UTILIZATION OF FOCUSED ANTENATAL CARE IN KENYA AMONG YOUNG WOMEN AGED 15 - 24 YEARS

BY

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DECLARATION

This research paper is my original work and has not been submitted for an award in any University

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Abbreviations

ANC Antenatal Care

FANC Focused Antenatal Care

KDHS Kenya Demographic and Health Survey

KNBS Kenya National Bureau of Statistics

MMR Maternal Mortality Rate

MOH Ministry of Health

NHIF National Health Insurance Fund

SDGs Sustainable Development Goals

SSA Sub-Saharan Africa

Abstract

This paper explored the factors that influence utilization of FANC among young women in Kenya. The study focused on women in the age bracket of 15-24 years in the KDHS (2014). The study sample is 2,032 women. The study was guided by Andersen's theory of healthcare utilization. Utilization of FANC in the paper is measured by the number of visits and adequacy of services received. The data was modelled using logistic regression model. Pearson correlation is used to check for the significance of independent variables on utilization of FANC and marginal effects obtained to check probability of the outcome. From the findings, education, employment status, choice of pregnancy and place of residence have the highest effect on probability of FANC utilization.

CHAPTER 1

INTRODUCTION

1.1 Background

Focused antenatal care (FANC) aims to offer comprehensive care services to expectant women to ensure that they have a normal pregnancy (WHO, 2016). The model recommends four clinic visits which should take place at 16, 28, 32 and 36 weeks of pregnancy unless there are any emerging conditions that require the attention of a health service provider (MOH Kenya, 2014; WHO 2016). Evidence-based interventions in the model include screening for sexually transmitted infections, tetanus immunization, malaria prevention and HIV transmission to the unborn baby (MOH Kenya, 2014).

The WHO introduced FANC in model in 2000. The model prescribes a minimum of four contacts with a health service provider by expectant women. The traditional ANC model emphasizes quantity over quality of service (WHO, 2001) and classified expectant women as either high or low risk based on a general risk assessment (Konlan et al., 2020). In contrast, the aim of FANC is to ensure normal pregnancies for expectant mothers by identifying disease and potential complications and addressing it by treatment or prevention (WHO, 2016).

FANC has several advantages over the traditional ANC model (WHO, 2016). First, FANC emphasizes on quality with only four prescribed visits. Thus model is suitable in areas with few health service providers and is convenient to women. FANC encourages women to attend ANC through education programs provided during the clinic visits (Konlan et al., 2020). Second, antenatal care services are individualized, client-centered and based on detection of disease rather than classification according to risk (WHO,2016). FANC service package is

comprehensive and extensive, including tetanus immunization, nutrition advice, birth preparation, immunization services and post-natal services for the mother (WHO, 2016).. FANC has been linked to reduction in maternal and neonatal deaths and complications arising from pregnancy and delivery (Baffour-Awuah et al., 2015; Haruna et al., 2019).

According to Baffour-Awuah et al. (2015), practicing midwives in Ghana viewed FANC positively and attested that the interventions in the package impacted both the maternal and child survival during birth. The authors noted that the promotive and prevention strategies ensure that there are less complications arising before and after delivery. Haruna et al. (2019) had similar findings; that in rural Ghana, women who attended ANC used skilled delivery minimizing the risk of fatalities. Ngonzi et al. (2016) found that in Uganda, the leading causes of maternal mortality were puerperal sepsis, hypertensive disorder and obstetric haemorrhage which can be managed if detected early. Early detection of such conditions is feasible when ANC is started at an earlier stage of pregnancy and adequately utilized throughout the journey (Chorongo et al., 2016).

Haruna et al. (2019) noted other benefits of FANC. Women who attend FANC are more likely than those who do not attend to give birth to healthy babies who live past the neonatal age. Second, women who attend FANC are more likely to get post-natal care and adhere to neonatal health services. Further, FANC provides a health system entry point for women which ensures that they seek medical attention early for themselves and the children they deliver. The integrated level of FANC ensures that women receive education on neonatal health and issues like nutrition and breastfeeding (Bekele et al. 2019). In addition, newborn complications are detected early enough. HIV transmission from the mother to the unborn child and infants is also prevented since its prevention is included in the package improving outcomes in neonatal

health (Fenta et al., 2021). Moreover, family planning education and services provided in the FANC package have also been instrumental in preventing mistimed pregnancies. FANC has significantly improved outcomes in perinatal, neo-natal, post-natal and maternal health.

Maternal deaths are a problem. The global MMR declined by 38% between 2000 and 2017(WHO, 2017). However, approximately 810 deaths occur daily globally due to pregnancy and delivery related complications especially among youth (WHO,2017). Further, 99% of maternal deaths are in developing countries and SSA bears the largest burden (WHO, 2019). Although MMR in Kenya has declined over the years, it is relatively high compared to the global rate. It was 708 per 100,000 live births in 2000 and 342 deaths for every 100,000 live births in 2017 (WHO, 2019). The number is higher than global rate of 211 deaths per 100,000 live births. The MMR in Kenya is lower than the Sub-Saharan Africa rate which is 542 deaths for every 100,000 live births. However, in line with the SDGs, WHO target for each country in SSA to have MMR less than 140 per 100,000 live births.

Both local and global initiatives address maternal health in Kenya. In 2013, the government introduced the policy on free maternal services to increase access to ANC services (GoK, 2013). The aim is to reduce maternal complications, deaths and disabilities (GoK, 2015). Second, USAID Maternal Health Vision for Action is a global initiative aimed at reducing the disparities in maternal services utilization in selected counties that are considered high priority for the intervention (Mbugua & Macquarrie, 2018).

The above initiatives and policies have been developed to increase awareness of FANC and encourage more women to utilize the services by making them accessible (GOK, 2013; USAID, 2014). According to Orangi et al. (2021), increased uptake of FANC ensures that

complications are identified early enough hence averting resultant fatalities. Overall, positive maternal health outcomes are highly associated with but not limited to FANC.

