	Cancer screening services =1, 0 if not screened	
Explanatory Variables		
Age	Complete years of age	**Positive** (Morema et al., 2014)

Age^2	Complete Years of Age^2	**Negative** (Morema et al., 2014)
Marital Status	1 if married, 0 if single	**Positive** (Kileo, et al., 2015)
Educational Level	No schooling=1, 0 otherwise Primary=1, 0 otherwise Secondary=1, 0 otherwise Higher =1, 0 otherwise	**Positive** (Cunningham et al., 2015, Melvin et al, 2016; Jenkins, et al., 2018)
Socioeconomic status	Wealth index: (poor=1, middle=2, rich=3)	**Positive** (Darj, et al., 2019)
Distance to health facility	Far=1 and Near=0	**Negative** (Ebu, et al., 2015; McFarland, et al., 2016)
Medical Insurance	Health insurance cover Yes=1, No=0	**Positive** (Cunningham et al., 2015, Melvin et al, 2016; Jenkins et al., 2018)
Decision making on own health	1 if woman (herself), 0 if spouse or otherwise	**Positive** (Melvin et al, 2016; Jenkins, et al., 2018)
Exposure to Media	Frequent access to media (1 and 0 otherwise)	**Positive** (Muthoni, et al., 2016, Kadam, 2016; Feyisa, & Temesgen, 2019)

3.5 Data Source and Data Issues

This research used the Kenya Demographic and Health Survey data of 2014, collected between May to October 2014. The use of a national dataset is due to the fact that it has all information of rural women with regard to uptake of services of screening cancer to model the relationship. A nationally, regionally and county representative sample of 40,300 households was drawn targeting females of the age of reproduction (15-49 years) and males aged between 15-54 years. The sampling of households applied two-stage cluster sampling methodology where at first stage a total of 1,612 clusters were drawn from the master sampling frame after which 25 households were systematically drawn from each of the sampled clusters. Of the sampled households, 36,813 households were found occupied at the time of interview visits out of which 36,430 were successfully interviewed resulting to a 99 percent response rate. Approximately a total of 32,132 females were qualified for the national survey. From the eligible number, only 31,079 women were successfully interviewed. Data on place of residence was used to separate rural women from urban women. Information on the type of screening they have ever done is collected and utilization levels. Information on demographic or individual characteristics, socioeconomic data, community and environmental factors that was used in this study was also collected.

3.5.1. Multicollinearity Issue

Multicollinearity is a scenario where which one feature variable in a retrogression model is optimally linearly correlated with another feature variable. As stated by McCormick, Vatcheva, Lee & Rahbar (2016) the retrogression transmissions are not exceptionally decided due to multicollinearity. Later on it damages the model explicability as then the retrogression transmissions are not exceptional and have impacts from other attributes. The presence of Multicollinearity was detected using computed

correlation matrices. The highly collinear variables have values of Variance Inflation Factor (VIF) being more than 10 and 1/VIF being lower than 0.10. The inclusion of highly correlated variables may lead to inflated coefficients which have an impact on policy implication if the results thereof are to be used in a simulation exercise. Variables that are highly correlated therefore have to be removed as a remedy.

3.5.2. Heteroscedasticity Issue

Heteroscedasticity refers to the condition whereby the variable discrepancy is not same within the set of values of a 2nd variable that predicts it (Lewis-Beck & Lewis-Beck, 2015). This issue is majorly due to the availability of data deviation. Deviation implies that the observations that are either small or large in respect to the other observations are available in the sample (Manoharan, Ganesh, & Sathiaseelan, 2016). It also occurs due to exclusion of variables from the model. Heteroscedasticity also known as heterogeneity of variance was tested by the use of residual plots. If it exists, its eradication involves the adoption of heteroscedasticity probit regression models or employment of robust standard errors using STATA software.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents the findings and discussion of empirical results exploring the determinants for demand of the CCSS in rural areas of Kenya. Specific objectives explored in analysis include; exploring the general profiles of women using CCSS in rural areas in Kenya and determining the effect of socioeconomic factors on demand for Ca cervix screening while holding provider factors constant in rural areas in Kenya. Presentation and discussion of descriptive statistics, as well as empirical results are presented.

