SCHOOL OF BUILT ENVIRONMENT AND DEVELOPMENT STUDIES

COLLEGE OF HUMANITIES

Factors Affecting Antenatal Care Utilization in South Sudan: Evidence from 2010 South Sudan Household Survey

BY

BIONG DENG KUOL AROP

SUPERVISED BY

DR. KERRY VERMAAK

May, 2015

Submitted in partial fulfilment of the academic requirement of the Degree of the Master of Population studies in the school of Built Environment and Development Studies in the University of KwaZulu-Natal, Howard College Campus

Dedication

This project is dedicated to my loving wife, Nyandeng Monykwer, and our children, Arop, Deng, Kuol, Achai and Nyanaar, and not to forget my loving mother for nurturing me. Your unconditional love, encouragement, patience and perseverance have contributed to my successes. You are my source of energy and wisdom; you have been an inspiration in my life.

Declaration

I, Biong Deng Kuol Arop declare that:

1. The research reported in this thesis, except where otherwise indicated, is my original research.

2. This thesis has not been submitted for any degree or examination at any other university.

3. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

4. This thesis does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
    i. Their words have been re-written but the general information attributed to them has been referenced
    ii. Where their exact words have been used, then their writing has been placed in italics and inside quotation marks, and referenced.

5. This thesis does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the thesis and in the References sections.

_____

Student signature

_____

Date

Acknowledgment

To compile this work was not an easy task; I believe it was the result of the combined efforts and assistance from a number of individual and institutions, for which I am very grateful. I would like to express my sincere gratitude to all for their support and encouragement.

It was my great pleasure and fortune to work under the supervision of Dr Kerry Vermaak. I have no words to describe my indebtedness to her and I am truly thankful to her for her excellent supervision and tireless assistance at every step of developing this dissertation. Her experience and expertise have made this dissertation possible.

Special thanks also to Dr Suleiman for his valuable comments and consultations. I would like to express my deepest gratitude to UNFPA South Sudan office for sponsoring my study and for their cooperation and material support. I would also like to thank the Chairperson of the National Bureau of Statistics, His Excellency, Isaiah Chol Aruai and the NBS office for providing me this opportunity and their kind cooperation.

My greatest gratitude goes to my big brother, Dr Luka Biong, for his continuous encouragement and inspiration to this stage. Last, but not least, very special thanks goes to my loving wife, Nyandeng Monykwer Miyan, and our lovely children Arop, Deng, Kuol, Achai and Nyanaar for their patience and moral support. They were a great source of strength. I shall forever remain grateful to them.

Abstract

Background

Maternal mortality in South Sudan was estimated to be as high as 2054 per 100,000 live births, amongst the highest mortality in the world. The utilisations of antenatal care (ANC) services, which provide the opportunity for early diagnoses and preventions of complications during pregnancy, are crucial to reducing maternal mortality.

This study is meant to identify the factors that affect the utilization of ANC services among pregnant women aged 15 – 49 years in South Sudan using the *Second South Sudan Households Survey* (SSHHS II).

Methods

The Second South Sudan Households Survey was conducted using the UNICEF's Multiple Indicator Cluster Survey (MICS) methodology. The population used in this study is the 4,067 women who gave birth in the last two years before the survey. The dependent variables in this study were any ANC and adequate ANC utilisation, defined as the proportion of pregnant women who had attended ANC, and were seen by a skilled professional (a doctor, a nurse or skilled midwife) at least once during their pregnancy. The second indicator was the proportion of pregnant women who had attended ANC at least four times during their pregnancy, and were seen by any health provider.

The explanatory variables were the women's age, age at first marriage, marital status, parity, maternal educational level, household wealth quintile, geographical location (states) and place of residence (urban or rural).

Results

More than half 56% of the women did not use ANC services at all during their pregnancy, and only 18% used ANC adequately, while 26% of the selected women used it inadequately.

Multivariate analysis shows that most of the explanatory variables were strong predictors to ANC utilization at least once, while household wealth seems to be the only variable predicting the utilization of ANC services by women of South Sudan at least four times. However, pregnant women with primary and secondary level of education were 2.04 and 2.32 times, respectively, more likely to use ANC than women with no education. Likewise, women in the fourth and the richest (fifth) quintiles were twice and three times, respectively, more likely to utilize ANC than those in the poorest quintile.

Conclusions

In conclusion the utilization of ANC in South Sudan was inadequate and far from satisfactory. The findings show a high level of illiteracy among women of South Sudan, but education variables were shown to be significantly associated with at least one ANC utilization. This result implies that providing women with at least primary education will enhance the likelihood of ANC utilization, and may increase with improved education. Nevertheless, this study has proved household wealth is the only variable that has influence on the mother's utilization of ANC services at least four times or more.

Acronyms

MDGs: Millennium Development Goals

IFAD: International Fund for Agricultural Development

AFDB: African Development Bank

NBHS: National Baseline Household Survey

WHO: World Health Organization

MMR: Maternal Mortality Ratios

UNICEF: United Nations Children's Fund

ANC: Antenatal care

UN: United Nations

NBS: National Bureau of Statistics

SSMOH: South Sudan Ministry of Health

SSHHS: South Sudan Households Survey

SSHHS II: Second South Sudan Households Survey 2010

UNFPA: United Nations Population Fund

STIs: Sexually Transmitted Infections

HIV: Human Immunodeficiency Virus

USA: United States of America

NGOs: Non-Governmental Organizations

DRC: Democratic Republic of Congo

MICS: Multiple Indicator Cluster Survey

UNDP: United Nations Development Programmes

USAID: United States Agency for International Development

UNAIDS: Joint United Nations Programme on HIV and AIDs

WFP: World Food Organization

EAs: Enumeration Areas

IDP: Internally Displaced People (Persons)

CI: Confidence Interval

OR: Odds Ratios

List of tables

Table 1: Variables description 28

Tables 2: Distribution of study population by explanatory variables.....34

Table 3: Explanatory variables in relation to ANC utilization 37

Table 4: Multivariate logistic regression of ANC utilization 41

Table 5: Explanatory variables in relation to number of ANC utilized.....43

Table 6: Multivariate logistic regressions of the number of ANC utilized.....46

List of figures

Figure 1: Individual Determinants of health services systems 13

Figure 2: Percentage distribution of ANC utilization in South Sudan.....34

Graph 1: The relationship between household wealth quintile and ANC utilization 36

Table of Contents

Dedication ii

Declaration iii

Acknowledgment iv

Abstract v

Acronyms vii

List of tables ix

List of figures x

Table of Contents xi

1 CHAPTER ONE 1

1.1 Background 1

1.2 The importance of ANC 4

1.3 Statement of the problem 6

1.4 Rationale of the study 7

1.5 Aim of the study 8

1.6 Objectives 8

1.7 Questions to be asked 8

1.8 Hypotheses 9

2 CHAPTER TWO 10

2.1 Introduction of the Literature Review 10

2.2 Theoretical Framework 10

2.3 Socio-demographic variables 14

2.3.1 Predisposing factors: - socio-demographic factors 14

2.3.2 Social structure 16

2.4 Socio-economic variables 18

2.4.1 Enabling factors: - Family factors 18

2.4.2 Community factors 19

3 CHAPTER THREE 21
3.1 METHODOLOGY 21
3.1.1 Location of the Study 21
3.1.2 Source of the data 21
3.1.3 Sampling Design: 22
3.1.4 Weighting measures 23
3.1.5 Study Population and Sample Size: 23
3.1.6 Variable Description and Measurement 24
3.1.7 Data management 28
3.1.8 Data analysis methods 28
3.2 Ethical considerations 29
3.3 Validity, Reliability and Rigour 30
4 CHAPTER FOUR 31
4.1 Outcome of the research 31
4.1.1 Introduction 31
4.1.2 General description of the population under study 31
4.1.3 ANC utilization in South Sudan 34
4.1.4 Explanatory variables in relation to ANC utilization 35
4.1.5 ANC utilization multivariate analysis 39
4.1.6 Explanatory variables in relation to adequate utilization of ANC 42
4.1.7 Number of ANC utilized multivariate analysis 46
5 CHAPTER FIVE 49
5.1 Discussion 49
5.1.1 Introduction 49
5.1.2 ANC utilization and demographic factors 49
5.1.3 ANC utilization and social structure factors 50
5.1.4 ANC utilization and family factors 52
5.1.5 ANC utilization and community factors 52

5.1.6 Association with adequate utilization of ANC services 53
5.2 Conclusion 54
5.3 Recommendations 55
References 57
Appendix I: Ethics Approval 70

1 CHAPTER ONE

1.1 Background

The fifth Millennium Development Goal (MDG), according to World Health Organization (2012), is to improve maternal health. This goal is being assessed using two targets, a reduction in the maternal mortality rate (MMR) by three quarters and the achievement of universal access to reproductive health care between 1990 and 2015 (WHO, 2012; Mangeni Mwangi, Mbugua and Mukthar, 2013; Baral Y., Lyones, K., Skinner, J., & van Teijlingen, E, 2012). Maternal mortality has been defined by UNICEF (2008) and Yar'zever and Said (2013) as the death of a woman during pregnancy or within 42 days of the termination of the pregnancy , regardless of the duration and place of pregnancy, from any causes or complications related to the pregnancy but not as a result of accidents.

During the 2005 United Nations summit of Heads of State Meeting, new targets were added to the MDGs. Target B, for the fifth MDG, aims to achieve "*universal access to reproductive health*" (UNICEF, 2008; Kaur and Kaur, 2013). Two of the indicators used for monitoring this target are related to antenatal care (ANC) utilization. One indicator is the proportion of pregnant women who have attended ANC, and who were seen by a skilled professional (a doctor, a nurse or skilled midwife) at least once during the pregnancy. The second indicator is the proportion of pregnant women who have attended ANC at least four times during their pregnancy, and seen by any health care provider (UNICEF, 2008; Sohag, A., Memon, S., Bhatti, M., Abdul Azeem, M, 2013). ANC has been defined as the care that a woman receives from the confirmation of conception until she goes into labour (Onasoga, O. A., Afolayan, J. A., & Oladimeij, B. D, 2012; Rooney, 1992). In this period, sufficient use of ANC services improves the outcome of pregnancy and childbirth (Onasoga et al, 2012; Ms and Peter, 2013). Previous research has shown that four ANC visits would be adequate for normal

pregnancies, with more visits deemed necessary only in the case of high-risk pregnancies (Simkhada, B., Teijlingen, E. R. V., Porter, M., &Simkhada, P, 2008). Moreover, many developing countries reported ANC attendance far below the UN recommendation of a minimum of four ANC visits (UNICEF, 2008).

The addition of this target was deemed necessary as, although there has been an overall improvement in global health, maternal mortality continue to be a major cause of death to women in the age group 15-49 in developing countries (Sharma, 2002; Dhakal, S., Chapman, G. N., Simkhada, P. P., van Teijlingen, E. R., Stephens, J., and Raja, A. E, 2007). According to UNICEF (2008) adequate ANC utilization is associated with safer maternal pregnancy and childbirth outcomes. Several studies have indicated that more than half a million women died unnecessarily due to complications and causes related to pregnancy and childbirth with 99% of cases from less developed countries (Gabrysch and Campbell, 2009; Yohannes, B., Tarekegn, M and Paulos, W, 2013 and UNICEF, 2008). The maternal mortality ratio (MMR) is 920 women per 100,000 live births in Sub-Saharan Africa, compared to 8 women per 100,000 live births in developed countries, where almost all pregnant women access health care facilities for ANC and are attended by skilled health workers (UNICEF, 2008; Kipronoh, 2009). However, because countries and people are not the same in terms of development and individual income, the utilization of ANC services by women in developing countries varies considerably (Nisar and White, 2003; Ye, Y., Yoshida, Y., and Sakamoto Junichi, J, 2010).

Maternal death is considered to be extremely high in South Sudan, according to the South Sudan Ministry of Health (SSMOH) and National Bureau of Statistics (NBS). Data from the 2006 South Sudan Household Survey (SSHHS) has estimated maternal mortality as high as 2054 per 100,000 live births, among the highest maternal mortality in the world (SSMOH, 2009), which is an indication of the low level of access to health care services in the country.

The government of South Sudan has committed to reducing maternal and child mortality through strengthening the health care systems and offering a comprehensive reproductive health package through the public health system (SSMOH, 2009). The aim of the government strategic plan is to reverse the poor reproductive health status of the people of South Sudan, as well as to address issues related to MDGs, particularly MDG Five (universal access to health care services) (SSMOH, 2009).

Current indications are that South Sudan will fall short in achieving the MDGs in 2015, due to limited time and resources available, but the implementation of the strategies will still improve the reproductive health status and reduce maternal and child mortality in the country (MOH and NBS, 2013).