1.1.2 FANC uptake in Kenya

Kenya introduced FANC in 2001 following the WHO guidelines and recommendations. An integrated service delivery approach has been adopted by focusing on antenatal services, birth preparation and planning, family planning services and immunization (MOH, 2013). The free maternal policy was only for public facilities hence leading to an overwhelming turn up in relation to the number of staff. According to Gitobu et al. (2018), the policy has been crucial in increasing the number of women who utilize FANC services and skilled birth attendance. In 2017, the Linda Mama was started in line with FANC to include the private sector and cover pregnancy and post-natal services up to 3 months after delivery for women who cannot afford the National Health insurance Fund Card (NHIF) (MOH, 2016). Therefore, women with the card can still access the services in some private health facilities. According to KNBS (2015), Nairobi county had the highest FANC utilization and West Pokot county had the lowest utilization. Even with the increased efforts to raise awareness on FANC and increase access to the services, there is still low utilization of FANC where

1.2 Research Problem

According to the KDHS (2014) survey 58% of women in Kenya aged 15 to 49 years utilized ANC services. The proportion was 52.3% among young women of age 15 to 24 (KDHS, 2014). The government is making efforts to increase access and utilization through free maternal services and Linda Mama initiative (MOH, 2016). Low utilization of ANC is associated with poor health outcomes and high mortality for expectant women and unborn child (Baffour-Awuah et al., 2015; Afulani et al., 2019; Haruna et al., 2019). Existing studies on correlates of FANC utilization pool women of reproductive age. However, young women (15-24 years) have

lower FANC utilization rate than those 15-49 years. It is not clear why. Empirical evidence of the factors that affect FANC utilization for young women (15-24 years) is scarce.

1.3 Research Questions

i. What factors explain utilization of FANC among young women aged 15-24 years in Kenya?
ii. Which factors influence the adequacy of services received during FANC clinics?

1.4 Study Objectives

1.4.1 General Objective

To investigate the determinants of utilization and adequacy of FANC services among young women aged 15-24 years in Kenya.

1.4.2: Specific Objectives

i. To determine the factors that influence utilization of FANC among young women aged 15-24 years in Kenya?
ii. To determine the factors that influence probability of receiving adequate antenatal care services
iii. To recommend potential strategies to increase utilization of FANC by young women, 15-24 years in Kenya.

1.5 Justification of the study

The study will add to existing literature by identifying the factors that hinder young women of age 15-24 from utilizing and receiving adequate. Studies on maternal health and antenatal services have lumped all women of child bearing age into one (Chorongo et al., 2016; Gitonga 2017; Muthingu et al., 2018). However, the factors associated with health seeking behavior may differ across age-groups due to the behavioral, socio economic and generational differences. The studies have found a difference in the representation of those utilizing FANC services according to age group and one of the age groups that exhibits a huge disparity is 15-

24 years. Understanding these factors will inform evidence-based interventions aimed at increasing the use of FANC among them and reduce maternal mortality and pregnancy complications in this group. In addition, identifying the adequacy of services offered is crucial in guiding policy to strengthen the system and reduce disparities in quality of services.

According to the 2019 census in Kenya, 20.6% of the females fall between 15-24 years age (KNBS, 2019). This age group is a priority in attaining economic development by addressing its needs in different areas through policy and decision making (UN, 2018). The age group has a high number of early and unintended pregnancies and late pregnancy detection (Ministry of health Kenya, 2015). According to the National Adolescent and reproductive health policy of 2015, contraceptive use of the youth is at 50% leaving the other half more likely to get early and unwanted pregnancies and without the awareness of ANC services and adequate resources to seek them. The youth age 15 – 24 years have high pregnancy complications and maternal mortality rates (WHO, 2019). The National Guidelines for quality obstetrics and perinatal care advocate for provision of FANC with adherence to the services package during each visit to achieve effectiveness (WHO, 2016). However, there is inconsistency in receiving the services which impairs effectiveness of FANC (Afulani et al., 2019).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter contains empirical and theoretical review of literature on FANC. The theoretical review will identify a theory that explains utilization of FANC. The empirical review will look at findings from different studies and statistical methodologies employed.

2.2 Theoretical Review

2.2.1 Andersen's Expanded model.

The research is based on Andersen's model of health care utilization originally developed in the 1960s. The original model sought to explain how and why people seek health services, explore inequalities in service provision and guide policies to increase access (Andersen, 1995). The model classified the factors that influence health utilization into predisposing, enabling and need which is divided further into influenced and perceived need. Predisposing factors mainly refer to the socio-demographic characteristics while enabling factors are the resources that facilitate utilization. Using the model, the effectiveness, efficiency and equitability of provision of health services can be assessed. In addition, it aids in understanding the health care system and external environment that influences utilization of the services. The original model had limitations whereby the predisposing factors did not consider attitudes, cultural norms and perceived control that is influenced by the sociodemographic characteristics like race and culture (Bradley et al., 2002). Therefore, in the expanded model, the name psychological factors was included in the predisposing group. Need is enhanced by education and awareness programs through the media, community and social circle. Moreover, perceived need may arise from previous experiences. Enabling factors are the resources that aid utilization and are mainly the socio-economic factors. According to Aday and Andersen

(2014), the enabling factors when altered are more likely to make interventions more effective and accessible. The theory will be used to guide and explain the outcome in the variables in the multivariable logistic regression model in the analysis.

2.3 Empirical Literature Review

Several studies have explored on FANC using different approaches. The studies are discussed in this section under different sub-headings.

2.4: Factors influencing ANC uptake

2.4.1: Predisposing factors

Age, religion, marital status and residence are some of the predisposing factors that influence utilization of health care services. Research has shown that they also impact utilization of FANC. Gitonga (2017) conducted a study to find out the factors that influenced FANC uptake in Tharaka Nithi county. The findings indicated that age is one of the determinants whereby women below 20 years of age had the least uptake at 31% while those between the age of 30-34 years had the highest uptake at 63% out of the 345 study participants. In addition, married women and those with present partners tend to have a higher uptake of FANC than those without partners (Gitonga, 2017). According to Gitonga (2017), social support from partners and family is one of the strategies that encourage women to attend FANC. Chorongo et al. (2016), conducted a similar study in Kilifi county with a sample of 385 respondents. The study sought to find out the determinants of adequate FANC uptake and factors that influence how early women start attending the clinics. The study findings indicated that age and marital status were some of the determinants since 86% of the women in the study who attended ANC clinics were married. However, a study by Muthingu et al. (2018) had contrary findings whereby married women were less likely to attend ANC clinics than those without spouses. According to the author, the main reason was that the married women needed to seek permission from

their spouse to attend the clinics. The study was conducted in Nakuru county and had a sample of 337 women who delivered in two year prior to the study.

Religious affiliation also plays a role in FANC attendance and facility choice. According to a study by Chorongo et al. (2016), religion influenced the choice of facility based on where it was located and whether the facility was founded by religious organizations or not. In addition, some of the traditional religions did not support seeking health care services hence discouraging attendance from women affiliated with them. From the study, some cultures believed that women who attended the clinics were weak. According to Fenta et al. (2021) some religions in Ethiopia have less awareness on reproductive health issues. The finding is based on the Ethiopia Demographic Health Survey data for 2016. Efendi et al. (2017) adds that frontline health workers should empower the community by conveying the information. Mulinge & Aimakhu (2017) supported the findings by conducting a study among teenagers in Malindi subcounty and found a knowledge gap in maternal health education. Study participants with an understanding of maternal and reproductive health had higher uptake of FANC services than those with no information. A similar study was conducted in Indonesia with the study participants being between the age of 15-24. The findings indicated that maternal health awareness had a positive influence on ANC (Efendi et al., 2017). In addition, this age group is more likely to experience stigma from the society due to early pregnancies which prevents them from seeking the healthcare services they need (Dairo & Antalogun,2018).