4.2 Descriptive Statistics

The descriptive characteristics (comprising of, standard deviation, mean, minimum and maximum) of women sampled across the rural Kenya as per the Demographic and Health Survey (KDHS-2014) are presented in this section. The study presents the distribution of women in urban and rural settings, uptake of Ca Cervix screening services, as well as general profiles of women residing in rural Kenya. The dependent variable under study is the uptake of CCSS among women residing in rural areas in Kenya. The independent variables include; current age of the woman, age squared, educational levels, marital status, socioeconomic status, distance to the nearest health facility, medical insurance, decision making on own health and access to media. In the survey, there were a sum of 31, 079 women in the reproductive age (WRA) in Kenya who were respondents. The data showed that there were approximately 19,465 WRA in rural Kenya. This inferred that most of the respondents who were in this case 62.6 percent resided mainly in rural areas (see table 4.1).

Table 4.1: Distribution of women in Urban and Rural Areas in Kenya

Residence	Freq.	Percent
Urban	11,614	37.37
Rural	19,465	62.63
Total	31,079	100.00

4.2.1 Uptake of Cervical Cancer Screening Services in Kenya

As indicated in the findings presented in table 4.2, respondents who reported to have utilized CCSS in Kenya were 16.57 percent whereas those who did not use this service were 83.43 percent. Further, the study assessed those women who used cervical cancers screening services in urban and rural areas. In urban areas, about 20.15 percent of respondents were found to have had CCSS in comparison to 14.12 percent respondents in rural areas.

Table 4.1: Demand for Cervical Cancer Screening Services in Kenya

Variable	Observations	Mean	Std. Dev.	Min	Max
Countrywide	10,333	0.1656828	0.3718136	0	1
Urban areas	4,198	0.2015245	0.4011867	0	1
Rural Areas	6,135	0.1411573	0.3482121	0	1

Source: ***Computation from KDHS 2014***

4.2.2 General Demographic and Socioeconomic Profiles of Women in Rural Kenya

In the first objective, the study investigated the general profiles of women using ca cervix screening services in the rural areas in Kenya. On the assessment of age distribution, most respondents were found to be 29 years old on average with little variation of about 9 years. Considering the minimum and the maximum, the youngest female was 15 years and the oldest

was 49 years. Marital status was also assessed where married women was compared to unmarried women. From the findings, approximately 58.75 percent respondents were married. On educational levels, majority of the respondents that is 55.18 percent had attained primary level of education, 23.82 percent had attained secondary level of education whereas about 16.28 percent had no education. Only 4.72 percent had tertiary or higher level of education.The results findings are as indicated in table 4.3

Table 4.1: Women' Characteristics and Health Insurance Coverage Levels

Variable	Observations	Mean	Std. Dev.	Min	Max
Age of the Woman	19,465	29.10	9.73	15	49
Age Squared	19,465	941.69	601.21	225	2401
Marital status	19,465	0.5875	0.4923	0	1
No education	19,465	0.1628	0.3692	0	1
Primary education	19,465	0.5518	0.4973	0	1
Secondary education	19,465	0.2382	0.4260	0	1
Higher education	19,465	0.0472	0.2121	0	1
Poorest	19,465	0.3159	0.4649	0	1
Poorer	19,465	0.2414	0.4279	0	1
Middle	19,465	0.2346	0.4237	0	1
Rich	19,465	0.1612	0.3677	0	1
Richest	19,465	0.0470	0.2116	0	1
Distance to health facility	9,267	0.3252	0.4685	0	1
Medical Insurance Coverage	9,265	0.1143	0.3182	0	1
Decision making on own health	5,749	0.3743	0.4840	0	1
Exposure to Mass media	19,465	0.7785	0.4152	0	1

Source: ***Computation from KDHS 2014***

Considering the socioeconomic status, it was revealed that there was a particular trend from the poorest to the richest where majority came from poorest group. Specifically, the poorest

group was high at 31.59 percent, followed by poorer group reported to be 24.14 percent whereas the rest of the categories that is, middle, rich and richest were 23.46, 16.12 and 4.7 percent respectively. Health facility distance was reported to be a big problem by 32.52 percent of the respondents. Only 11.43 percent of respondents owned medical insurance cover. The study further assessed whether respondents made decision on their own health. It was revealed that about 37.43 percent of the respondents had an opportunity to make decision on their own health. Lastly, the study revealed that 77.85 percent of women in rural areas had exposure to mass media.