While the utilization of ANC services is crucial for the early diagnosis of complications and risks that women might develop during pregnancy, these complications are defined to be preventable (Dairo and Owoyokun, 2010) and women who use them are not really sick. For this reason, ANC could easily be under-utilized. This situation might be exacerbated owing to socio-economic and socio-demographic factors status. The disparities in ANC utilization explain the big differences between developed and developing countries in terms of the maternal mortality and morbidity ratio (Dairo and Owoyokun, 2010; Kulkarni and Nimbalkar, 2008).

South Sudan according to International Fund for Agricultural Development (IFAD), 2013 have more than 50% of the population lives under the international poverty line, resulted from the civil war between the two parties of old Sudan (South and North). The same source indicated that 84% of the poor lives in rural areas of the country. Poverty according to IFAD, 2013 was driven by conflict, displacements, reduction of assets and difficulty in accessing social services. Consequently, only 24% of the population lives close to health care services

as indicated by Shimeles and Verdier-Chouchane, 2012, based on National Baseline household Survey (NBHS). The country is also characterized by eight members in average per a family (Shimeles and Verdier-Chouchane, 2012). Moreover, 42% of the country's population works in agricultural sector, 56% work in services sector while only 2.4% works in industrial sector (Shimeles and Verdier-Chouchane, 2012).

The long war fought between South and North Sudanese by then, had contributed negatively in the level of education of the South Sudanese population. Whereby, almost 91% of the South Sudanese citizens have below primary level of education, 70% of them cannot read or write and women have been underrepresented at different level of education as well (Shimeles and Verdier-Chouchane, 2012).

The purpose of this study is to identify the factors that affect the utilization of ANC services among women age 15-49 in South Sudan using the data from the Second South Sudan Households Survey (SSHHS II) which was conducted by the South Sudan Ministry of Health (SSMOH), South Sudan National Bureau of Statistics (NBS) and was technically supported by UNICEF and UNFPA. This data was used because it was the only data available in the country on ANC utilization. The outcome of the study will inform stakeholders and decision makers on the current status of ANC utilization and would, therefore, contribute to better utilization of ANC among the women of South Sudan.

1.2 The importance of ANC

There are many causes of maternal death around the globe especially in developing countries. These causes includes hypertensive disorders, anaemia, haemorrhage, obstructed labour, unsafe abortion, ectopic pregnancy and specific chronic nutritional deficiencies (Khan, K. S., Wojdyla, D., Say, L., Gülmezoglu, A. M., & Van Look, P. F, 2006; Villar, J., Merialdi, M., Gülmezoglu, A. M., Abalos, E., Carroli, G., Kulier, R., & de Onis, M, 2003). Routine

monitoring of women during their pregnancy can prevent death from these complications (Ekabua, J., Ekabua, K., and Njoku, C., 2011). For example, a pregnant woman's blood pressure can be monitored during her pregnancy through an ultrasound examination; severe anaemia due to deficiencies in iron and foliate can be corrected by introducing iron and folic acid into the mother's diet; and dietary interventions during pregnancy can help to reduce the risk of gestational weight gain (Thangaratinam, S., Rogozińska, E., Jolly, K., Glinkowski, S., Roseboom, T., Tomlinson, J. W., ...& Khan, K. S, 2012). ANC services therefore present opportunities to provide pregnant women with interventions that are essential to their health and their welfare (Hall & Chng, 1982; Ejigu, T., Woldie, M., & Kifle, Y, 2013). ANC is also used as an opportunity to educate women about the hazards and symptoms that might place them at risk during their labour and delivery (Paudel. D. P, Dr. Nilgar B. R. and Dr. Bhandankar M, 2013; Baral, Y., Lyones, K., Skinner, J., & van Teijlingen, E, 2012). For example, pregnant women are usually advised about their deliveries based on their pregnancy situation (vaginal delivery vs caesarean section) (Tewodros, B., Mariam, A. G., & Dibaba, Y, 2009; Pell, C., Meñaca, A., Were, F., Afrah, N. A., Chatio, S., Manda-Taylor, L., & Pool, R, 2013; Sharma, 2002; Dyeli, 2012). Women are advised of the importance of delivering with professional assistance and skilled health personnel, as well as the spacing of births, which improves their health and infant survival (Dowswell, T., Carroli, G., Duley, L., Gates, S., Gülmezoglu, AM., Khan-Neelofur, D., & Piaggio, GGP, 2010). ANC provides an opportunity to monitor foetal development and provide suitable interventions to improve the mother's nutritional status (van Eijk, A. M., Bles, H. M., Odhiambo, F., John G Ayisi, J. G., Blokland, I. E., Rosen, D. H., Adazu, K., Laurence Slutsker, L., and Kim A Lindblade, K. A, 2006). On the other hand, tetanus immunization during pregnancy is very essential and ANC is used to protect pregnant women and infants from tetanus (Babalola, 2014; Abel, N. M., Françoise, M. K., Dramaix-Wilmet, M., & Donnen, P, 2012). In addition, health

complications such as malaria can be managed (Tshabalala, 2012). Visiting ANC regularly means that there is often enough time for early detection and treatment of infections such as HIV and STIs during pregnancy (Sharma, 2002; WHO, 2003; Varma, G. R., Kusuma, Y. S., & Babu, B. V, 2011; Holtz, T. H., Patrick Kachur, S., Roberts, J. M., Marum, L. H., Mkandala, C., Chizani, N., & Parise, M. E, 2004). Urine also can be tested during pregnancy to detect other infections such as bacteriuria and proteinuria (Rogan & Olveña, 2004).

Despite the importance of ANC outlined above, the frequency of utilization of ANC varies dramatically from one country to another. In the USA and in many countries of western Europe, pregnant women use ANC 12-16 times during pregnancy and within 42 days of the postpartum period (Agus & Horiuchi, 2012).

According to UNICEF (2008), one in every three women in developing countries does not use ANC services at all during pregnancy. The same source notes that the risk of maternal mortality for a woman in a developing country is estimated to be more than 300 times higher than for a woman living in a developed country.

1.3 Statement of the problem

South Sudan is facing reproductive health challenges, which is not surprising considering the limited provision of the health facilities network. This consists of only 52 hospitals around the country, 252 Primary Health Care Centres and about 988 Primary Health Care Units (MOH & NBS, 2013).

Reports from NGOs and the South Sudan Ministry of Health have indicated that most of the maternal deaths in South Sudan can be attributed to complications in pregnancy. Furthermore, most of these complications were deemed to have occurred in pregnant women who do not use ANC services (SSMOH, 2009; Baral et al, 2012). Consequently poor

utilization of ANC among South Sudanese pregnant women has become a public concern due to its negative outcomes (SSMOH, 2009; Yousuf, F., Haider, G., & Shaikh, R. B, 2010).

Given that South Sudan is a new country, little research has been done as yet on maternal health in the country. However, in its strategic plan for the year 2012-2015, the government of South Sudan has planned to address the previously poor health care situation and accelerate the provision of quality health care for the people of South Sudan (MOH & NBS, 2013).

1.4 Rationale of the study

The Ministry of Health and the National Bureau of Statistics South Sudan had indicated in SSHHS II publication that very few representative studies have been done at a national level in South Sudan on the determinants of ANC utilization. Those studies were focused on certain areas of maternal health and on specific geographical areas of the country (MOH & NBS, 2013). These findings are of limited usefulness as the society of South Sudan is still very mobile, due to the fact that South Sudan is a new country and populations are still moving in from neighbouring countries, with new areas constantly being established (MOH & NBS, 2013).

Therefore, using a nationally representative sample investigating factors that are associated with the pattern of ANC services utilization might help more in public health decision making and could inform the kinds of intervention that may promote the utilization of maternal health services by the pregnant women of South Sudan (Babalola, 2014; Titaley, C. R., Dibley, M. J., & Roberts, C. L, 2010).

However, ANC services utilization varies as socio-economic and socio-demographic status varies across the country. 51.9 % of the women in the age group of 15-24 utilized ANC

services compare to 39.6% of the women who utilized ANC services in the age group of 35years and above. Similarly married women (49.6%) are more likely to utilized ANC services than single women (44.8%). Obviously like most of the African countries, women in the urban areas of South Sudan (65.7%) utilized ANC services than women in the rural areas (40.5%) do. Likewise, utilization of ANC services increase as the level of household wealth increase. Also ANC visit increases as the women's level of education increased.

1.5 Aim of the study

The aim of this study is to investigate socio-economic and socio-demographic factors that influence utilization of ANC by women during pregnancy.

1.6 Objectives

The objectives of this study are:

1. To investigate the association of socio-demographic factors with ANC attendance during the last completed pregnancy.
2. To investigate the association of socio-economic factors with ANC attendance during the last completed pregnancy.

1.7 Questions to be asked

This study is intended to answer the following questions:

1. What are the socio-demographic factors that affect the utilization of ANC in South Sudan?
2. What are the socio-economic factors that affect the utilization of ANC in South Sudan?

1.8 Hypotheses

- Socio-demographic factors associate with the utilization of ANC in South Sudan
- Socio-economic factors associate with the utilization of ANC in South Sudan

2 CHAPTER TWO

2.1 Introduction of the Literature Review

A number of studies have outlined the reasons why ANC utilization is low in developing countries. These studies show that to some extent women in developing countries have limited information about the importance of ANC, and many of them have no control over their health issues due to their limited resources and decision making. In addition, women reported long distances between their place of residence and ANC services and they complained about poor infrastructure and lack of transportation. They also perceived health providers as rude sometimes, and more importantly single mothers were psychosocially and economically challenged in using ANC services during their pregnancy (Dyeli, 2011; Tshabalala, 2012; Sakala, 2011).

This chapter outlines the conceptual framework of Anderson and Newman (2005), which has been adapted by a number of studies investigating factors related to ANC utilisation. The findings of other studies are presented within the organisation of conceptual categories proposed by the framework.

2.2 Theoretical Framework

The conceptual framework applied in this study is developed by Anderson and Newman (2005), which basically initiated based on health-seeking behaviour model (Anderson and Newman, 2005; Abor and Abekah-Nkrumah, 2014). The model also helps in the selection of the appropriate variables that could be analyzed. The model assumes that a variety of circumstances determine the type and the intensity of health services that an individual might need (Yar'zever & Said, 2013). These are divided into three categories:

1) Predisposing features category: these are the socio-demographic characteristics of an individual that influence their propensity to look for health care (Anderson and Newman, 2005; Abor and Abekah-Nkrumah, 2014). The assumption is that an individual will act wisely when it comes to health care choices (Abor and Abekah-Nkrumah, 2014) and all people with the same features will act the same way in their search for health care services. These influential predisposing factors are the woman's age, education, parity, marital status and health-related issues.

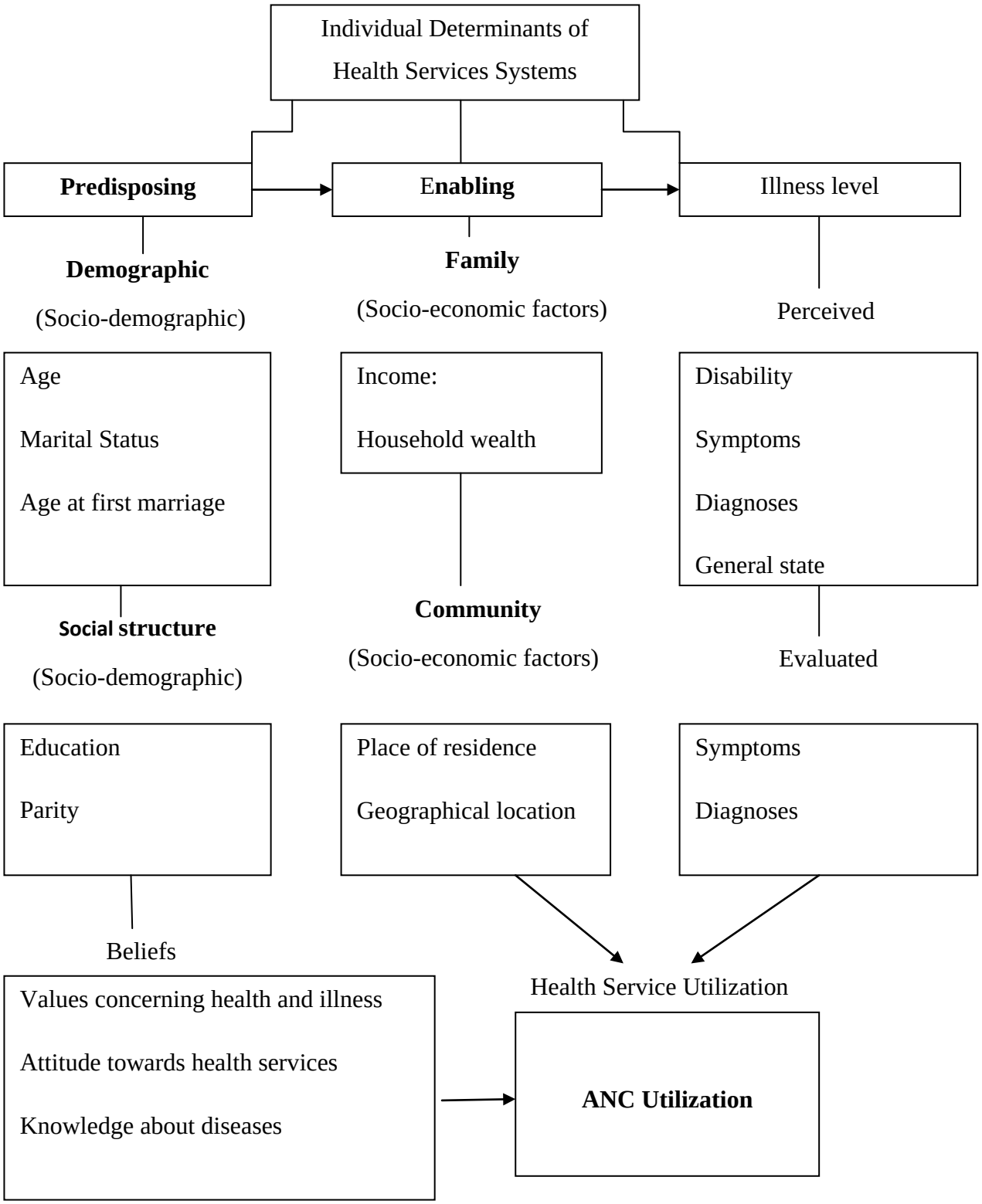
2) The enabling features category: is based on assumptions of accessibility, which assumes the possibility of accessing the health facilities is one of the determinants of ANC utilization (Ayanda, 2014). In other words, the utilization of health care facility depends on its availability and accessibility (Abor & Abekah-Nkrumah, 2014). An individual with characteristics that predispose them to health services utilization alone would not be sufficient to determine actual utilisation. There must be some factors that enable families to use the facilities, which can be measured in terms of resources like income, insurance and accessibility of the facility (Anderson and Newman, 2005; Abor & Abekah-Nkrumah, 2014).