Place of residence is another factor whereby women in urban areas are more likely than in rural areas to attend FANC. Women in urban areas start FANC clinics in the first trimester while those in rural areas tend to start the clinics in the second or third trimester (Chorongo et al., 2016). In rural areas, health facilities tend to be far away and the long distance to health facilities has a significant association to low utilization of FANC (Konlan et al., 2020)

Chorongo et al. (2016) also found women who lived further from the health facilities attended less than the recommended four visits.

2.4.2: Enabling Factors

Education, access to media, employment status, wealth index and whether the expectant mother wanted to get pregnant are some of the enabling factors that influence FANC utilization. According to the Ibworo (2020), income is one of the key determinants of uptake of FANC for women. Women who have a source of income are more likely to seek FANC services than those with no source of income (Kiplangat & Ochieng, 2021). Even with the introduction of the free maternal policy, other costs remain high and deter many women from receiving the services (Gitobu et al., 2018). Efendi et al., (2017) conducted a study in Indonesia on ANC uptake among women of age 15-24 and found that the socio-economic factors had the largest influence on utilization of ANC services. Low income, unemployment, low education levels were prevalent in the group and hence resulting to non-utilization of FANC. Employment and income increase the likely hood to adequately attend FANC clinics and the start date. However, the nature of employment is another factor where those in formal employment have higher attendance than those informal employments. Lack of formal employment constraints the available financial resources required to cater for the indirect costs like transport to the health facility for the ANC clinics (Chorongo et al., 2016). Konlan et al. (2020) had similar findings where a high number of women in the informal sector did not utilize FANC services. The authors recommended more public education on maternal health in homes and workplaces to increase awareness. Women from rich households attended FANC clinics in higher numbers than those from poor households or those without a source of income. According to Gitonga (2017), there are indirect costs like transport which tend to hinder access to the services even without the direct costs. Women with high income and those in formal employment went for FANC services at the onset of their pregnancy.

Education attainment and literacy levels influence FANC uptake. Gitonga (2017) add that high literacy levels are associated with higher uptake of FANC services and health facility delivery. Women who had secondary school education and above utilized FANC services more than those with lower levels of education. Similarly, Kiplangat and Ochieng (2021) found that by conducting in Murang'a County low literacy levels were associated with low uptake of FANC. Chorongo et al. (2016) and Fenta et al. (2021) also found that spouse's education is also a contributing factor. Women with educated spouses are more likely to attend FANC clinics than those with uneducated partners. In addition, a study in Indonesia among young women of age 15-24 had similar findings where women with spouses who had formal education were more likely to attend all four ANC clinics (Efendi et al., 2017). According to a study by Ngonzi et al. (2016) in Uganda, most of the women who succumbed due to pregnancy related complications did not attend ANC clinics, were uneducated and did not seek health services on time.

Wealth index is determined by the assets owned in a household, income levels and access to clean water and sanitation (KDHS, 2014). Women with access to the media are more enlightened on the availability and importance of FANC services and tend to utilize the services (Efendi et al., 2017). In addition, women between the age of 20-24 in urban areas and with a high income and formal employment are more likely to adequately partake ANC. Adolescents aged 15-19 with a middle-income were twice as likely to attend all four clinics than to those with low income (Efendi et al., 2017). More interventions with a focus mainly on young women with a low socio-economic status would be more effective since they reduce the disparities in resources to enable one seek healthcare (Efendi et al., 2017; Adow et al. 2020). Therefore,

there is a huge economic disparity between the group and other higher age groups hence increasing the urgency to understand their needs in relation to uptake of FANC.

2.4.3: Need Factors

Parity also determines the likelihood of a woman to seek FANC services. Gitonga (2017) found that in Kenya women who had over five previous pregnancies and births did not see the need of FANC in the pregnancies that followed. Efendi et al., (2017) found that in Indonesia, more women attended four ANC clinics during their first pregnancy than those who had more pregnancies and births. According to Muthingu (2018), parity is one of the factors that influences perceived risk of complications among pregnant women. The author adds that most women who have given birth previously without complications tend not to appreciate the importance of FANC unlike those who have had complicated pregnancies and births before. Konlan et al. (2020) also found that in Ghana, more previous births was associated with low FANC uptake in the most recent pregnancies. The study was conducted in a tertiary health facility in Ghana among 210 participants who were currently seeking postnatal services.

2.5: Indirect costs in FANC utilization

The free maternal policy removed user fees for maternal clinics. However, there are still some other costs incurred by expectant women in order to access the services. Travel costs to and from the facility is the one of the indirect costs. A study by Pell et al., (2013) in Kenya and Ghana found that expectant women in rural areas spent a lot on transport to the health facilities due to the distance. Women also incur food costs where the waiting time in facilities is long (Kiplangat and Ochieng, 2021). Waiting time in the facilities in the study in Murang'a county was one hour and 2 minutes on average. In addition, even with the free maternal policy, women have to pay for a clinic visit card. Women who are in informal employment, self-employment and whose wages are calculated according hours worked are faced with the dilemma of

choosing the opportunity cost between attending FANC and going to work (Konlan, et al., 2020).

Lack of drugs and medical equipment to carry out some tests lead to some more costs where women have to buy the drugs elsewhere and get the tests done in other facilities (Ibworo & Ibworo, 2020). Those who cannot afford tend to forego the services and medication. According to Orangi et al. (2021), lack of medical supplies is a major hinderance to achieving maximum benefits from FANC. Harun et al. (2019) highlighted that provision of essential medical supplies and transport channels needs to be addressed to improve utilization of FANC and reduce the costs incurred by women.

2.6: Statistical/Econometric methodologies employed

The studies employed different statistical and econometric methodologies. Baffor-Awan et al., (2015) conducted a descriptive study and purposive sampling was used in recruiting the participants who were midwives. Haruna et al. (2019) also used a qualitative descriptive design and purposive sampling to recruit communities into the study with the respondents being midwives and nurses working in the sample communities. The two studies collected data using key informant interviews and Focus Group Discussions (FDGs). Chorongo et al., (2016) used similar data collection methods and their study was a descriptive cross-sectional design. Systematic sampling was used to select the respondents and analysis followed a multivariable regression model.