4.3 Diagnostic Tests

4.3.1 Correlation Analysis

The study explored the association between variables under study to determine the strength. From table 4.4, the study established that all pairs of variables were moderately correlated. The correlation coefficients were below 0.5. However, age and age squared were highly correlated which was expected as age squared was a derived variable from age. Considering the sign of correlations, almost all respective pairs were positively correlated except correlations between education levels and marital status, wealth index and marital status, exposure to mass media and marital status. Also, the study revealed a negative link between distance to health facility and wealth index, health facility distance and medical insurance and finally health facility distance and exposure to mass media. Based on correlation matrix table, there was a conclusion that there was no presence of multicollinearity among the study variables.

Table 4.1: Correlation Matrix

Variable	Age	Age squared	Marital status	Education Level	Wealth index	Distance to the health facility	Medical insurance	Decision on own health	Exposure to mass media
Age	1.0000								
Age Squared	0.9923	1.0000							
Marital Status	0.0326	0.0284	1.0000						
Education Level	0.0048	0.0049	-0.0151	1.0000					
Wealth index	0.1655	0.1599	-0.0014	0.4191	1.0000				
Distance to the health facility	0.0213	0.0162	0.0120	-0.0636	-0.1546	1.0000			
Medical insurance	0.1049	0.1009	0.0322	0.3350	0.3491	-0.0904	1.0000		
Decision on own health	0.1188	0.1123	-0.0316	0.0452	0.0587	0.0091	0.0037	1.0000	
Exposure to mass media	0.0608	0.0599	-0.0077	0.2725	0.2856	-0.0853	0.1452	0.0344	1.0000

Source: ***Computation from KDHS 2014***

4.3.2 Heteroscedasticity Test

The study used the heteroscedasticity residual plot to test to determine variation/constancy of the variance. The results are presented in Figure 4.1.