3) The third category is illness level needs category, which implies that the use of ANC services depends on how mothers perceive the necessity of health care services. ANC utilization is not only determined by the existence of physical complications, but also by cultural points of view on that condition (Okutu, 2011; Chitimbe, 2006). Cultural factors have been found to strongly influence health-seeking behaviours, especially among pregnant women and those with children (Abor & Abekah-Nkrumah, 2014; Chakraborty N, Islam MA, Chowdhury RI, Bari W W, Akhter HH, 2003). This is when people do not pay attention to a certain symptom or condition and considers it

normal, according to their traditions and cultural understanding (Abor & Abekah-Nkrumah, 2014). The existence of predisposing and enabling factors are not enough for a woman to use ANC services, she has to perceive the complications as something dangerous and she should believe in treatment as the only solution (Anderson and Newman, 2005; Chakraborty et al, 2003; Okutu, 2011).

The theory examines the effect of individual and health management factors on the utilization of ANC (Anderson, 1973; Andreson, 1995). This study had only used predisposing and enabling individual categories of utilizing health facility. The third category of this theory has not been used, due to the unavailability of the questions that asked about the needs level of ANC utilized by pregnant women in the Second South Sudan Households Survey (SSHHS II) (see figure 1). Furthermore, the predisposing determinants consist of demographic and social structure determinants (The socio-demographic factors), while enabling factors consist of family and community determinants (The socio-economic factors). The socio-demographic determinants investigated in this study were age, age at first marriage and marital status. Social structure in this study consists of education and parity. Belief factors were not used in this study due to the absence of the questions that covered belief factors in the SSHHS II. The enabling factors comprise household wealth index, geographical location (states) and place of residence (rural and urban) (Balabola, 2014).

Figure 1: Individual determinants of health services systems



Anderson and Newman Individual Determinants of Health Service Utilization, 2005

2.3 Socio-demographic variables

This part of the section contained the details of the socio-demographic factors which encourage and influence pregnant mothers to ask for ANC help. Socio-demographic factors in this topic refer to a set of women's characteristics such as women's age, marital status, age at first marriage, women's education and marital status. These factors comprised of demographic and social structural factors as follows:

2.3.1 Predisposing factors: - socio-demographic factors

Predisposing factors indicates the variables that explain the propensity of a woman to use ANC services (Anderson, J. G., 1973)

2.3.1.1 Age of the mother

The age of the woman at the time of her pregnancy is marked as an important factor that influences the utilization of ANC. Older women (35 years old and above) are more likely to have experienced risks and complications during their previous pregnancies and acquired knowledge of health care services which could have prevented or ameliorated these difficulties, making them more likely to attend ANC services (Abor and Abekah-Nkrumah, 2014). Studies from Ghana and South Africa found that older mothers were more likely to attend ANC than the younger mothers (Abor and Abekah-Nkrumah, 2014; Tshabalala, 2012).

In contrast, studies conducted in other contexts have found that younger mothers were more likely to utilize ANC than older mothers. Berhe, K. K., Welearegay, H. G., Abera, G. B., Kahsay, H. B., & Kahsay, A. B (2014) and (Pandey and Karki, 2014) found in their studies in Ethiopia and East Nepal that, as a result of educational developments and medical improvements in these countries, those younger mothers have more knowledge on modern health care facilities; therefore they are more likely to seek ANC services than older mothers. Simkhada et al (2008) concluded in his systematic review of the literature that women in the age group 30 – 34 used ANC more frequently and earlier than those in the younger and older

ages. In contrast women younger than 35 were more likely to visit ANC services to make sure their babies are in a good position and healthier. Unlike older women were less likely to seek care unless they were experiencing problems or complications (Simkhada et al, 2008; Alikhasi, N., Khadivi, R., & Kheyri, M, 2014).

2.3.1.2 Marital status

Marital status is one of the influential factors that affect health-seeking behaviours (Mlilo-Chaibva, 2007). For instance, single pregnant women do not use ANC services frequently, mainly because they lack resources and social support from their families or partners (Mlilo-Chaibva, 2007). Similarly, married women also may lack power and the independence to take decisions on their own in issues related to ANC services utilization (WHO, 2003). Mekonnen and Mekonnen (2002) found that in Ethiopia married women were 40% more likely than unmarried women to utilize ANC services during their pregnancy. In the systematic review carried out by Simkhada et al (2008) and others on literature review in developing countries it was revealed that married women were in a position to use ANC more than unmarried women. For example, in Kenya women who were not married and those who had started their childbearing earlier, below 20 years of age reported less utilization of ANC services than married women (Fotso, J. C., Ezeh, A., Madise, N., Ziraba, A., & Ogollah, R., 2009).

2.3.1.3 Age at first marriage and cohabitation

Women at a younger age in developing countries are more at risk of having complications during their pregnancy (Banda I., 2012). Younger mothers are less likely to continue their education, and moreover, they are less likely to be aware of the complications related to pregnancy as indicated by Banda I (2012). A study carried out in Malawi and Zambia found out that, women aged less than 25 had a lower rate of utilization of antenatal care compared to older women (Banda C, 2013; Banda I. 2012).

Moreover, a study conducted by Sharma (2002) in Nepal found that a considerable number of women were married before they were 15. Only 7% of these young women attended ANC, compared to 20% of women aged 18 years and older. This was attributed to the high rate of illiteracy in Nepal and a lack of knowledge about maternal health programmes. Nonetheless, according to literature review by Simkhada et al (2008) a number of studies in developing countries have shown that utilization of ANC is positively associated with the age of mothers at their first marriage. However, age at first union was not a significant indicator of ANC utilization in some countries such as Jordan, probably due to early marriage practices (Simkhada et al, 2008; Babalola, 2014).

2.3.2 Social structure

Social structure reflected by an individual education and the pattern of his or her behaviour which indicate an individual's status in the society (Anderson and Newman, 2005).

2.3.2.1 Maternal education

The level of education to women plays very important role in the mother's use of ANC services (Jimoh, 2003). More educated girls and women are more likely to delay their marriage in order to have a healthier and manageable family (UNFPA, 2013; Varma et al, 2011). As a result, improving the mother's education and creating more opportunities for women can have a greater contribution in improving utilization of ANC services (Abor & Abekah-Nkrumah, 2014). Education increases a women's autonomy, through which they can gain confidence, skills and the ability to make good decisions on their own and their family's health care services (Abor & Abekah-Nkrumah, 2014; Jalal & Shah, 2011). A woman with better education knows the effectiveness of health care and how to seek it for herself and her children (UNFPA, 2013). Educated women seek quality health care services and have the

capability of taking right decision at the right time (Abor & Abekah-Nkrumah, 2014). An educated mother is better educated about women's complications and where to seek health care services; she can therefore effectively influence the family's health status. A systematic literature review of ANC utilization from developing countries by Simkhada et al (2008) indicated that in sixteen studies mothers with better education were more likely to meet the United Nations recommended four visits to ANC than less educated women. Many studies have positively proved the impact of mother's education and their utilization of ANC services (Abor & Nkrumah, 2013; Babalola, 2014). In a study conducted in a remote area of India by Paudel et al (2013) it was found that even in such a setting educated mothers have better accesses to information on many issues concerning maternal health care services and the ability to seek for modern medical care wherever and whenever they need it. Women's education stood as a strong predictor of ANC utilization.

2.3.2.2 Parity

Parity in this context is defined as a number of times a woman had given birth to a child, irrespective of being born alive of stillbirth. Previous pregnancies of a woman influence the degree of risk in her current pregnancy.

Parity has been strongly associated with ANC utilization in Simkhada and his colleague's (2008) systematic review and (Chandhiok, N., Dhillon, B. S., Kambo, I., & Saxena, N. C, 2006) study. They indicated that high parity prevents mothers of using ANC services adequately. A report from the Indonesian Demographic Health Survey by Titaley et al (2010) associated a high number of parity with low ANC utilization (less than three visits to ANC). They conjectured that mothers with more children have more chores and responsibilities that take up their time and they seem to rely on their past experiences and do not perceive the need for ANC services. Another study from Nepal confirmed that the percentage of women with only one or two children attended ANC more frequently in contrast to women with three

or more children, which is an indication that women with less parity are more likely to use ANC than those with high parity (Sharma, 2002; Yalem, 2010; Ali, A. A., Osman, M. M., Ameer O Abbaker, A.O., Ishag Adam, I, 2010). Additionally a study from Vietnam revealed that women took good care in their pregnancy by visiting ANC facilities because government had recommended only two children per family. As a result women with one or no children utilized ANC services more frequently than those with two or more children (Nguyen, N. T., Deoisres, W. and Sangin, S, 2013). Needless to say, previous negative pregnancies prompted women to use ANC more. Studies from India indicated that women with a high number of parity used ANC services more frequently and earlier than those with a lower number of parity (Meshram, I. I., Rao, K. M., Reddy, C. G., Krishna, K. S., Venkaiah, K., Laxmaiah, A., & Brahmam, G. N, 2014).

2.4 Socio-economic variables

2.4.1 Enabling factors: - Family factors

Enabling factors describe the means that available to pregnant women in order to access ANC services. Those include the resources (Household wealth) available to a woman or to her family and the context in which the woman lives (rural or urban) (Anderson, J. G., 1973).

2.4.1.1 Household wealth

Financial viability is one of the most important determinant variables in the utilization of ANC services. Its mainly depends on women and their partners' jobs or their family's wealth. Women who earn a salary or have a husband who earns a monthly salary may be better able to afford expenditure on health care services. Many studies confirmed that women who earn a monthly salary are more likely to use ANC services compared with women who farm/on farms or those who do not have a job (Samson, 2012). Women whose husbands earn a high

income were even more able to pay for ANC services (Nketiah-Amponsah, E., Senadza, B., & Arthur, E, 2013). Economic hardship reduces the likelihood of ANC services utilization among women in the rural areas and those with no jobs. It is clear that a high level of economic status is associated with high level of ANC utilization (Haque & Haque, 2014). Although ANC services may be provided for free in some countries, costs may be involved in another way, for example travelling costs, or time away from subsistence farming or other work and therefore only those with more money can afford it (Arthur, 2012).

Moreover, Chimankar & Sahoo (2011) and Arthur (2012) found that women resident in households within the wealthier quintiles were more likely to attend ANC services than those in the lowest wealth quintile. The same result was found in rural Nigeria by Nwosu (2012) and in Indonesia by Titaley et al (2010). Sharma (2002) also carried out a study in Nepal which indicated that the proportion of women who used ANC adequately increased with household wealth quintile. The study showed that ANC utilization was 10 times higher in wealthier households compared with poor households in Nepal.

2.4.2 Community factors

The level of access and the availability of health facilities, influence the level of ANC services utilization in the community.