Ngonzi et al. (2016) conducted a retrospective unmatched case control study and multivariable logistic regression analysis which aimed to identify the factors that led to maternal mortality. Orangi et al. (2021) conducted a retrospective interrupted time-series analysis where they used a negative binomial regression model which was segmented to account for seasonality to

determine the trend and immediate effect of the free maternal health policy. The final model was a controlled interrupted time-series model. Muthingu et al. (2018) conducted a cross-sectional study and collected both qualitative and quantitative data. The authors tested for association of the variables using the chi-square test. Dairo & antalogun (2018) used the binary logistic regression model in their study and the Chi-square test. Kiplangat & Ochieng (2021) applied multistage sampling using the Fischer method for probability proportions to recruit the participants. Efendi et al., (2017), used bivariate and multiple logistic regression analysis to identify factors that influence ANC utilization.

Gitonga (2017) conducted stratified sampling to select sample facilities and the respondents were selected through systematic sampling. The logistic regression model was used to obtain the odds ratio. Konlan et al. (2020) calculated the sample size using the Snedecor and Cochran formula and used systematic sampling. Cross tabulation was carried out to check for the relationship between variables and across different age groups. Mulinge & Aimakhu (2017) used a logistic regression model and carried out analysis to obtain descriptive statistics and the chi square tests at 95% confidence interval.

2.8: Overview of Literature Review

Andersen's healthcare utilization model groups the factors influencing FANC utilization into predisposing, enabling and need factors. From the literature review, Residence, religious affiliation and marital status are some of the predisposing factors that influence the uptake of FANC (Chorongo et al., 2016; Gitonga, 2017; Muthingu, 2018). Employment status, nature of the job, income, wealth index and education level are the enabling factors that provide resources to increase access to FANC (Ibworo, 2020; Fenta et al., 2021). Birth parity is a need factor whereby women who have had previous pregnancies seek FANC based on their

perceived risk of developing pregnancy complications (Muthingu, 2018; Konlan et al, 2020). From the literature, indirect costs are a major hinderance to FANC utilization. The indirect costs incurred by women include travel and food costs, loss of productive time, purchase of medication and medical tests unavailable in health facilities (Pell et al., 2013; Konlan et al., 2020; Kiplangat &Ochieng, 2021.

The literature reviewed has identified and explored the factors influencing FANC uptake for all women in the reproductive age category (15-49 years). Many studies have pooled all women of child-bearing age (Chorongo et al., 2016; Gitonga, 2017; Haruna et al., 2019; Konlan et al, 2020). However, there is need to focus on specific age-groups (Efendi et al., 2017). The strategies and policies developed from the findings of studies pooling all women of child bearing age may not be effective in addressing barriers within different age groups due to their different needs. In Kenya, maternal health policies are also formulated to address all women of child bearing age without distinction on their existing needs. Therefore, there is need to research on different age groups separately to inform policies relating to them. This study will focus on the factors influencing use of FANC in Kenya among 15-24 year old young women.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This section explains the research methodology to be employed in answering the research questions. The section is divided into conceptual framework, model specification, data source, data diagnostic tests and how data analysis will be carried out.

3.2 Conceptual Framework

The framework guiding the study is developed using Andersen's model presented in chapter 2. The framework fits in the study because it portrays utilization of FANC as an outcome influenced by several factors that are the independent variables.

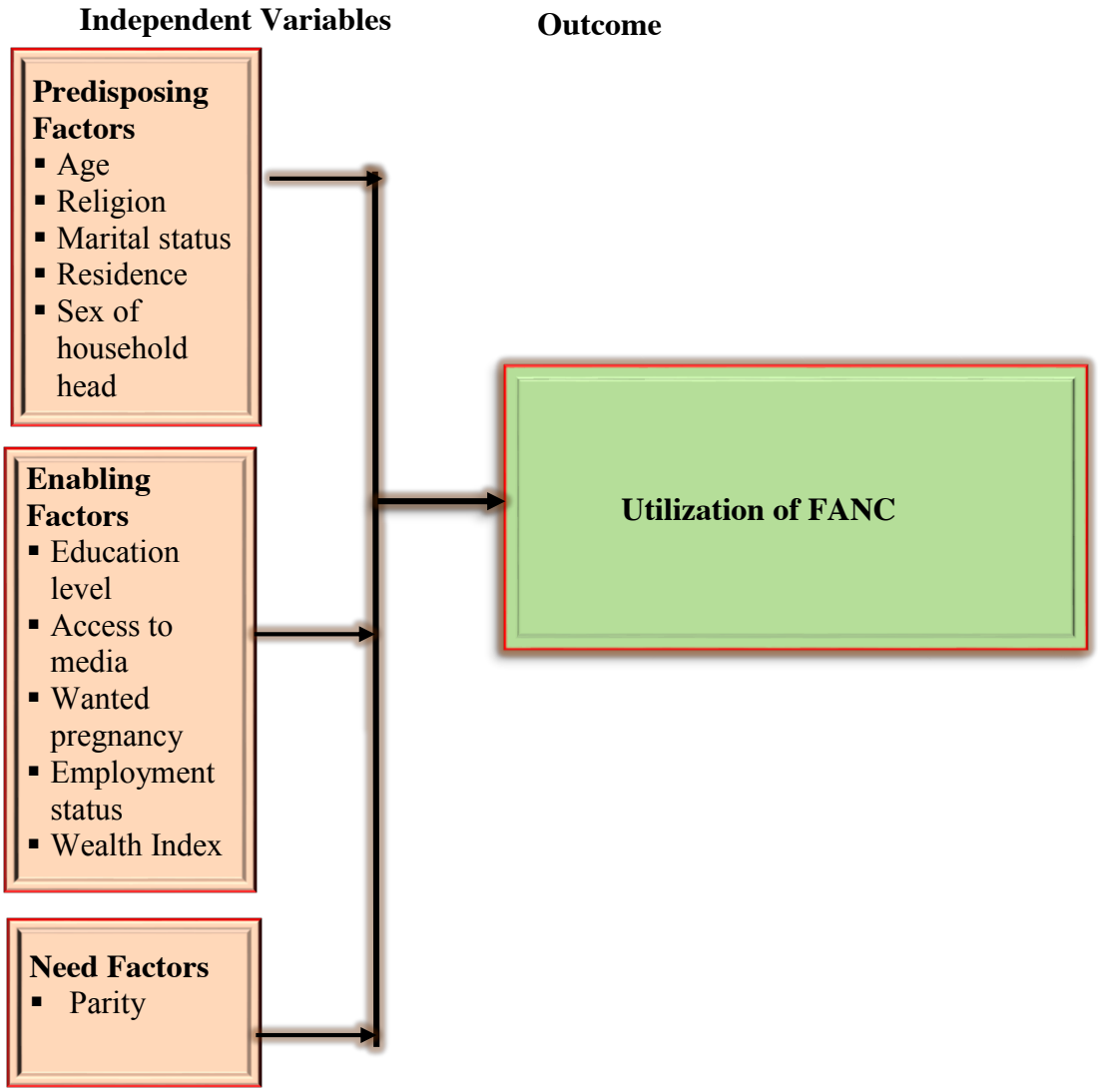

Figure 3.1: Conceptual framework for the study.