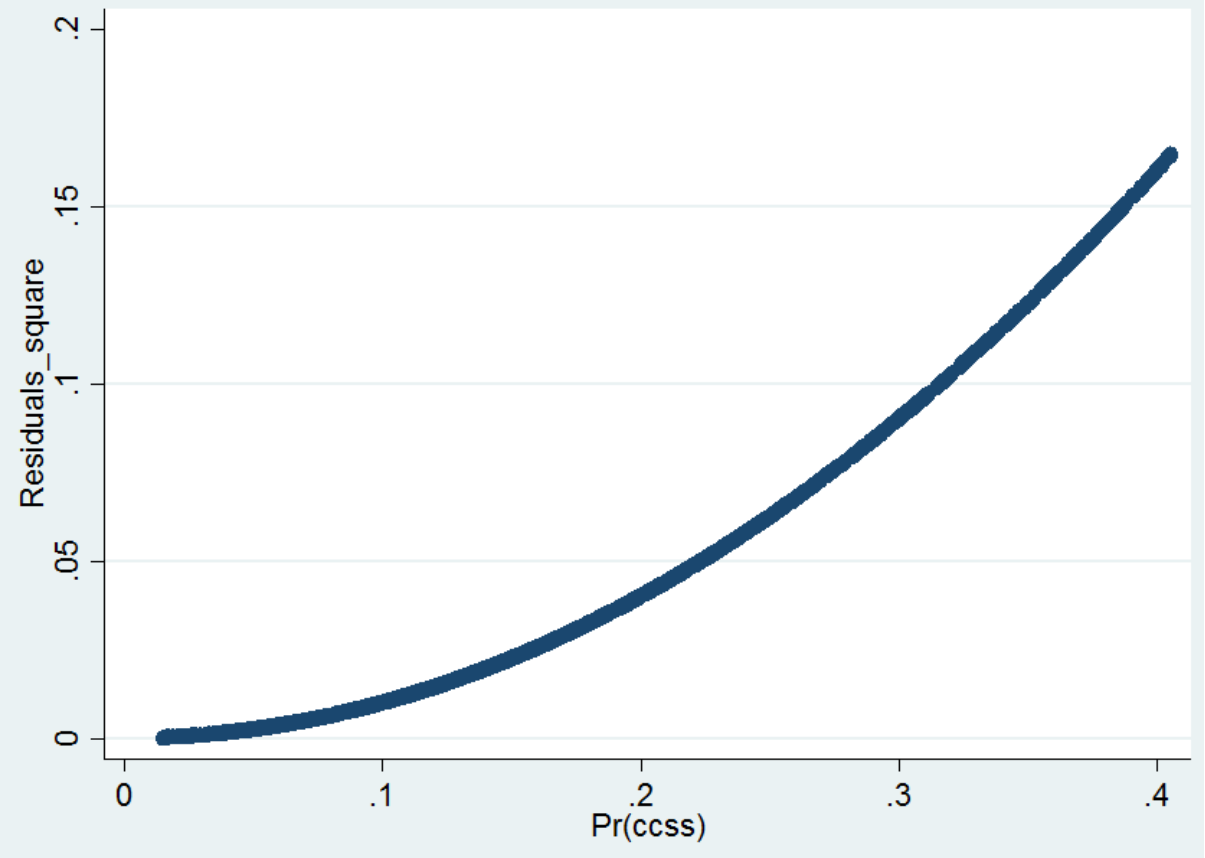

Figure 4.1: Heteroskedastic Test through Residual Plot Analysis

Source: ***Computation from KDHS 2014***

From the heteroscedasticity test results, a consistent trend can be observed implying absence of homoscedasticity with the fitting full probit model given considerably fewer iterations compared. Thus there was a need for adoption of robust standard errors in the final estimated model.

4.4 Estimation of Demand for Cervical Cancer Screening Services in Rural Kenya

In the second objective, the study was meant to determine the effect of socioeconomic factors on demand for cervical cancer screening while holding provider factors constant in rural areas in Kenya. Robust probit regression model with the respective probit indices was evaluated and the results are shown in table 4.5.

Table 4.1: Binary Probit Regression Results: Demand for Cervical Cancer Screening Services by Women in Rural Kenya

	Probit regression Number of obs = 3,921 Wald chi2(12) = 196.40 Prob > chi2 = 0.0000 Log pseudo-likelihood = -1673.4183 Pseudo R2 = 0.0575			
Dependent Variable				
Demand for Cervical cancer screening	**Co-efficients (t- statistics)**	**P values**	**Confidence Intervals**	
Age of the Woman	0.0510** (2.02)	0.043	0.0016	0.1003
Age Squared	-0.00056 (-1.54)	0.124	-0.0013	0.0002
Marital status	0.0025 (0.02)	0.981	-0.2028	0.2079
Primary Education	0.444*** (3.50)	0.000	0.1956	0.6924
Secondary Education	0.4934*** (3.62)	0.000	0.2265	0.7603
Higher Education	0.4847*** (2.99)	0.003	0.1673	0.8022
Middle	0.1137* (1.80)	0.071	-0.0099	0.2374
Rich	0.3283*** (4.87)	0.000	0.1963	0.4604
Distance to the health facility	-0.0223 (-0.40)	0.686	-0.1306	0.0859
Medical insurance	0.3944*** (6.16)	0.000	0.2690	0.5198

	Probit regression Number of obs = 3,921 Wald chi2(12) = 196.40 Prob > chi2 = 0.0000 Log pseudo-likelihood = -1673.4183 Pseudo R2 = 0.0575			
Dependent Variable				
Demand for Cervical cancer screening	**Co-efficients (t- statistics)**	**P values**	**Confidence Intervals**	
Decision on own health	0.04527 (0.91)	0.362	-0.0520	0.1426
Exposure to mass media	0.1236 (1.43)	0.153	-0.0459	0.2930
Constant	-2.780621 (-6.30)	0.000	-3.6463	-1.9149

Source: *Author's Calculation, KDHS 2014:* ***(***) (**) and (*) Significant at 1% 5% and 10% levels respectively.***

From the estimated model, the overall p-value was less than 5 percent level of significance (Prob > chi2=0.0000) implying that the determinants identified (both socioeconomic and demographic factors) significantly explained the dependent variable (demand for CCSS among rural women in Kenya). Further, the pseudo R2 of 5.75 percent indicates the proportion or percent of independent variables explaining the dependent variable (demand for CCSS). For interpretation purposes, the study estimated the marginal effects and the findings are as presented in table 4.6.

Table 4.2: Robust Marginal Effects: Demand of CCSS by Women in Rural Kenya

Dependent Variable	**Robust (ME)**			
Demand for CCSS	**Marginal Effects (t- statistics)**	**P values**	**Confidence Intervals**	
Age of the Woman	.0121** (2.02)	0.043	.0003	.0237
Age Squared	-.00013 (-1.54)	0.124	-.0003	.00003
Marital status	.0006 (0.02)	0.981	-.0480	.0492