2.4.2.1 Place of residence

Place of residence in most of the developing countries plays a major role in the utilization of ANC since those resident in urban areas are more likely to be closer to health care services than those who reside in the rural areas (Abor, P. A, Abekah-Nkrumah, G, Sakyi, K., Adjasi, C. K., &Abor, J, 2011; Kulkarni & Nimbalkar, 2008). This was in line with the finding of a study in Nepal done by Sharma (2002) which revealed that women in urban areas made four times more adequate visits to ANC than women in the rural areas. Different studies

conducted in the states of Andhra Pradesh, Karnataka and Tamil Nadu of India during 1992-1993 indicated that utilization of the antenatal health care among residents of the state vary from rural to urban areas (Navaneetham & Dharmalingam, 2002; Fotso et al, 2009). Another study from Ethiopia reported similar findings (Tura, 2009; Ibnouf, A. H., van den, H., and Maarse, J. A, 2007). Contrary to the above findings, a systematic review carried out by Say and Raine (2007) in developing countries revealed that place of residence has no significant association with ANC utilization services. This is mainly because the effect of place of residence might have been reduced where women live in households close to ANC services, or have the resources to spend on accessing the more distant ANC.

2.4.2.2 Geographic location

Geographical location or state of residence is one of the variables that may influence ANC utilization in developing countries, as the states are not the same in terms of resources and infrastructure, as some states are better off in terms of services availability and financial ability to use those services (Abor et al, 2011). A study from India by Navaneetham & Dharmalingam (2002) indicated that factors influencing the use of ANC vary across the states of the country; it found that the factors which were very influential in one state may not have the same influence in the other states. This may be due to the availability of ANC services and economic development differences among the states (Navaneetham & Dharmalingam, 2002; Fotso et aI, 2009).

3 CHAPTER THREE

3.1 METHODOLOGY

3.1.1 Location of the Study

The data used in this study was collected from the Republic of South Sudan, a country which became an independent nation on 9 July, 2011, after struggling through decades of civil war (MOH & NBS, 2013). The land area of South Sudan lies between 25° to 30° east longitude and 4° to 12° north latitude. The land area is about 640,000 square kilometres. South Sudan borders six countries: Ethiopia to the east, Kenya and Uganda to the south, DRC to the south-west, Central African Republic to the west and Republic of Sudan to the north. The country is divided into ten states, 79 counties, 514 Payams and 2,159 Bomas. South Sudan's population was estimated at 8.2 million in the 2008 South Sudan census. There are about 300 ethnic groups in the country (SSMOH, 2009).

3.1.2 Source of the data

The Second South Sudan Household Survey the (SSHHS II) data were used in this study. The survey was conducted on the foundation of the UNICEF's Multiple Indicator Cluster Survey (MICS) methodology (MOH & NBS, 2013). Additional information was incorporated to satisfy the needs of the Ministry of Health, various stakeholders and developmental partners. The SSHHS II aimed to collect information on health and related indicators that were used for the identification of women and children's needs and for establishing a data-base to provide information on health and development indicators used for planning and decision making (MOH & NBS, 2013). The project was conducted in 2010 by the Ministry of Health and

the National Bureau of Statistics of South Sudan. They were funded by and had technical assistance from UNICEF and UNFPA, in addition to UNDP, USAID, UNAIDS, WHO, WFP and World Bank

3.1.3 Sampling Design:

The sample frame used in the SSHHS II was originally for the 2008 Sudan and Housing Census. The ten states of the country (Jongele, Unity, Upper Nile, Warrap, Northern Bahr-Elgazal, Western Bahr-Elgazal, Lakes, Western Equatoria, Central Equatoria, and Eastern Equatoria) were selected as sampling domains of the analysis. The sample was used for the selection of 20 geographical areas from urban and rural area, two from each state. A simple random sample was used to select 40 enumeration areas (EAs) or clusters from each state, to come up with 400 EAs in total, which were used as a primary sampling unit. Household listing was done in each EA. Thereafter, 25 households were selected from each EA, which was expected to form a total of 10,000 households selected for interviews in the country. However, in the states of Jongele and Unity only 39 EAs were derived from each, which changed the total EAs to 398 and the total households to 9950 (MOH & NBS, 2013).

The proportion of the population comprising internally displaced people (IDP) and nomadic populations were excluded from the sample. The inaccessible EAs were not replaced irrespective of any reasons. Socio-demographic and socio-economic data, as well as a history of ANC utilization, were gathered in the 2010 SSHHS II (MOH & NBS, 2013).

3.1.4 Weighting measures

Based on MOH and NBS (2013) report,

> "*In order to report national level results and to obtain unbiased estimates from the SHHS data, appropriate weights were applied to the sample data based on the probabilities of selection. Measures of sampling variability for key survey estimates were also calculated. The Sudan Household Health Survey's sample was not self-weighted. Essentially, by allocating equal numbers of households to each of the regions, different sampling fractions were used in each region since the size of the regions varied. For this reason, sample weights were calculated and these were used in the subsequent analyses of the survey data".*

3.1.5 Study Population and Sample Size:

Only women eligible for the study in the age-bracket of 15-49 were interviewed. From the sample of 9,950 household which were selected in SSHHS, only 9,760 were reported as occupied. Out of the occupied households only 9,369 were interviewed, forming a 96% rate of response. There were 11,568 eligible women aged 15-49 identified in these occupied households; 9,069 of them were interviewed, forming a 78% rate of response. The selected group in this study was the number of women who gave birth in the last two years before the survey; which was about (4,067) women. Among this group there were only (1,952) women who had used ANC at least once during their pregnancy. The SSHHS II measured ANC utilization as number of women who have visited health care facilities at least once during their pregnancies (MOH & NBS, 2013).

3.1.6 Variable Description and Measurement

3.1.6.1 Dependent variable

The dependent variable in this study is ANC utilization which will be used to quantify the use of ANC services by pregnant women in the last two years before the survey. Two questions from the 2010 SSHHS II were used to identify the dependent variable, they were "*before you gave birth to this child; did you see anyone for ANC*?" (MOH & NBS, 2013). The response is [binary response]: Yes or No. The second question was "*how many times did you receive Antenatal Care during this pregnancy?*" This category grouping was based on the World Health Organization as mentioned earlier in Chapter One, which recommended at least four visits for a normal pregnancy (women without health complications in developingcountries) and more than four for pregnant women with complications (WHO, 2014; UNICEF, 2008).

3.1.6.2 Explanatory variables

According to Anderson and Newman (2005), an individual's behavioural framework is classified into: predisposing determinants, enabling determinants and illness determinants. The predisposing factors included in this study consist of socio-demographic variables and their corresponding categories as follows: a woman's age and her marital status. The social structure determinants were parity and maternal educational level.

Enabling determinants consist of family factors (household wealth quintile) and community factors such as geographical location (states) and place of residence (urban or rural) (Anderson & Newman, 2005).

The household wealth quintile, according to MOH and NBS (2013), was derived from data on household characteristics, amenities and assets owned by households. This information was useful when there was no other data available on household income and expenditures.

Table 3.1 indicates the questions asked of the women during the interview and any recoding of data to create the explanatory variables and their categories.

Table 1: Variables description

S/N	Socio-demographic variables	Description
1	Women's age	This variable was derived from the question: How old were you at your last birthday? The variables flows from 15 to 49 and grouped as 1= 15-24, 2= 25-34, 3= 35+
2	Age at first marriage	This variable was derived from the question: How old were you when you started living with your first husband/partner? This variable was categorized as 1= Below 18 years of age; 2= 18 or more years of age.
3	Marital status	It was grouped into: 0= Single (never married, widowed, divorced or separated); 1= Currently married; 2= Living with a man as if married. This was derived from the question: What is your marital status now?
4	Parity	Parity was grouped into: 1= 1-2 children; 2=

		3-5 children; 3= 6 or more children. This question was derived from three different questions which combined gave the number of children ever born alive to a woman. The category was done in this way because South Sudan is one of the countries with a high fertility rate (MOH & NBS, 2013). These categories include all the children born alive, because some of the women, who gave birth to one or two children in the last two years prior the survey, might have lost their children due to death hence, although they no longer consider them alive, they were born alive and should be considered.
4	Women's education	Defined as the highest level of education attained by mothers and categorised as follows: 0 = no education; 1 = primary level; 2 = secondary and above; 3 = Sunday education (informal education, such as adult education)
	Socio-economic variables	
6	Place of residence (Rural/Urban)	This variable was categorized as 1=Rural; 2= Urban.
7	Geographical location (States)	Distribution of health care facilities across the

		country also matters in the utilization of ANC services. South Sudan is divided into ten states as follows: 71 = Upper Nile; 72 = Jongele; 73 = Unity; 81 = Warrap; 82 = Western Bahr El Ghazal; 83 = Northern Bahr El Ghazal; 84= Lakes; 91 = Western Equatoria; 92 = Central Equatoria; 93= Eastern Equatoria.
8	Households' wealth quintile	Household wealth quintile was. Categorised into five equal groups as 1= Poorest; 2 = Second; 3= Middle; 4 = Fourth; 5 = Richest quintile, based on 2008 Sudan demographic and housing census weight. According to MOH and NBS (2013), "*wealth was constructed by using information on household characteristics (crowding), amenities (water and sanitation), households assets (durable goods) owned by households*".
	Dependent variables	
9	ANC utilization	Utilization of ANC services was measured by whether a woman has utilized ANC services during her pregnancy or did not use it in a binary response yes or no; where 0 = 'No' ANC was not used; 1 = 'Yes' ANC was used.

10	Number of ANC utilized	Number of ANC utilizations, measured by the number of times a woman utilized ANC services during her pregnancy to identify those who fulfilled the recommended four or more visits and those who did not visit at all; where 0 = three times or less (Inadequate); 1 = four times or more (Adequate).

3.1.7 Data management

A request was made to the National Bureau of Statistics for the utilization of the Second South Sudan Households Survey data. Written permission was obtained from the NBS. The survey report was downloaded from the NBS website (http://ssnbs.org/publications/). The Stata format of the data was obtained from the NBS database because the Stata software package was used for the analysis of this study.

3.1.8 Data analysis methods

Univariate, bivariate and multivariate analysis was carried out to achieve the aims of this study. A 95% confidence interval from odds ratio at P-value of < 0.05 was used to link between the ANC utilization which was the dependent variable of the study and the socio-economic and socio-demographic variables which were the explanatory variables. Stata software version 12 was used for the analysis of this study. Moreover, the univariate analysis indicated the frequency distribution of the socio-demographic and socio-economic features relating to women who gave birth in the last two years prior to the survey. Svyset command

was applied to identify the characteristics of the survey design and indicate it as complex survey data.

In attaining the first aim of this study a bivariate analysis was conducted through chi-square examination. Also chi-square examination was done to test the socio-demographic and socio-economic determinants that are linked with the pattern of women utilization of antenatal care in South Sudan. So far, the factors that were significantly linked with antenatal care utilization in the country at bivariate level were included in the multivariate logistic regression.

Multivariate analysis was carried out to investigate the influence of multiple explanatory variables on ANC utilization.

The following multivariate logistic regression will be adopted in the study.

$$\text{Logit}(Y_i) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots. \beta_i X_i$$

Where $_i$=1, 2, 3 ……

Y_i = dependent variable; α = constant; β_i = Co-efficient; X_i = explanatory variables.

3.2 Ethical considerations

Ethical approval to conduct the secondary analysis was obtained from the Humanities and Social Science Ethics Committee (protocol approval number HSS/1654/014M) at the University of KwaZulu-Natal (see Appendix I)

The Second South Sudan Households Survey data was used for this study by the granted permission from National Bureau of Statistics through a written request to the institution.

The original survey data was collected after informed consent of the respondents was obtained.

3.3 Validity, Reliability and Rigour

Any study has considerable limitations, which needs to be acknowledged during the interpretation and explanation of the study outcome (Sharma, 2002). This study was based on secondary data which was controlled by the methodology and the framework used previously in the Second South Sudan Household Survey (SSHHS II). The data were represented at the national level and do not reflect the health situation at the grassroots (MOH & NBS, 2013). Obviously many factors influence the utilization of ANC. However, this study was limited to use only those factors that were available in the data set of the SSHHS II.

Clearly this study did not examine the timing and the quality of the antenatal care used. It was focused only on the antenatal care utilization pattern for pregnant women in the age group 15-49. The study also did not try to link the outcome of the pregnancy with the mode or frequency of antenatal care utilization.

4 CHAPTER FOUR

4.1 Outcome of the research

4.1.1 Introduction

The total number of the women who were pregnant during the last two years before the survey was 4,067, but, due to missing data to the question on ANC attendance, the number of cases included in the analysis was 4,041. In addition, there was missing data in the responses to the questions on the number of times ANC was attended, so the cases included in this analysis were 3,828.

The first section of this chapter describes the sample of women who had had a pregnancy in the two years prior the study, and had either given birth, a still birth or a miscarriage. The second section presents the analysis of the association of the exploratory variables with whether or not these women attended any ANC.

4.1.2 General description of the population under study

The mean age of the women included in this analysis was 28.82 years. Just over half 51.8% of the women were married before 18 years of age. At the time the data were collected 77.1% of the women were married, 16.7% were living with a man as if married and only 6.2% were single, meaning either they were widowed, divorced, separated or had never been married (Table 2).