3.3 Econometric Model of FANC Utilization

3.3.1 Logit Model

The Logit model was estimated to determine the influence of the factors on FANC utilization.

The dependent variables are qualitative, hence dummy variables were created as follows:

$$FANC = \begin{cases} = 1 \; if \; ANC \; visits \geq 4 \\ = 0 \; if \; ANC \; visits < 4 \end{cases}$$

$$ADEQUATE = \begin{cases} = 1\ if\ all\ ANC\ services\ received \\ = 0\ if some\ ANC\ services\ missed \end{cases}$$

The Logit model takes the form(Gujarati, 2004; Woolridge, 2012). ;

$$p_i(y = 1) = \frac{e^{\sum_{k=1}^{k} B_K X_K}}{1 + e^{\sum_{k=1}^{k} B_K X_K}}$$

β_k are the coefficients

X_k is the independent variable

3.3.3 Model Estimation

The Maximum Likelihood Estimation method was used because the model is non-linear and has a binary response for the dependent variable (Gujarati, 2004).

3.4 Definition and Measurement of Variables

Table 3.4: Variables in the model

Variables	**Unit/Measurement**	**Expected Sign**
Utilization of FANC	< 4 visits = 0 > 4 visits =1	
Adequacy of FANC	Adequate (All services received; tetanus injection, pregnancy risk information, blood sample taken, blood pressure was checked, deworming, malaria prevention and supplements information.) = 1 Inadequate (At least one service not received= 0 Don't know response will be treated as missing	

Explanatory Variables		
Age 15-19 (Teenager) 20-24 (Other)	Teenager- 1 Other- 0	Older women are more likely to utilize FANC compared to younger women (Chorongo et al., 2016 ; Gitonga, 2017)
Education No education Primary level Secondary level Higher Education	1if yes and 0 otherwise for each of the levels	+ Women who are literate and educated are more likely to seek FANC due to the level of exposure and appreciation of its benefits (Ngonzi et al., 2016, Kiplangat &Ochieng 2021, Fenta et al., 2021)
Employment status Employed-salaried Employed-casual Self-employed Unemployed	1 if yes, 0 otherwise for each of the levels	+/- Women in employment are more likely to go for FANC. However, the nature of employment may influence this whereby those in informal employment are less likely to adhere to the clinics (Muthingu, 2018; Efendi et al., 2017,Konlan et al.,2020)
Religion Roman Catholic Protestant/other Christian Muslim Other	1 if yes and 0 otherwise For each of the categories	Religion influences utilization of FANC whereby beliefs determine when and where women seek the services. There is less awareness of reproductive health among Muslims (Fenta et al. 2021, Chorongo et al., 2016)
Place of Residence Rural Urban	Rural- 1 Urban-0	+ Women residing in urban areas are more likely to seek FANC than those in

		rural areas (Ngonzi et al., 2016; Muthingu et al., 2018;Adow et al, 2020).
Sex of Household head	Male- 0 Female -1	+ Women from households headed by males are less likely to attend FANC than those from households headed by females (Muthingu et al. 2018)
AM Access to media Frequency of; • watching Television • listening to radio • reading newspaper	Not at all At least once a week More than once a week 1 if yes, 0 otherwise for each response	+ Women with access to media are more exposed to FANC information hence more likely to seek the services (Gitobu et al, 2018; Muthingu 2018; Kiplangat &Ochieng, 2021) .
MS Marital Status	Married/Cohabiting Divorced/widowed Single 1 if yes , 0 otherwise for each response	+/- Marital status has been found to influence FANC both positively and negatively. In some studies, married women are more likely to go for the clinics (Chorongo et al., 2016; Gitonga 2017) while in others they had less likelihood due to partner interference (Muthingu et al.,2018) .
Total number of previous births		+/- Women with previous births are less likely to attend FANC than women with no previous births unless there is perceived risk (Gitonga, 2017; Efendi et al., 2017; Muthingu 2018; Konlan et al., 2020)

Wanted pregnancy	Wanted pregnancy Wanted pregnancy later during pregnancy Did not want pregnancy at all 1 if yes , 0 otherwise for each of the responses	+ Women who get pregnant out of choice are more likely to utilize FANC than those who have not planned for the pregnancy (Muthingu 2018, Gitobu et al., 2018, Ibworo, 2020)
Wealth Index Poor Middle Rich	1 if yes, 0 otherwise For each category.	+ Women from households with a high wealth index are more likely to attend FANC clinics (Efendi et al., 2017; Kiplangat &Ochieng, 2021)

3.5 Data Source

The research used secondary data which was obtained from the Kenya Demographic and Health Survey of 2014. A multi-stage stratified design was used in sampling. 40,300 households were selected to take part in the survey (KDHS, 2014). The total number of women in the study were 31079 and those between 15 and 24 years were 11483. A Sampling for the survey was selected from a master sampling frame that has 5360 clusters that are divided into four samples (KDHS, 2014). All the 47 counties in Kenya took part in the survey. Only sampled households were visited and no replacement was done during data collection. A long and short version questionnaire were administered. The study focused on 2032 women aged 15-24 and who responded to the long version questionnaire.

3.6 Diagnostic Tests for data issues

Diagnostic tests were carried out to check for reliability and validity of the data in relation to the assumptions of the classical linear regression model (CLRM) (Greene, 2000). One of the tests was to check for multicollinearity to ensure that there are no any two explanatory variables

that are perfectly correlated. The variance inflation factor (VIF) test was be used. The goodness of fit test was carried out to check if the model fits the data well.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This section presents the data analysis results. It is divided into summary statistics, analysis for objective 1 and analysis for objective 2.

4.2 Summary Statistics of Independent Variables

A total of 2,032 young women of age 15to 24 years across all the 47 Counties in Kenya were included in this study. Dummy variables were created for all categorical variables with each response taking the value of a 0 and 1. Age was divided into two categories; 15-19 (teenagers) and 20-24 (others). Less than half (20.3%) were aged below 20 years while the majority were aged 20-24 years (79.7%). About one third (35.9%) resided in urban areas while the majority resided in urban areas (Table 2). Slightly more than half (55.9%) had primary education and a majority (73.1%) were married/cohabiting. 28.8% came from a rich household and this was a majority in the wealth index category. A majority of the respondents were not employed (45.3%) while only 13.7% were employed-salaried. Most of the respondents (56%) wanted the pregnancy when they got pregnant. Less than half the respondents (32.1%) came from households headed by females and about 85% were Christians (protestants/catholic).75.1% did not read the newspaper at all, 62.6% listened to the radio at least once a week and 62.9% did not watch television at all. All the respondents had at least 1 previous with the maximum total number of previous births being 6 as displayed on table 2.