Dependent Variable	**Robust (ME)**			
Demand for CCSS	**Marginal Effects (t- statistics)**	**P values**	**Confidence Intervals**	
Primary Education	.0856*** (4.38)	0.000	.0473	.1239
Secondary Education	.0978*** (4.29)	0.000	.0531	.1425
Higher Education	.0956*** (3.05)	0.002	.0343	.1570
Middle	.0255* (1.78)	0.075	-.0025	.0535
Rich	.0815*** (4.71)	0.000	.0475	.1154
Distance to the health facility	-.0053 (-0.40)	0.686	-.0309	.0203
Medical insurance	.0933*** (6.22)	0.000	.0639	.1227
Decision on own health	.0107 (0.91)	0.362	-.0123	.0337
Exposure to mass media	.0292 (1.43)	0.153	-.0109	.0694

Source: *Author's Calculation, KDHS 2014:* ***(***) (**) and (*) Significant at 1% 5% and 10% levels respectively.***

In examining the findings, it was showed that socioeconomic factors were significant in influencing or had an effect on demand for CCSS among women in rural Kenya given the t statistics of 1.78 and 4.78 for middle and rich respectively. It was revealed that women who had attained primary, secondary and higher level of education, rich and medical insurance were statistically significant at 1 percent. Only age and middle socioeconomic status were statistically significant at 5 percent and 10 percent respectively. However, the study showed all the significant determinants were positively related to demand for CCSS in rural areas in Kenya. To proceed, the study considered significant covariates in for further discussions.

4.5 Discussions of the Results

From the estimated model, some of the covariates were noted to be significant statistically to determine demand for CCSS whereas others were statistically insignificant at all levels. To begin with, the effect of the middle and rich socio economic status were assessed against poor socioeconomic status. In particular, the probability of uptake of CCSS by rural women was significantly increased by women in the middle (β=0.0255, p=0.075) and rich (β=0.0815, p=0.000) socioeconomic status compared to women in poor socioeconomic status. These findings were supported by study results obtained by Morema, et al (2014) in a study whereby the key aspects of CCSS uptake for females who are between 18 and 49 years old were assessed. They established that there was a strong as well as a positive correlation was established among age, income and education levels with the CCSS uptake. Also, Tiruneh, et al (2017) concurred that the ca cervix screening was more prevalent among females who had optimal family wealth index as well as being on a payroll in a year compared to their fellow counterparts.

Considering other covariates, socio-demographic factors such as age of the woman, levels of education and medical insurance ownership were associated with increased demand for CCSS in rural areas in Kenya. Specifically, the study found that an additional year to the age of a woman led to a significant increase in demand for CCSS at 5 percent level by 1.21 percent holding other factors constant. The findings were supported by Morema et al (2014) who revealed a strong as well as a positive correlation with age, income and education levels with the CCSS consumption. Nzioka et al (2018) concluded that workers of health with 30 years of age or below along with those who are in 31-40 age bracket of years had minimum chances of using CCSS in contrast to healthcare workers who were 50 years and more.

The study also showed that women who had attained primary level of education, secondary or higher education level were associated with higher likelihood of utilizing CCSS compared to those who had no education. It was shown that having primary education, secondary education and higher education led to a significant increase in demand for CCSS by 8.56 percent, 9.78 percent and 9.56 percent respectively holding other factors constant. These significance were pegged at 1 percent level. The study results concurred with findings obtained in the literature where high level of education, white-collar jobs and access to information were positively connected with uptake of CCS services (Kadam, 2016; Muthoni, et al, 2016; Feyisa, & Temesgen, 2019)

Health insurance coverage is highly associated with protection from catastrophic health expenditures and thus positively associated with healthcare use. In the estimated model, medical insurance was found to be significantly linked to demand for Ca cervix screening by women in rural areas. The findings showed that, women who were covered by any form of health insurance were more likely to undertake CCSS at 1 percent level of significance by 9.33 percent holding other factors constant. In particular, the introduction of social health insurance lowers out of pockets (OOP) and catastrophic health spending as established by Wagstaff and Pradhan (2006), while utilization increases and improves health outcomes. The findings were confirmed by the results of Tiruneh, et al (2017) who concluded that Ca cervix screening was more universal between females who had insurance cover and had visited a health amenity.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter reflects on the study results, presents summary of the results of findings, conclusions and policy implications on the determinants for demand of CCSS in rural areas of Kenya. In addition, it provides a comprehensive discussion on directions to be considered in future research studies.