However, with regard to parity, it was noted that 47.5% of the women had three to five children, 30.9% had one to two children and about 21.6% of the women had more than six children. Most of the women in this study 74.6% lived in rural areas, while 25.4% lived in urban areas of South Sudan. Distribution of women in the different states of the country varied considerably, with the highest number found in Jongele 14.6%, followed by Central

Equatoria 13.6%, while the lowest distribution of women were in Western Bahr El Gazal 3.7% (Table 2)

The distribution of pregnant women according to household wealth quintile, were almost the same because wealth quintiles were created by dividing the household wealth scores into five equal groups. The distribution percentages in the poorest, second, middle, fourth and richest quintiles were 20.3%, 19.4%, 19.5%, 20.6% and 20.1% respectively. With regard to level of education 80.7% of the women had no educational level, 15.7% had primary school Level and only 3.3% had a secondary school or above level of education (Table 2).

Tables 2: Distribution of study population by explanatory variables

Table 2: Distribution of study population by explanatory variables, n=4041			
Explanatory Variables	Variables characteristics	Frequencies	Distribution percentage
Socio-demographic variables			
Women's educational level attained	No education	3,259	80.7
	Primary	634	15.7
	Secondary and above	133	3.3
	Sunday education	14	0.3
	Total	4,041	100
Women's age	15-24	1,169	28.9
	25-34	2,005	49.6
	35+	867	21.5
	Total	4,041	100
Age at first marriage	Age below 18	2,093	51.8
	Age 18 and above	1,948	48.2
	Total	4,041	100
Marital status	Single	251	6.2

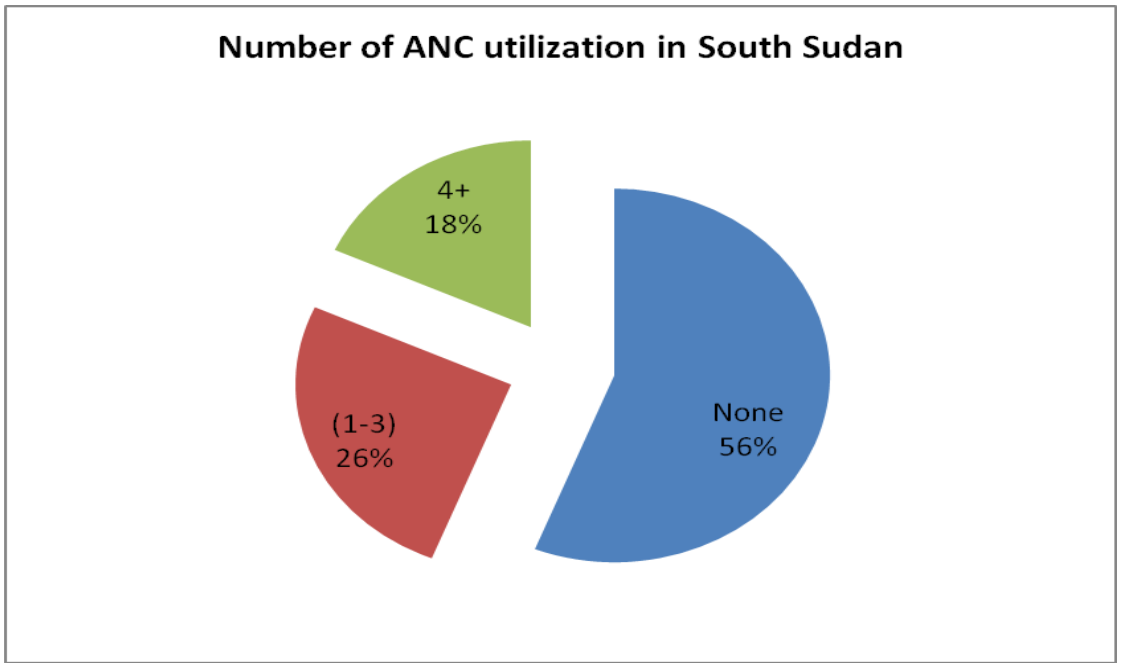
	Currently married	3,114	77.1
	Living with a man	676	16.7
	Total	4,041	100
Parity	1-2 children	1,251	30.9
	3-5 children	1,918	47.5
	6+	872	21.6
	Total	4,041	100
Socio-economic variables			
Place of residence	Rural	3,015	74.6
	Urban	1,026	25.4
	Total	4,041	100
States	Upper Nile	496	12.3
	Jongele	588	14.6
	Unity	269	6.7
	Warrap	505	12.5
	Northern Bahr-Elgazal	354	8.8
	Western-Bahr-Elgazal	151	3.7
	Lakes	316	7.8
	Western Equatoria	325	8.0
	Central Equatoria	551	13.6
	Eastern Equatoria	486	12.0
	Total	4,041	100
Household wealth	Poorest	822	20.3
	Second	784	19.4
	Middle	788	19.5
	Fourth	834	20.6
	Richest	813	20.1
	Total	4,041	100

Dependent variables			
ANC utilization	No	2,144	53.1
	Yes	1,897	46.9
	Total	4,041	100
Number of ANC visits	None	2,144	56.0
	1-3	988	25.8
	4+	696	18.2
	Total	3,828	100
Source: 2010 South Sudan Households Survey (SSHHS II).			

4.1.3 ANC utilization in South Sudan

ANC utilization in South Sudan has been known to be poorly used given its background as a new country. The findings of this study revealed that 56% (CI = 54.3 - 57.7) of the women in South Sudan did not use ANC services at all during their pregnancy, only 18% (CI = 24.4 - 27.3) used ANC adequately, while 26%, (CI = 16.9 - 19.5) used it inadequately.

Figure 2: Percentage distribution of ANC utilization



Source: 2010 South Sudan Households Survey

4.1.4 Explanatory variables in relation to ANC utilization

In this section the relationship between the explanatory variables and any ANC utilization is examined.

The association between ANC utilization and the explanatory variables was examined using the chi-square statistic, with $p <= 0.05$ comparing the differences. These findings are presented in detail in Table 3.

Just over half (51.9%, CI = 48.9 - 54.9) of the women in the youngest age category, 15 - 24 years, reported that they had attended ANC at least once. While (39.6%: CI: 36.1– 43.0) of the women in the age group of 35 and older visited ANC at least once.

Women who were married at the time of the study (49.6%, CI = 47.8 - 51.5) have utilized ANC compared with those who were single (44.8%, CI = 38.5 - 51.4), while those who were not married, but were living with a man, were the least likely to utilized ANC (35.4%, CI = 31.6 - 39.4) ribbon

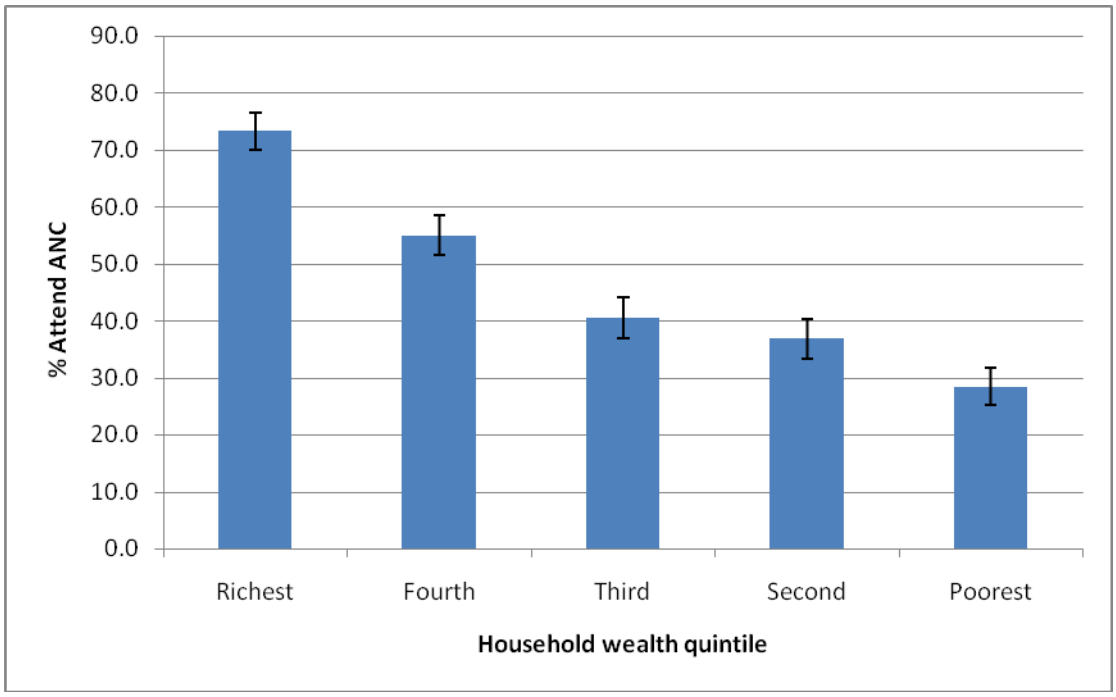
The proportion of women who had six or more children (50.4%, CI = 46.9 - 53.9) and those who had one and two children (49.8%, CI = 46.85 - 52.7) used ANC more frequently in contrast with those who had three to five children (43.5%, CI = 41.2 - 45.9), ($chi2 = 17.281$, $p = 0.0005$).

Almost two thirds (65.7%, CI = 62.7 – 68.6) of the women in urban areas used ANC compared with women in rural areas (40.5%, CI = 38.7 - 42.4). With regard to the distribution in the various states, the highest proportion of women using ANC were found in Central Equatoria and Western Equatoria (77.1%, CI = 72.7 - 81.0) and (72.2%, CI = 67.6 -

76.5) respectively, compared with the rest of the states which fell between (56.0%, CI = 51 - 60.8) in Western Bahr-elgazal to (28.4%, CI = [24.1 - 33.1) in Jongele (chi2 = 455.709, p = 0.0000).

With regard to household wealth quintile, the highest proportion of women who used ANC were in the richest quintile (73.4%, CI = 70.1 - 76.5), in contrast to (55.0%, CI = 51.5 - 58.5) in the fourth, (40.5%, CI = 37 - 44.2) in the middle, (36.8%, CI = 33.3 - 40.5) in the second and (28.3%, CI = 25.2 - 31.7) in the poorest quintile, (chi2 = 413.123, p = 0.0000).

Graph 1: The relationship between household wealth quintile and ANC utilization



Moreover, the proportion of women (80.9%, CI = 72.9 - 86.9) with secondary education and above used ANC more than those with a primary level of education (74.4%, CI = 70.6 - 77.8) and those who had no level of education (40.3%, CI = 38.5 - 42.0), (chi = 314.783, P = 0.0000).

Table 3: Explanatory variables in relation to ANC utilization

Table 3: Explanatory variables in relation to ANC utilization N=4041					
Explanatory Variables	Variables characteristics	ANC Utilization		Chi2	P-value
		No=2144 (53.1) n (%) [95% CI]	Yes=1897 (46.9) n (%) [95% CI]		
Socio-demographic variables					
Women's age	15-24	562 (48.1) [45.1 - 51.1]	607 (51.9) [48.9 - 54.9]	30.845	0.0000
	25-34	1058 (52.8) [50.4 - 55.1]	947 (47.2) [44.9 - 49.6]		
	35+	524 (60.4) [56.9 - 63.9]	343 (39.6) [36.2 - 43.1]		
Age at first marriage	Age below 18	1122 (53.6) [51.4 - 55.9]	970 (46.4) [44.1 - 48.6]	0.548	0.4860
	Age 18 and above	1022 (52.5) [50.1 - 54.8]	926 (47.5) [45.2 - 49.9]		
Marital status	Single	139 (55.2) [48.6 - 61.5]	113 (44.8) [38.5 - 51.4]	45.557	0.0000
	Currently married	1569 (50.4) [48.5 - 52.2]	1545 (49.6) [47.8 - 51.5]		
	Living with a man	436 (64.6) [60.6 - 68.4]	240 (35.4) [31.7 - 39.4]		
Parity	1-2 children	628 (50.2) [47.3 - 53.2]	623 (49.8) [46.9 - 52.7]	17.281	0.0005
	3-5 children	1083 (56.5) [54.1 - 58.8]	835 (43.5) [41.2 - 45.9]		
	6+	433 (49.6)	439 (50.4)		

		[46.1 - 53.1]	[46.9 - 53.9]		
Women's education	No education	1947 (59.7) [57.9 - 61.5]	1312 (40.3) [38.5 - 42.0]	314.783	0.0000
	Primary	162 (25.6) [22.2 - 29.4]	472 (74.4) [70.6 - 77.8]		
	Secondary and above	25 (19.1) [13.1 - 27.1]	108 (80.9) [72.9 - 86.9]		
	Sunday education	10 (63.85) [34.1 - 85.8]	5 (36.15) [14.2 - 65.9]		
Socio-economic variables					
Place of residence	Rural	1792 (59.5) | [57.6 - 61.3]	1222 (40.5) [38.7 - 42.4]	195.694	0.0000
	Urban	352 (34.3) [31.4 - 37.3]	674 (65.7) [62.7 - 68.6]		
States	Upper Nile	270 (54.5) [49.8 - 59.1]	226 (45.5) [40.9 - 50.2]	455.709	0.0000
	Jongele	421 (71.6) [66.9 - 75.9]	167 (28.4) [24.1 - 33.1]		
	Unity	174 (64.7) [59.6 - 69.5]	95 (35.3) [30.5 - 40.4]		
	Warrap	357 (70.8) [66.1- 75.0]	147 (29.2) [24.9 - 33.9]		
	Northern Bahr-Elgazal	198 (56.0) [51.3 - 60.6]	156 (44.0) [39.4 - 48.7]		
	Western-Bahr-Elgazal	66 (44.0) [39.2 - 49]	84 (56.0) [51 - 60.8]		
	Lakes	171 (54.1) [49.5 - 58.6]	145 (45.9) [41.4 - 50.5]		

	Western Equatoria	90 (27.8) [23.5 - 32.5]	235 (72.2) [67.6 76.5]		
	Central Equatoria	126 (22.9) [18.9 - 27.3]	425 (77.1) [72.7 - 81.0]		
	Eastern Equatoria	270 (55.5) [50.4 - 60.4]	216 (44.5) [39.6 49.6]		
Household wealth	Poorest	589 (71.7) [68.3 - 74.8]	233 (28.3) [25.2 - 31.7]	413.123	0.0000
	Second	496 (63.2) [59.6 - 66.7]	289 (36.8) [33.3 - 40.5]		
	Middle	469 (59.5) [55.8 - 63]	320 (40.5) [37 - 44.2]		
	Fourth	375 (45.0) [41.5 - 48.5]	459 (55.0) [51.5 - 58.5]		
	Richest	216 (26.6) [23.5 - 29.9]	597 (73.4) [70.1 - 76.5]		
Source: 2010 South Sudan Households Survey (SSHHS II).					