Table 2: Summary Statistics

N=2032				
Variable	Mean	Std. Dev.	Min	Max
Teenagers	.203	.403	0	1
Urban	.359	.48	0	1
No Education	.137	.344	0	1
Primary Education	.559	.497	0	1
Secondary Education	.274	.446	0	1
Higher Education	.031	.172	0	1
Single	.185	.388	0	1
Married/Cohabiting	.731	.444	0	1
Divorced/widowed	.084	.278	0	1
Poor	.53	.499	0	1
Middle	.182	.386	0	1
Rich	.288	.453	0	1
Female sex of Household head	.321	.467	0	1
Not employed	.453	.498	0	1
Employed-salaried	.137	.344	0	1
Employed-casual	.207	.405	0	1
Self-employed	.203	.403	0	1
Wanted pregnancy when got pregnant	.56	.497	0	1
Wanted pregnancy later on during pregnancy	.418	.493	0	1
Did not want pregnancy	.022	.147	0	1
Roman Catholic	.198	.399	0	1
Protestant/other Christian	.65	.477	0	1
Muslim	.124	.329	0	1
Other	.028	.165	0	1
Does not read newspaper/magazine at all	.751	.433	0	1
Read newspaper/magazine less than once a week	.157	.364	0	1
Read newspaper/magazine at least once a week	.092	.289	0	1
Does not listen to radio at all	.251	.434	0	1
Listen to radio less than once a week	.123	.329	0	1
Listen to radio at least once a week	.626	.484	0	1
Does not watch television at all	.629	.483	0	1
Watch television less than once a week	.123	.329	0	1
Watch television at least once a week	.248	.432	0	1
Total number of births	1.724	.912	1	6

4.3 Factors that influence utilization of FANC

This section presents the logistic regression model for FANC visits and the marginal effect of the independent variables on utilization of FANC.

4.3.1 Logistic Regression for FANC visits and Marginal Effects

From the logit model, the factors with a significant influence on FANC visits are residence, education, marital status, wealth index and whether the woman wanted the pregnancy or not. Each independent variable's influence on FANC visits is interpreted holding other factors constant.

Belonging to the teenagers age group has a negative influence on FANC visits (Table 3). The marginal effect shows that decrease in age from other group (20-24 years) to teenage age group (15-19 years) decreases the probability of attending at least 4 ANC visits by 3.1% (Table 4). The finding is consistent with previous studies by Gitonga (2017) and Chorongo et al. (2016) where increase in age increases the probability of attending FANC clinics.

Place of residence has a positive influence on FANC visits and is statistically significant (Table 3). Young women from urban areas have 5.4% higher probability of utilizing at least 4 FANC visits compared to those from the rural areas. The marginal effect is statistically significant (Table 4). The findings are consistent with literature whereby women in urban areas are more likely to attend FANC clinics than those from rural areas (Chorongo et al., 2016 ; Konlan et al., 2020).

Primary education positively influences the number of FANC visits and is statistically significant. Having secondary education positively and significantly influences on utilization of FANC. Higher Education also has a positive influence on FANC visits but the effect is not statistically significant (Table 3). Young women with primary education have 11.8% higher probability of attending at least 4 FANC visits than women with no education holding other correlates constant. Young women with secondary education have a 12.6% higher probability

of attending at least 4 ANC visits than those with no education. Probability of attending at least 4 ANC visits increases by 10% for those with high education compared to those with no education (Table 4). Gitonga (2017) and Kiplangat & Ochieng (2021) had a similar finding where education and literacy levels increase the probability of attending FANC clinics.

Married/cohabiting has a positive and statistically significant influence on FANC visits. Divorced /widowed has a positive effect on FANC visits which is not significant (Table 3). Being married/cohabiting increases probability of FANC utilization by 8.2% compared to being single. Marginal effects show that being divorced/widowed only increases probability of attending at least 4 FANC visits by 0.7%. However, the probability is not statistically significant (Table 4). The finding is consistent with findings from literature by Chorongo et al. (2016) and Gitonga (2017) where married women are more likely to attend FANC clinics consistently than those who are single. The study findings are contrary to those of Muthingu et al. (2018) who found that married women are less likely to attend FANC than single women.

Being in the middle and rich wealth categories each has a positive and statistically significant influence on FANC visits (Table 3). Belonging to either category increases the probability of FANC utilization by 6.4% and 7.8% respectively compared to those in the poor category (Table 4). Having a female sex of household has a positive influence on FANC visits but the effect is not significant (Table 3). From the marginal effects, having a female household head does not affect the probability of FANC utilization (Table 4). From the results wealth index influences FANC utilization and the finding is similar to that by Ibworo (2020) and Kiplangat & Ochieng (2021) where women from poor households are less likely to seek FANC services.

Employed-salaried variable has a positive non-significant influence on FANC attendance and increases probability of attending at least 4 clinics by 3.8% compared to unemployed young women. Employed-casual and self-employed have a negative non-significant influence on FANC. Being employed-casual decreases the probability of attending at least 4 FANC visits by 3.9% while being self-employed decreases the probability by 4.6% compared to the unemployed group. The results show that nature of employment is influences FANC utilization where by those who are in formal employment and unemployed are more likely to seek the services than those in the informal sector as concluded by Muthingu et al (2018) and Konlan et al. (2020).

Wanting pregnancy later on during the pregnancy and not wanting the pregnancy at all both have a negative significant influence on FANC utilization adjusting for other factors. Wanting pregnancy later on during the pregnancy decreases the probability of attending at least 4 ANC visits by 9% while not wanting the pregnancy at all decreases the probability by 16.3% each compared to those who wanted the pregnancy. The findings are consistent with literature by Efendi et al. (2017), Gitobu et al. (2018) and Muthingu et al. (2018) where women who wanted the pregnancy are more likely to attend FANC than those with mistimed pregnancy or who did not want to get pregnant at all.

Belonging to Roman Catholic, Protestant/other Christian or Muslim religion each has a positive but non-significant influence on FANC visits. A Roman Catholic young woman has a 3.1% higher probability compared to those in other religion. Protestant/other Christians and Muslims have a 3.8% and 5.0% increased probability of attending at FANC respectively each compared to those in the other religion category. Religion has an influence on FANC and the finding is similar to that by Chorongo et al. (2016) and Fenta et al. (2021)

Reading the newspaper/magazine less than once a week, listening to radio at least once a week and watching television at less than once a week have a negative non-significant influence on FANC visits each with the probability of attending at least 4 clinics decreasing by 3.1%, 3.4% and 4.9% respectively compared to those who do not read, listen and watch at all(Table 3, Table 4). Reading at least once a week, listening to radio less than once a week and watching television at least once a week each has a positive non-significant influence on FANC visits. The finding is not consistent with studies by Efendi et al., 2017 and Adow et al. (2020) where women who have access to television, radio and newspapers are more likely to attend FANC than those without access.