5.2 Summary of the study findings

It is evident, in most Africa countries, Ca cervix constitutes up to 25 percent of all female cancers and is the second most prevalent cancer affecting women. In most nations of developing world, diagnosis is made in an advanced stage with poor survival rates. Recently, Kenya was ranked number 16 among the 20 high cancer of the cervix disease burden nations given age standardized share of 40.1 for every 100,000 women in the world. Despite the fact that screening is an effective means, uptake of CCS services is low among eligible women especially in rural Kenya. It is on this viewpoint that this study was mainly conducted to establish the determinants for demand of the CCSS in rural areas of Kenya. Specifically, the study was meant to determine the general profiles of women using CCSS in rural areas in Kenya. Secondly, the study was meant to investigate the effect of socioeconomic factors on demand for Ca cervix screening while holding provider factors constant in rural areas in Kenya.

The study utilized the latest Kenya Demographic Household Survey 2014 which is a household-based cross sectional survey data containing general information on all major health care services. The further estimated the hypothesised relationship through the binary outcome model that is probit model and tested significance at 1 percent, 5 percent and 10 percent levels of significance. From the findings, approximately 19,465 women of reproductive age resided in rural Kenya whereas 16.57 percent of all women interviewed utilized CCSS. It was revealed that about 20.15 percent of the persons interviewed in urban areas reported to have had ca cervix screening services while only 14.12 percent of the persons interviewed in rural areas demanded CCSS. Estimation results revealed that socioeconomic factors led to a significant increase in demand for CCSS among rural women in Kenya.

5.3 Conclusions

Literature and government records have shown that about 51.2% of women in reproductive age with an estimated population of 11 million are at risk of developing Ca cervix. Screening programs however can effectively reduce the cancer burden if women get the tests that they require and are executed perfectly and suitable way. The study conclude that a huge number of women in rural areas do not consume CCSS. To avert this trend, the government of Kenya through the Kenya National cancer control strategic plan 2011-2016 proposed cervical cancer screening integration into existing Maternal, and Child Health (MCH) or family planning services, comprehensive care services and routine gynaecology services to facilitate reaching the 70 percent screening coverage. The study supports the incorporation of cancer screening services in the national health social insurance cover to support and facilitate women

in rural areas as proposed in the current Kenya National cancer control strategic plan 2017-2022. This is because, estimation results show that there is a significant impact of socioeconomic status or factors on uptake of CCSS in rural Kenya.

5.4. Policy Implications

Ca cervix screening services plays a significant part in achievement of the Sustainable Development Goals (SDGs) aiming at lowering early death from non -infectious diseases by one third by prevention, medication and promoting mental health and wellbeing. Theoretically, health is demanded as a consumption good whereby health makes people feel better. In the world, cervical cancer remains the main root of cancer mortality amongst many women in low and medium regions. As demonstrated in the literature, there is not only low utilization of CCS programs globally, but as well as varied disparities linked to socioeconomic status in ca cervix screening intensities. Socioeconomic status has conventionally been described by education, income as well as occupation. Each component provides different resources, shows different interactions to various health outcomes and would be addressed by different policies.

In particular, women in rural areas experience poorer health outcomes and have less access to health care compared to urban women. This study is of the view that rural women in higher socioeconomic groups have higher likelihood of demanding for cancer screening services. Socioeconomic status (SES) influences three main determinants of health that is health care, environmental exposure, and health seeking behaviour. Based on the study finding where SES was significantly associated with increased or more uptake of CCSS, the study contributes to the theory where demand for healthcare as a consumption commodity is justified because it directly satisfies

the utility of an individual that is a health seeker. Rural women on higher levels of education were significantly associated with increased use of CCSS compared to those who had no education. There is need for the government to lower SES disparities in health by developing a policy initiative that addresses the components of socioeconomic status (income, education, and occupation) as well as how these affect health seeking behaviour of rural women.

5.5. Areas of further study

Considering the challenges cancer patients go through in Kenya, the study has mainly investigated determinants for demand of the CCSS in rural areas of Kenya. The study mainly used cross-sectional dataset with variables such as uptake of cervical cancer screening. In addition to socioeconomic factors, several other covariates as revealed in the literature were used which ensured model stability to eliminate biases. However, the study was not able to establish demand for various types of examinations for CCSS provided. This was as a result of the limitation of the data. Similarly, there are key factors such as such as cultural diversity or county of residence that are widely witnessed in public sector were not considered. Therefore, there is a need to include these factors in future studies as well as include other datasets over time (time series) relating to cancer screening services for prediction purposes. Continuing research on other types of cancers is advised as it may assist in unearthing underlying concerns and recommend best interventions from an empirical point of view. The study further suggests for the use of the current datasets for immediate policy contributions.

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