4.1.5 ANC utilization multivariate analysis

All the significant variables (p-value <0.05) in the ANC utilization bivariate analysis are included in the multivariate analysis so as to determine which variables predict or explain ANC utilization better.

In the multivariate analysis, all the explanatory variables significantly associated with ANC utilisation and remained strong predicators for ANC utilization (see table 4).

Mothers older than 34 years (OR = 0.71, 95% CI = 0.5 - 0.9) were significantly less likely to use ANC than mothers 15 - 24 years. However, with regard to parity, mothers with six children and more (OR = 1.43, 95% CI = 1.1 - 1.9) were more likely to use ANC than those

with one to two children. Likewise, mothers who were married at the time of the study (OR = 1.47, 95% CI = 1.1 - 2.1) were significantly more likely to use ANC than the mothers who were single.

Place of residence was a vital determinant of ANC utilization. Mothers who lived in urban areas were more than one and a half times more likely to use ANC than those who lived in the rural areas (OR=1.63, 95% CI =1.37-1.93), when controlling for other explanatory variables.

The distribution of likelihood of ANC use over the states was as follows: Western Bahr El Gazal, Northern Bahr El Gazal, Lakes, Western Equatoria and Central Equatoria were (1.48, 95% CI = 1.1 - 1.9), (1.41, 95% CI = 1.1 - 1.9), (1.40, 95% CI = 1.1 - 1.8), (2.53, 95% CI = 1.8 - 3.5) and (3.17, 95% CI = 2.3 - 4.4) respectively.

Furthermore, household wealth quintile was seen to be another essential predictor of ANC utilization. Mothers in the second quintile (OR = 1.40, 95% CI = 1.1 - 1.8), in the middle quintile (OR = 1.39, 95% CI = 1.1 - 1.7), in the fourth quintile (OR = 1.99, 95% CI = 1.6 - 1.2.5) and mothers in the richest quintile (OR = 3.10, 95% CI = 2.4 - 4.0) were greater users of ANC than those who were in the poorest quintile. It was realized also with each increase in wealth quintile the odds of mothers attending ANC increased, with the exception of the second and the middle quintiles which showed similar results, as indicated in the bivariate analysis.

Pregnant women with a primary level of education (OR=2.04, 95% CI=1.62-2.56) were more likely to use ANC than those with no level of education, and pregnant women with a secondary level of education (OR=2.32, 95% CI=1.35-3.98) were more likely to use ANC than women with no education.

Table 4: Multivariate logistic regression for ANC utilization

Table 4: Multivariate logistic regressions for ANC utilization				
Explanatory variables	Odds Ratios	95% CI		P-value
		Lower	Upper	
Socio-demographic variables				
Women's age				
15-24<Ref>	1.0	-	-	-
25-34	0.960861	0.785559	1.175281	0.698
35+	0.706402	0.542227	0.920286	0.010
Marital status				
Single<Ref>	1.0	-	-	-
Currently married	1.474676	1.059707	2.05214	0.021
Living with a man	1.014299	0.701816	1.465916	0.940
Parity				
(1-2) children<Ref>	1.0	-	-	-
(3-5) children	1.062235	0.868858	1.298652	0.556
6 or more	1.432843	1.106313	1.855749	0.006
Women's education				
No education<Ref>	1.0	-	-	-
Primary	2.039397	1.622184	2.563914	0.000
Secondary and above	2.316723	1.349878	3.976066	0.002
Sunday education	0.593789	0.142352	2.476849	0.474
Socio-economic variables				
Place of residence				
Rural<Ref>	1.0	-	-	-
urban	1.625821	1.370783	1.92831	0.000
States				
Upper Nile<Ref>	1.0	-	-	-
Jongele	0.813598	0.597211	1.108389	0.191
Unity	0.931929	0.685635	1.266696	0.652
Warrap	0.845601	0.623029	1.147684	0.282

Northern Bahr-elgazal	1.477065	1.108683	1.967848	0.008
Western Bahr-elgazal	1.406844	1.052971	1.879643	0.021
Lakes	1.401774	1.064383	1.846111	0.016
Western Equatoria	2.529120	1.837045	3.481921	0.000
Central Equatoria	3.170599	2.300604	4.369590	0.000
Eastern Equatoria	1.314183	0.982024	1.758691	0.066
Household wealth				
Poorest<Ref>	1.0	-	-	-
Second	1.395697	1.106071	1.761162	0.005
Middle	1.387605	1.104970	1.742533	0.005
Fourth	1.985686	1.573097	2.506489	0.000
Richest	3.103364	2.387684	4.033560	0.000
Source: 2010 South Sudan Households Survey (SSHHS II).				

4.1.6 Explanatory variables in relation to adequate utilization of ANC

A bivariate analysis was carried out on explanatory variables to check their association with adequate utilization of ANC services. Women who utilized ANC services three times or less, were categorised as “inadequate” utilization and those who utilized ANC four times or more, denoted as “adequate” utilization.

Only place of residence, geographical location (states), household wealth quintile and women’s education were significantly associated with the number of times women utilized ANC services. The explanatory variables of women’s age at first marriage, marital status and parity showed no association with the number of times ANC services were utilized (Table 5)

With regard to states or geographical location, the highest proportion of women to utilize ANC services adequately was (54.9%, CI = 41.5 - 55) in Western Bahr El Gazal, followed by (51.1%, CI = [45.3 - 56.9]) in Central Equatoria, then (48.2%, CI = 41.5 - 55) in Western

Equatoria and the lowest proportion (23.9%, CI = 16.9 - 32.6) in Warrap state (Ch2 = 73.648, P = 0.0000). Nevertheless, the proportion of women in the richest households (54.9%, CI = 50.4 - 59.3) utilized ANC four times or more compared with women (44.4%, CI = 39.3 - 49.6) in the fourth, (34.9%, CI = 29.5 - 40.8) in the middle, (34.2%, CI = 28.4 - 40.6) in the second and (18.7%, CI = 13.6 - 25.2) in the poorest household. Women's education was found to be significantly associated with the number of ANC utilizations (chi2 = 45.845, P=0.0000), women with a secondary level of education and above (60.1%, CI = 49.4 - 69.9) utilized ANC adequately in comparison with those with a Sunday education (57.3%, CI = 15.1 - 91), a primary level of education (50.7%, CI = 45.6 - 55.8) and those with no education level at all (36%, CI = 33.2 - 38.9).

Table 5: Explanatory variables in relation to number of ANC utilized

Table 5: Explanatory variables in relation to number of ANC utilized N=1684					
Explanatory Variables	Variables characteristics	Number ANC Utilization		Chi2	P-value
		Inadequate = 988 (58.7) n(%) [95% CI]	Adequate =696 (41.3) n(%) [95% CI]		
Socio-demographic variables					
Women's age	15-24	310 (55.7) [51.34, 59.98]	246 (44.3) [40.02, 48.66]	3.888	0.1800
	25-34	492 (59.4) [55.81, 62.89]	336 (40.6) [37.11, 44.19]		
	35+	187 (62.3) [56.34, 67.83]	113 (37.7) [32.17, 43.66]		
Age at first	Age below 18	511 (59.0)	355 (41.0)	0.086	0.7834

marriage		[55.56, 62.41]	[37.59, 44.44]		
	Age 18 and above	477 (58.3) [54.7, 61.87]	341 (41.7) [38.13, 45.3]		
Marital status	Single	66 (65.6) [55.13, 74.7]	35 (34.4) [25.3, 44.87]	3.826	0.1909
	Currently married	788 (57.6) [54.84, 60.35]	579 (42.4) [39.65, 45.16]		
	Living with a man	134 (62.2) [55.19, 68.77]	82 (37.8) [31.23, 44.81]		
Parity	1-2 children	323 (57.8) [53.44, 62.03]	236 (42.2) [37.97, 46.56]	0.372	0.8492
	3-5 children	434 (59.5) [55.64, 63.15]	296 (40.5) [36.85, 44.36]		
	6+	231 (58.5) [53.33, 63.56]	163 (41.5) [36.44, 46.67]		
Women's education	No education	733 (64) [61.05, 66.84]	412 (36) [33.16, 38.95]	45.845	0.0000
	Primary	211 (49.3) [44.22, 54.38]	217 (50.7) [45.62, 55.78]		
	Secondary and above	42 (39.9) [30.05, 50.58]	63 (60.1) [49.42, 69.95]		
	Sunday education	2 (42.7) [9.01, 84.87]	3 (57.3) [15.13, 90.99]		
Socio-economic variables					
Place of residence	Rural	658 (61.2) [58.03, 64.25]	418 (38.8) [35.75, 41.97]	7.858	0.0081
	Urban	330 (54.3) [50.16, 58.32]	278 (45.7) [41.68, 49.84]		

States	Upper Nile	109 (52.7) [45.34, 59.88]	98 (47.3) [40.12, 54.66]	73.648	0.0000
	Jongele	106 (73.1) [63.34, 81]	39 (26.9) [19, 36.66]		
	Unity	48 (61.4) [51.59, 70.33]	30 (38.6) [29.67, 48.41]		
	Warrap	110 (76.1) [67.39, 83.12]	34 (23.9) [16.88, 32.61]		
	Northern Bahr-Elgazal	98 (69.6) [62.28, 76.03]	43 (30.4) [23.97, 37.72]		
	Western-Bahr-Elgazal	35 (45.1) [38.36, 52.09]	42 (54.9) [47.91, 61.64]		
	Lakes	92 (69.1) [62.32, 75.23]	41 (30.9) [24.77, 37.68]		
	Western Equatoria	95 (51.8) [45, 58.51]	88 (48.2) [41.49, 55]		
	Central Equatoria	189 (48.9) [43.04, 54.69]	198 (51.1) [45.31, 56.96]		
	Eastern Equatoria	108 (56.7) [48.66, 64.34]	82 (43.3) [35.66, 51.34]		
Household wealth	Poorest	171 (81.3) [74.85, 86.37]	40 (18.7) [13.63, 25.15]	98.818	0.0000
	Second	168 (65.8) [59.36, 71.63]	88 (34.2) [28.37, 40.64]		
	Middle	188 (65.1) [59.24, 70.54]	101 (34.9) [29.46, 40.76]		
	Fourth	221 (55.6) [50.44, 60.7]	176 (44.4) [39.3, 49.56]		

	Richest	240 (45.1) [40.68, 49.65]	292 (54.9) [50.35, 59.32]		
Source: 2010 South Sudan Households Survey (SSHHS II).					

4.1.7 Number of ANC utilized multivariate analysis

Table 6 includes explanatory variables of place of residence, geographical location, household wealth quintile and women's education which were significantly associated with the number of times ANC was utilized by pregnant women. But when multivariate regression analysis applied, only the household wealth quintile remained significantly associated with adequate ANC utilisation in South Sudan.

Women in the richest household quintile were more than three times more likely to use ANC services compared with those in the poorest household quintile (OR = 3.54, CI = 2.24 - 5.61, P = 0.000), also women in the fourth, middle and the second household quintile were (OR = 2.77, CI = 1.76 - 4.36, P = 0.000), (OR = 1.96, CI = 1.23 - 3.12, P = 0.005) and (OR = 2.15, CI = 1.35 - 3.45, P = 0.001) respectively, more likely to use ANC services than women in the poorest quintile.