Total number of previous births has a negative non-significant influence on FANC visits. With an increase in previous births, the probability of attending at least 4 ANC visits reduces by 2%. The finding is consistent with literature by Gitonga (2017), Efendi et al.(2017) and Muthingu et al. (2018) where women with previous births are less likely to attend FANC compared to those without previous births.

Table 3: Logistic regression for FANC visits

fanc_visits	Coef.	St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Teenagers	-.133	.125	1.06	.287	-.377	.112	
Urban	.23	.112	2.04	.041	.01	.45	**
Primary Education	.511	.165	3.10	.002	.188	.834	***
Secondary Education	.548	.195	2.81	.005	.165	.931	***
Higher Education	.437	.336	1.30	.193	-.221	1.095	
Married/Cohabiting	.344	.141	2.45	.014	.068	.62	**
Divorced/widowed	.028	.2	0.14	.888	-.364	.421	
Middle	.275	.131	2.09	.036	.018	.532	**
Rich	.33	.147	2.25	.025	.042	.618	**
Female sex of Household head	.001	.106	0.01	.994	-.207	.208	
Employed-salaried	.164	.152	1.07	.283	-.135	.462	
Employed-casual	-.167	.126	-1.32	.186	-.414	.081	
Self-employed	-.196	.129	-1.52	.129	-.448	.057	
Wanted pregnancy later on during pregnancy	-.38	.103	-3.67	0	-.582	-.177	***
Did not want pregnancy	-.696	.326	-2.13	.033	-1.335	-.057	**
Roman Catholic	.131	.295	0.45	.656	-.447	.71	
Protestant/other Christian	.16	.283	0.57	.571	-.394	.715	
Muslim	.217	.307	0.70	.481	-.386	.819	
Read newspaper/magazine less than once a week	-.13	.135	-0.96	.337	-.395	.135	
Read newspaper/magazine at least once a week	.114	.175	0.65	.517	-.23	.457	
Listen to radio less than once a week	.071	.171	0.42	.677	-.264	.406	
Listen to radio at least once a week	-.145	.126	-1.15	.25	-.393	.102	
Watch television less than once a week	-.208	.153	-1.36	.173	-.507	.091	
Watch television at least once a week	.097	.144	0.67	.501	-.185	.378	
Total number of births	-.084	.058	-1.45	.148	-.198	.03	
Constant	-.513	.35	-1.47	.143	-1.199	.173	

Table 4: Marginal Effects of Independent Variables on FANC visits

	Delta-method					
	dy/dx	Std.Err.	Z	P>z	[95%Conf.	Interval]
Teenagers	-0.031	0.029	-1.060	-0.289	-0.089	0.026
Urban	0.054	0.027	2.040	0.041	0.002	0.106

Primary Education	0.118	0.037	3.210	0.001	0.046	0.191
Secondary Education	0.126	0.043	2.930	0.003	0.042	0.210
Higher Education	0.100	0.073	1.360	0.174	-0.044	0.243
Married/Cohabiting	0.082	0.033	2.440	0.015	0.016	0.147
Divorced/widowed	0.007	0.047	0.140	0.888	-0.085	0.099
Middle	0.064	0.030	2.130	0.033	0.005	0.123
Rich	0.078	0.034	2.260	0.024	0.010	0.145
Female sex of Household head	0.000	0.025	0.010	0.994	-0.049	0.049
Employed-salaried	0.038	0.035	1.080	0.280	-0.031	0.108
Employed-casual	-0.039	0.030	-1.320	0.187	-0.098	0.019
Self-employed	-0.046	0.031	-1.510	0.130	-0.106	0.014
Wanted pregnancy later on during pregnancy	-0.090	0.024	-3.680	0.000	-0.138	-0.042
Did not want pregnancy	-0.163	0.074	-2.210	0.027	-0.308	-0.019
Roman Catholic	0.031	0.069	0.450	0.654	-0.104	0.165
Protestant/other Christian	0.038	0.067	0.570	0.571	-0.093	0.168
Muslim	0.050	0.070	0.710	0.475	-0.088	0.188
Read newspaper/magazine less than once a week	-0.031	0.032	-0.960	0.338	-0.093	0.032
Read newspaper/magazine at least once a week	0.027	0.041	0.650	0.515	-0.053	0.107
Listen to radio less than once a week	0.017	0.040	0.420	0.676	-0.062	0.095
Listen to radio at least once a week	-0.034	0.029	-1.160	0.248	-0.092	0.024
Watch television less than once a week	-0.049	0.036	-1.360	0.175	-0.120	0.022
Watch television at least once a week	0.023	0.034	0.670	0.501	-0.043	0.089
Total number of births	-0.020	0.014	-1.450	0.147	-0.047	0.007

4.3.2 Goodness of Fit for FANC visits Logistic model

The model is a good fit for the data since the p-value is 0.2533

4.4 Factors that influence probability of receiving adequate FANC services

This section presents the logistic regression model for adequacy of FANC services and the marginal effect of the independent variables.

4.4.1 Logistic Regression for adequacy of FANC services and Marginal Effects

From the model, the factors that have a significant influence on the adequacy of FANC services are education and employment status (Table 5). Each independent variable's influence on FANC visits is interpreted holding all other factors constant.

Being in the teenage group has a positive influence on adequacy of services received but the effect is not significant. Probability of receiving adequate services increases by 2.4% for teenagers compared to other category (Table 6). Living in an urban area has a positive non-significant influence and increases probability of receiving adequate services by 0.1% compared to those from rural areas (Table 5, 6).

Having primary education, secondary education or higher education each has a positive influence on adequacy of services (Table 5). The influence of primary and higher education is significant with their marginal effects being13.9% and 24.6% each compared to those with no education (Table 6). Married/cohabiting and divorced/ widowed has a positive non-significant influence of adequacy of services received. Belonging to either of the groups increases probability of receiving adequate services by 5.2% and 4% respectively compared to being single.

Belonging to the middle wealth category has a positive influence on adequacy of services while the rich wealth category has a negative influence. The effect of each variable is not significant (Table 5). Middle wealth category increases the probability of receiving adequate services by 3.2% while being in the rich category reduces the probability by 4.1% each compared to the

poor (Table 6).Having a female as the head of the household has a positive non-significant influence on adequacy of services other factors held constant and increases the probability of receiving adequate services by 3.7% compared to households headed by a male(Table 5,6).

Employed-salaried has a positive and significant influence on adequacy of services while employed-casual and self-employed categories each has a positive non-significant influence holding other factors constant for each category (Table 5). With each category compared to unemployed, being employed-salaried increases probability of receiving adequate services by 7.6%, self-employed by 4% and employed casual 0.2% (Table 6).