Table 6: Multivariate logistic regressions of the number of ANC utilized

Table 6: Multivariate logistic regressions of the number of ANC utilized				
Explanatory variables	Odds Ratios	95% CI		P-value
		Lower	Upper	
Socio-demographic variables				
Women's education				
No education<Ref>	1.0	-	-	-
Primary	1.217829	.9260118	1.601607	0.158

Secondary and above	1.552174	.9614862	2.50575	0.072
Sunday education	1.912738	.1459012	25.07563	0.621
Socio-economic variables				
Place of residence				
Rural<Ref>	1.0	-	-	-
urban	.9432752	.7457576	1.193106	0.626
States				
Upper Nile<Ref>	1.0	-	-	-
Jongele	.595257	.3411178	1.038735	0.068
Unity	1.010995	.6044377	1.691012	0.967
Warrap	.5679143	.3267095	.9871968	0.045
Northern Bahr-elgazal	.7572718	.479428	1.196135	0.233
Western Bahr-elgazal	1.374015	.9097244	2.075264	0.131
Lakes	.6610803	.4283371	1.020288	0.062
Western Equatoria	1.055541	.6961197	1.60054	0.799
Central Equatoria	1.148849	.7754453	1.702059	0.489
Eastern Equatoria	1.000497	.6401361	1.56372	0.998
Household wealth				
Poorest<Ref>	1.0	-	-	-
Second	2.153966	1.346206	3.446404	0.001
Middle	1.956976	1.228392	3.117697	0.005
Fourth	2.772556	1.763234	4.359639	0.000
Richest	3.544102	2.237456	5.613812	0.000
_cons				

	.2942588	.1790734	.483535	0.000
Source: 2010 South Sudan Households Survey (SSHHS II).				

5 CHAPTER FIVE

5.1 Discussion

5.1.1 Introduction

Worldwide, the percentage of pregnant women who have utilized ANC at least once was 82% as indicated by Lawn and Kerber (2006), of which, only 51% of them utilized ANC at least four times. Adequate utilization of ANC was found to be 45% and 35% respectively in Sub-Saharan Africa and South Asia (Lawn & Kerber, 2006). In South Sudan, 47% of woman who reported being pregnant in the two years preceding the survey, utilized ANC at least once, which is far below the international level. Within South Sudan, there was a large variation between urban and rural areas, with 66% of women resident in urban areas and 41% in rural areas reporting they had utilized ANC services at least once. In addition, women resident in specific states, such as Central Equatoria, Western Equatoria and Western Bahr El Gazal were 77%, 72% and 56% respectively more likely to report utilizing ANC at least once.

Out of the number of women who utilized ANC services in South Sudan only 41% of them utilized the services adequately. Similarly in urban areas the rate of utilisation was 47%, while it was 39% in rural areas (MOH & NBS, 2013).

This section discussed the findings of this study with regard to the individual determinants of health services systems according to Anderson and Newman (2005).

5.1.2 ANC utilization and demographic factors

Women's age was significantly associated with ANC utilization. ANC utilization was highest in the youngest age group (15-24 years) and reduced as the age of the women increased. This

finding is in line with studies from Nepal and Ethiopia (Shrestha & Shrestha, 2012; Belayneh, T., Adefris, M., & Andargie, G, 2014; Zelalem Ayele, D., Belayihun, B., Teji, K., & Admassu Ayana, D, 2014; Berhe et al, 2014). The best explanation is probably that younger mothers are more enlightened by their education about the consequences and the benefits of ANC utilization and are more knowledgeable about modern ANC services.

Marital status was significantly associated with at least one ANC visit. Married women were more likely to utilize ANC services than single women, while women who lived with a man as if married were the most unlikely to use ANC compared with other two groups. This might be attributed to the fact that people in South Sudan communities are very conservative when it comes to moral values; women who are not legally married may not have the courage to show their condition publically. The same impact of marital status on ANC utilization was found in several studies (Kassyou, 2008; Anchang-Kimbi, J, Achidi, E, Apinjoh, T, Mugri, R, Chi, H, Tata, R & Troye-Blomberg, M, 2014). The finding also concurs with the outcome of a study done in Ethiopia by Gedefaw, Muche & Aychiluhem, (2014), which indicated that pregnant women who were single were 6.6 less likely to use ANC compared with married women. The reasons might be that those who are single (separated, widowed, divorced and unmarried) may not want to be seen in that condition and fear visiting public health services because of the stigma of being pregnant and unmarried.

5.1.3 ANC utilization and social structure factors

The outcome of parity examination in this study revealed that pregnant women with a high number of children utilized ANC more often compared with women with fewer children. This finding was found to be consistent with previous studies in Madhya Pradesh, India which confirmed the direct association between the number of children born to a

woman and ANC utilization (Meshram, et al, 2014). The high utilization of ANC services in this group might be attributed to related health complications as a result of the increased number of pregnancies. Moreover, the knowledge, experience and confidence a woman with more children gains from previous pregnancies may lead to more frequent ANC utilization (Singh, A., Kumar, A., & Pranjali, P, 2014). On the contrary other studies had revealed that a low number of parity to a woman associated with more frequent ANC used, this might be attributed to low educational level or close attachment to local cultures and traditions which restrict women with high parity to use ANC even if she is at risk (Ghaffar, A., Pongpanich, S., Chapman, R. S., Panza, A., Mureed, S., & Ghaffar, N, 2012; Ciceklioglu, M., Soyer, M. T., & Öcek, Z, 2005; Yar'zever & Said, 2013).

Likewise, the study had established evidence that level of education has empirical influence on women's utilization of ANC. The findings shows that pregnant women with secondary or higher levels of education utilized ANC services at least once, more frequently compared with those with no or a low level of education. The justification for that might be, educated mothers have achieved better autonomy at home, have more opportunities to know about pregnancies and various complications, and have the opportunity to communicate freely with other family members on issues related to pregnancy and women's health in general (Osorio, 2014). This impact was confirmed by several studies in developing countries (Nisar & White, 2003; Resty, 2011; Bonono & Ongolo-Zogo, 2012; Nwoye, 2010; Gaur, K. L., Gupt, P., Kuldeep, R., Sharma, M. C., Gupta, R., & Manohar, R. K, 2014). Consequently, educating women in South Sudan may contribute positively in the improvement of ANC services utilization and hence reduced the level of maternal and infant mortality (Lidoroh, 2013; Gupta, S., Yamada, G., Mpembeni, R., Frumence, G., Callaghan-Koru, J. A., Stevenson, R., & Baqui, A. H, 2014; Ajayi, 2013; Alemayehu, T., Haidar, J., & Habte, D, 2010). However, where most women have not received any education, as is the case in South Sudan, they had

to be adequately made aware about when and why ANC service need to be utilized by pregnant women. The same finding was found in a study from Ghana, by Arthur (2012) and others from Sudan and Shanghai by Ibnouf et al (2007) and Zhao Q., Huang, Z. J., Yang, S., Pan, J., Brian Smith, B., and Biao Xu, B (2012). More often in a poor background such as in South Sudan, girls are deprived of educational opportunities so that the male siblings in the family are educated if the family cannot afford to pay the cost of education for all of them. However, a further problem is that, despite the fact that girls in cities and urban areas have enrolled significantly in primary and secondary education, there is a high dropout rate, which may still be hindering efforts at reform, as was obvious from the low number of women with secondary education and above (3.6%).

5.1.4 ANC utilization and family factors

The findings indicate that there was a significant association between a household's wealth and at least once utilization of ANC services among the respondents of the study group. Respondents in the richest quintile were three times more likely to use ANC at least once than those in the poorest quintile. To put this in plain words, for women to make better use of ANC services in South Sudan, given the poor infrastructure of the country, she has to spend resources for transportation, accessibility and medication. This gives some explanation as to why women in the richest quintile are more likely to use ANC than women in the other household wealth quintile. This outcome was consistent with findings from studies done in Vietnam and the Nkasi District of Tanzania by Nguyen et al, 2013; Samson, 2012; Singh et al, 2014; Abel et al, 2012; Wablembo & Doctor, 2013; Haque & Haque, 2014.

5.1.5 ANC utilization and community factors

Women in urban areas were more likely to report using ANC services than those who are resident in rural areas. The reason might be attributed to the unfair manner of the

distribution of health care facilities between rural and urban areas which favours urban residents at the expense of rural residents with regard to ANC services availability and accessibility. This outcome was expected since 74.6% of the population predominantly lives in rural areas, and since women in urban areas are more likely to attend ANC, overall government, health partners officials and policy makers can expect poor ANC attendance unless the reasons why rural women are less likely to attend are addressed. Findings from other countries confirm these outcomes (Alemayehu et al, 2010; Chimankar & Sahoo, 2011; Dolla, 2008).

With regard to differentials in using ANC services in South Sudan, the states in which mothers lives is expected to have influence on the frequency of their ANC utilization. The influence of states was significantly associated with at least once utilization of ANC services by pregnant women. Only the states of Central Equatoria, Eastern Equatoria, Northern Bahr El Gazal, Western Bahr El Gazal and Lakes maintained their significance in multiple logistic regression models. However, women in these states used ANC more than the state of reference 'Upper Nile'. Consistently these states have more urban areas than rural areas. Therefore, the government of South Sudan may need to further and improve the distribution of health care centers and health care units in the various states in order to capitalize on better utilization of ANC services in the country. Similar finding have been shown by different studies in Ghana by (Owoo & Lambon-Quayefio, 2013).

5.1.6 Association with adequate utilization of ANC services

The explanatory variables in bivariate and multivariate logistic analysis showed different interactions with the number of times ANC has been utilized by pregnant women in South Sudan. A woman's age, age at first marriage, parity and marital status in the bivariate analysis showed no association with at least four visits to ANC by pregnant women. This

means that the demographic characteristics of the women were less important in predicting adequate ANC utilisation, while the social structure, family and community factors become important factors in understanding adequate ANC utilization. The significant explanatory variables carried forward for multiple logistic regressions analysis were: place of residence, geographical location and women's education do not remain significantly associated with adequate utilization of ANC. Only household wealth quintile proved to be the true predictor for adequate utilization of ANC services in the country.

This finding correlates to the study of a systematic literature review in developing countries by Simkhada et al (2008), whereby they found the cost of using ANC services to be the most important determinant for adequate utilization of ANC by pregnant women, specifically where health facilities were located long distances from the place of residence. If ANC services are to be freely provided in proximity to where women live, it is likely that the services may be used more frequently during their pregnancy.

5.2 Conclusion

So far in conclusion, this study has investigated the utilization of ANC services among women of reproductive age (15-49) in South Sudan using SSHHS II data.

The data had shown a strong relationship between women utilization of ANC services at least once and almost all the explanatory variables (Both socio-demographic and socio-economic factors) accept age at first marriage. This result significantly fulfilled the objectives of this study. But data has demonstrated limited association between the socio-demographic factors and ANC services utilization at least four times, whereby, only women's education demonstrates strong relationship with ANC services utilization. On the other hand, all the socio-economic factors had shown significant relationship with ANC services utilization at least four.

At the level of multivariate analyses which investigating the influence of the multiple explanatory variables on ANC services utilization for at least once during pregnancy, data had reflected that only women at age group 35 years and above, women with 6 children and above, currently married women, women with primary education and women with secondary education and above of socio-demographic factors influence the ANC services utilization. While place of residence and household wealth of the socio-economic factors strongly influence ANC services utilization for at least once during pregnancy.

In investigating the influence of the multiple explanatory variables on ANC services utilization for at least four times, it's found that only household wealth of socio-economic factors proved to be the most and only powerful factor that influence ANC services utilization at least four times during pregnancy.

Despite the fact that government and NGOs in South Sudan have made substantial efforts to improve the level of maternal health care, inadequate level of ANC services utilization is still an issue of concern. Some of the reasons why ANC utilization are very poor in South Sudan might be attributed to the fact that the country is new with poor infrastructure and few health care facilities distributed at long distances far from most of the residents, beside the focus of the existing policies and programmes on the other parts of maternal health issues. The findings of this study show that the likelihood of using ANC services is less among pregnant women in rural areas, and varies from one state to another. Nonetheless, strategies for easy ANC utilization should be the main concern in South Sudan.

5.3 Recommendations

In referring to the outcome of this study the following few points were recommended: since single women (widowed, divorced, separated or never married) are less likely to utilize ANC

because of stigma or ignorance, government should increase the awareness of mothers on the complications and dangers related to pregnancy and emphasize the importance of ANC in tackling these problems, which may improve the level of ANC utilization.

The truth of the matter is that South Sudan was in a struggle for decades, fighting for its freedom and rights as a sovereign state, which only recently translated into independence. Yet the data has shown that 80.7% of the women in this study have no educational qualifications. However, since education has demonstrated significant influence on ANC services utilization, government needs to pay extraordinary attention to education specifically to increase educational opportunities for girls and women in the country and eventually more jobs opportunities for women to enhance their ability to decide on their own health and thereafter better utilization of ANC. On the other hand, the findings also shows that women at an older ages utilized ANC less in comparison with women at younger ages, which is thought to be connected to bad practices of traditional and cultural norms. That may require NGOs and civil society's organization beside the government to focus on those groups of women with little or no education in civic educational campaign to enlighten them and promote adequate utilization of ANC.