Wanting pregnancy later on during pregnancy and not wanting pregnancy have a negative non-significant influence on adequacy of FANC other factors held constant with a decrease in probability by 1% and 4.5% respectively compared to those who wanted the pregnancy (Table 5, 6). Total number of births has a positive and non-significant influence on adequacy of services (Table 5). With each birth, the probability of receiving adequate services increases by 1.6% (Table 6)

Reading the newspaper/ magazine less than once a week, listening to radio less than once a week and at least once a week, watching TV at less than once a week and at least once a week each has a positive non-significant influence on adequacy of visits (Table 5). Each of the variables increases probability of receiving adequate services by 1.1%,0.9%,1.8%,3.4% and 2.2% respectively compared to those who do not read at all, watch tv or listen to radio (Table 6). Reading the newspaper/ magazine at least once a week has a negative influence on adequacy and the influence is not significant (Table 5). Belonging to the group decreases probability of receiving adequate services by 2.4% compared to those who do not read at all (Table 6)

Table 5: Logistic regression for Adequate FANC

adequate_fanc	Coef.	St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Teenagers	.145	.206	0.70	.482	-.259	.548	
Urban	.006	.176	0.04	.971	-.339	.351	
Primary Education	.883	.312	2.83	.005	.273	1.494	***
Secondary Education	.22	.367	0.60	.548	-.499	.939	
Higher Education	1.211	.507	2.39	.017	.217	2.205	**
Married/Cohabiting	.338	.254	1.33	.183	-.159	.835	
Divorced/widowed	.233	.355	0.66	.511	-.462	.928	
Middle	.192	.206	0.93	.353	-.212	.595	
Rich	-.257	.238	-1.08	.281	-.723	.21	
Female sex of Household head	.222	.174	1.28	.2	-.118	.563	
Employed-salaried	.431	.221	1.95	.052	-.003	.864	*
Employed-casual	.011	.212	0.05	.959	-.405	.427	
Self-employed	.236	.212	1.11	.266	-.18	.652	
Wanted pregnancy later on during pregnancy	-.064	.169	-0.38	.705	-.395	.267	
Did not want pregnancy	-.302	.61	-0.50	.62	-1.497	.892	
Roman Catholic	.175	.509	0.34	.731	-.822	1.172	
Protestant/other Christian	.057	.488	0.12	.907	-.9	1.014	
Muslim	.482	.526	0.92	.359	-.549	1.514	
Read newspaper/magazine less than once a week	.067	.218	0.31	.76	-.361	.494	
Read newspaper/magazine at least once a week	-.15	.288	-0.52	.604	-.715	.416	
Listen to radio less than once a week	.052	.268	0.20	.845	-.473	.577	
Listen to radio at least once a week	.11	.203	0.54	.588	-.288	.508	
Watch television less than once a week	.2	.247	0.81	.417	-.283	.684	
Watch television at least once a week	.133	.228	0.58	.561	-.315	.58	
Total number of births	.097	.097	1.00	.319	-.094	.288	
Constant	-2.645	.657	-4.03	0	-3.933	-1.358	***

Table 6: Marginal Effects of Independent Variables on Adequate FANC

	Delta-method					
	dy/dx	Std.Err.	Z	P>z	[95%Conf.	Interval]
Teenagers	0.024	0.035	0.690	0.492	-0.045	0.093
Urban	0.001	0.029	0.040	0.971	-0.055	0.057
Primary Education	0.139	0.047	2.960	0.003	0.047	0.232
Secondary	0.037	0.063	0.590	0.557	-0.086	0.159

Education						
Higher Education	0.246	0.116	2.130	0.033	0.019	0.473
Married/Cohabiting	0.052	0.037	1.400	0.160	-0.021	0.126
Divorced/widowed	0.040	0.064	0.630	0.530	-0.085	0.165
Middle	0.032	0.036	0.900	0.367	-0.038	0.102
Rich	-0.041	0.037	-1.110	0.269	-0.113	0.032
Female sex of Household head	0.037	0.030	1.250	0.210	-0.021	0.095
Employed-salaried	0.076	0.041	1.830	0.067	-0.005	0.157
Employed-casual	0.002	0.035	0.050	0.959	-0.066	0.070
Self-employed	0.040	0.037	1.070	0.283	-0.033	0.113
Wanted pregnancy later on during pregnancy	-0.010	0.027	-0.380	0.704	-0.064	0.043
Did not want pregnancy	-0.045	0.084	-0.540	0.589	-0.210	0.119
Roman Catholic	0.029	0.087	0.340	0.737	-0.142	0.201
Protestant/other Christian	0.009	0.079	0.120	0.907	-0.145	0.164
Muslim	0.086	0.101	0.850	0.396	-0.112	0.284
Read newspaper/magazine less than once a week	0.011	0.036	0.300	0.763	-0.060	0.082
Read newspaper/magazine at least once a week	-0.024	0.044	-0.540	0.592	-0.110	0.063
Listen to radio less than once a week	0.009	0.045	0.190	0.846	-0.079	0.096
Listen to radio at least once a week	0.018	0.033	0.550	0.585	-0.046	0.082
Watch television less than once a week	0.034	0.043	0.780	0.434	-0.051	0.119
Watch television at least once a week	0.022	0.038	0.570	0.566	-0.053	0.097
Total number of births	0.016	0.016	1.000	0.318	-0.015	0.047

4.4.2. Goodness of Fit for Adequacy of FANC services Logistic model

The model is a good fit for the data since the p-value is 0.1135

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter gives an overview of the findings from the research and gives recommendations for interventions and areas of further research.

5.1 Conclusion

Overall factors that influence utilization of FANC range from demographic disposition to socio-economic factors. From the study, education and has the highest influence on both FANC visits and adequacy of services received with the probability of utilizing antenatal services increasing with each level of education. Choice of pregnancy has the second highest influence on FANC visits while employment status has the second highest influence on adequacy of services received. Place of residence has a higher influence on FANC visits than on adequacy of services received where urban and rural outcomes are almost similar. Access to media has a negative influence which is not consistent with other studies.

5.2 Recommendations

From the findings, interventions geared towards increasing FANC utilization should be multisectoral focus in order to address the disparities in the different age groups effectively. The ministry of health should work collaboratively with the education sector in order to incorporate ANC education at lower levels of education like primary school. Contraceptive education should also be intensified to avoid unwanted and mistimed pregnancies. Health care workers should also be evaluated on the compliance of the FANC care package to ensure that every pregnant woman receives the recommended services.

Further research should look at perceptions of young women towards ANC to delve deeper into the hinderances that lead to the trends depicted within the age group in the study.

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