References

Abel, N. M., Françoise, M. K., Dramaix-Wilmet, M., & Donnen, P. (2012). Determinants of maternal health services utilization in urban settings of the Democratic Republic of Congo–A Case study of Lubumbashi City. *BMC pregnancy and childbirth*, *12*(1), 66.

Abor, P. A, Abekah-Nkrumah, G, Sakyi, K., Adjasi, C. K., &Abor, J. (2011). The socio-economic determinants of maternal health care utilization in Ghana. *International Journal of Social Economics*, *38*(7), 628-648.

Abor, P. A., & Abekah-Nkrumah, G. (2014). Socioeconomic determinants of use of reproductive health services in Ghana.

Abosse, Z., Woldie, M., Ololo, S. (2010). Factors influencing antenatal care service utilization in hadiya zone. Ethiop J Health Sci. Vol. 2o, No. 2.

Agus, Y., & Horiuchi, S. (2012). Factors influencing the use of antenatal care in rural West Sumatra, Indonesia. *BMC pregnancy and childbirth*, *12*(1), 9.

Ajayi, I. O. (2013). Socio-demographic Factors Determining the Adequacy of Antenatal Care among Pregnant Women Visiting Ekiti State Primary Health Centers. *Online Journal of Health and Allied Sciences*, *12*(2).

Alemayehu, T., Haidar, J., & Habte, D. (2010). Utilization of antenatal care services among teenagers in Ethiopia: a cross sectional study. *Ethiopian Journal of Health Development*, *24*(3).

Ali, A. A., Osman, M. M., Ameer O Abbaker, A.O., Ishag Adam, I. (2010).Use of antenatal care services in Kassala, eastern Sudan. BMC Pregnancy and Childbirth 10:67.

Anchang-Kimbi, J. K., Achidi, E. A., Apinjoh, T. O., Mugri, R. N., Chi, H. F., Tata, R. B., ... & Troye-Blomberg, M. (2014). Antenatal care visit attendance, intermittent preventive treatment during pregnancy (IPTp) and malaria parasitaemia at delivery. *Malar J*, *13*, 162.

Andersen, R., & Newman, J. F. (2005). Societal and individual determinants of medical care utilization in the United States. *Milbank Quarterly*, *83*(4), Online-only.

Anderson Ronald M. (1995). Revising the behavioural model and access to medical care: does it matter? *Journal of Health and Social Behaviour*, Vol. 30:1-10.

Anderson, J. G. (1973). Health services utilization: framework and review. *Health services research*, *8*(3), 184.

Arthur, E. (2012). Wealth and antenatal care use: implications for maternal health care utilization in Ghana. *Health economics review*, *2*(1), 1-8.

Ayanda, O. J., (2014). Utilization of health care services in rural and urban areas: a determinant factor in planning and managing health care delivery systems. *African Health Sciences; 14(2):322-333*

Babalola, B. (2014). Determinants of urban-rural differentials in antenatal care utilization in Nigeria (Doctoral dissertation).

Baral, Y., Lyones, K., Skinner, J., & van Teijlingen, E. (2012). Maternal health services utilisation in Nepal: Progress in the new millennium. *Health Science Journal*, *6*(4), 618-633.

Belayneh, T., Adefris, M., & Andargie, G. (2014). Previous Early Antenatal Service Utilization Improves Timely Booking: Cross-Sectional Study at University of Gondar Hospital, Northwest Ethiopia. *Journal of pregnancy*, *2014*.

Berhe, K. K., Welearegay, H. G., Abera, G. B., Kahsay, H. B., & Kahsay, A. B. (2014). Assessment of antenatal care utilization and its associated factors among 15 to 49 years of age women in Ayder Kebelle, Mekelle City 2012/2013. *American Journal of Advanced Drug Delivery*; A Cross Sectional Study.

Bonono R.C., Ongolo-Zogo P. 2012. Optimizing the use of antenatal care services in Cameroon. *Centre for Development of Best Practices in Health – Central Hospital Yaoundé, Cameroon*

Chakraborty N, Islam MA, Chowdhury RI, Bari W W, Akhter HH 2003. Determinants of the use of maternal health services in rural Bangladesh. Health Promotion International, 18(4): 327-337.

Chimankar, D. A., & Sahoo, H. (2011). Factors influencing the utilization of maternal health care services in Uttarakhand.

Chitimbe G. E. (2006). Determinants of utilisation of antenatal health care services by pregnant women during the first trimester of pregnancy in nsanje. University of Malawi - College of Medicin

Ciceklioglu, M., Soyer, M. T., & Öcek, Z. A. (2005). Factors associated with the utilization and content of prenatal care in a western urban district of Turkey. *International Journal for Quality in Health Care*, *17*(6), 533-539.

Dairo, M. D., & Owoyokun, K. E. (2010). Factors affecting the utilization of antenatal care services in Ibadan, Nigeria. *Benin Journal of Postgraduate Medicine*, *12*(1).

Dhakal, S., Chapman, G. N., Simkhada, P. P., van Teijlingen, E. R., Stephens, J., & Raja, A. E. (2007). Utilisation of postnatal care among rural women in Nepal. *BMC pregnancy and childbirth*, *7*(1), 19.

Dolla, C. K. (2008). Utilization of antenatal care in Madhya Pradesh, India. *Royal tropical institute (KIT).*

Dowswell, T., Carroli, G., Duley, L., Gates, S., Gülmezoglu, AM., Khan-Neelofur, D., & Piaggio, GGP.(2010). Alternative versus standard packages of antenatal care for low-risk pregnancy. *Cochrane Database of Systematic Reviews*, Issue 10. Art. No.: CD000934. DOI: 10.1002/14651858.CD000934.pub2.

Dyeli, N. (2012). An invesigation into the implementation of the basic antenatal care programme by midwives in Mdantsane clinics. *Doctoral dissertation, University of Fort Hare*.

Ejigu, T., Woldie, M., & Kifle, Y. (2013). Quality of antenatal care services at public health facilities of Bahir-Dar special zone, Northwest Ethiopia. *BMC health services research*, *13*(1), 443.

Ekabua, J., Ekabua, K., and Njoku, C. (2011). Proposed Framework for Making Focused Antenatal Care Services Accessible: A Review of the Nigerian Setting. *International Scholarly Research Network.*

Fotso, J. C., Ezeh, A., Madise, N., Ziraba, A., & Ogollah, R. (2009). What does access to maternal care mean among the urban poor? Factors associated with use of appropriate maternal health services in the slum settlements of Nairobi, Kenya. *Maternal and child health journal*, *13*(1), 130-137.

Gabrysch, S & Campbell, O. (2009). Still too far to walk: Literature review of the determinants of delivery service use. *BMC Pregnancy and Childbirth*. Pp, 2-18

Gaur, K. L., Gupt, P., Kuldeep, R., Sharma, M. C., Gupta, R., & Manohar, R. K. (2014). Factors Associated with Antenatal Care Services Utilization and Institutional deliveries.

Gedefaw, M., Muche, B., & Aychiluhem, M. (2014). Current Status of Antenatal Care Utilization in the Context of Data Conflict: The Case of Dembecha District, Northwest Ethiopia. *Open Journal of Epidemiology*, *4*(04), 208.

Ghaffar, A., Pongpanich, S., Chapman, R. S., Panza, A., Mureed, S., & Ghaffar, N. (2012). Provision and utilization of routine antenatal care in rural Balochistan Province, Pakistan: a survey of knowledge, attitudes, and practices of pregnant women. *Journal of Applied Medical Sciences*, *1*(1), 93-24.

Gupta, S., Yamada, G., Mpembeni, R., Frumence, G., Callaghan-Koru, J. A., Stevenson, R., & Baqui, A. H. (2014). Factors Associated with Four or More Antenatal Care Visits and Its Decline among Pregnant Women in Tanzania between 1999 and 2010. *PloS one*, *9*(7), e101893.

Hall, M. A. R. I. O. N., & Chng, P. K. (1982). Antenatal care in practice. *Effectiveness and satisfaction in antenatal care. London: William Heinemann Medical*, 60-8.

Haque, S. M., & Haque, A. K. (2014). Which Factors Affect Probability of Women Using Prenatal Care? The Case of Bangladesh. *The Case of Bangladesh (June 2014). Asian Development Policy Review*, *2*(2), 39-46.

Holtz, T. H., Patrick Kachur, S., Roberts, J. M., Marum, L. H., Mkandala, C., Chizani, N., & Parise, M. E. (2004). Use of antenatal care services and intermittent preventive treatment for malaria among pregnant women in Blantyre District, Malawi. *Tropical Medicine & International Health*, *9*(1), 77-82.

Ibnouf, A. H., van den, H., and Maarse, J. A. (2007). Utilization of antenatal care services by Sudanese women in their reproductive age. *Saudi Med J*; Vol. 28(5): 737-743

Jimoh, A. A. G. (2003). Utilisation of antenatal services at the provincial hospital, Mongomo, Guinea Equatoria. *African Journal of Reproductive Health*, 49-54.

Kassyou, H. (2008). Factors Affecting Antenatal Care Attendance in Maichew Town, Southern Tigray (Doctoral dissertation, Addis Ababa University).

Kaur, J., & Kaur, K. (2013). Does an Antenatal Care make a difference?. *Hum Biol Rev*, *2*, 120-35.

Kipronoh K. M. 2009. Factors influencing the quality of antenatal care in public maternal and child health facilities in Nairobi Province, Kenya

Kulkarni, M. S., & Nimbalkar, M. R. (2008). Influence of socio-demographic factors on the use of antenatal care. *Indian J. Prev. Soc. Med*, *39*(3&), 4.

Lidoroh, S. A. (2013). Factors associated with utilization of maternal health care services in Western Province, Kenya.

Mangeni, J.N., Mwangi, A., Mbugua S., Mukthar V. (2013). Male Involvement in Maternal Health Care as a Determinant of Utilization of Skilled Birth Attendants in Kenya. *United States Agency for International Development* (USAID)

Mekonnen, Y, &Mekonnen, A. (2002). Utilization of maternal health care services in Ethiopia.

Meshram, I. I., Rao, K. M., Reddy, C. G., Krishna, K. S., Venkaiah, K., Laxmaiah, A., & Brahmam, G. N. (2014). Predictors of ante-natal care, delivery and infant feeding practices among rural women in Madhya Pradesh, India. *International Journal of Medicine and Public Health*, *4*(4), 385.

Ministry of Health (MOH) and National Bureau of Statistics (NBS). (2013). South Sudan Household Survey 2010, Final Report. *Ministry of Health. Juba, South Sudan.*

Mlilo-Chaibva, C. N. (2007). Factors Influencing Adolescents' Utilization of Antenatal Care Services in Bulawayo, Zimbabwe. *University of South Africa*

Ms, I., & Peter, C. (2013). Use of Antenatal and Skilled Care during Delivery: A Systematic Review and Meta-analysis of Effectiveness of Interventions Implemented in Developing Countries.

Navaneetham, K., &Dharmalingam, A. 2002. Utilization of maternal health care services in Southern India. *Social Science & Medicine*, *55*(10), 1849-1869.

Nguyen, N. T., Deoisres, W. and Sangin, S. (2013). Factors Predicting Antenatal Care Utilization among Postpartum Women in Tu Du Hospital, Ho Chi Minh City, Vietnam. *Journal of Science, Technology, and Humanities: Vol. 11, No. 1 pp. 49-54.(* Nguyen, *2013)*

Nisar, N., & White, F. (2003). Factors affecting utilization of antenatal care among reproductive age group women (15-49 years) in an urban squatter settlement of Karachi. *JOURNAL-PAKISTAN MEDICAL ASSOCIATION*, *53*(2), 47-53.

Nwosu, Emmanuel O. (2012). Determinants of antenatal care services utilisation in Nigeria. *Developing Country Studies*. Vol 2, np.

Nwoye. J. I. (2010). Utilization of antenatal care services among women of child bearing age in onitsha north local government area of anambra state. Nnamdi Azikiwe Univesity, Awka

Okutu D. (2011). Access to and utilization of antenatal care services in Uganda. Regional Institute for population Studies, University of Ghana.

Onasoga, O. A., Afolayan, J. A., & Oladimeij, B. D. (2012). Factors influencing utilization of antenatal care services among pregnant women in Ife Central Lga, Osun State Nigeria. *Advances in Applied Science Research*, *3*(3), 1309-1315.

Osorio, A. M., Tovar, L. M., & Rathmann, K. (2014). Individual and local level factors and antenatal care use in Colombia: a multilevel analysis. *Cadernos de Saúde Pública*, *30*(5), 1079-1092.

Owoo, N. S., & Lambon-Quayefio, M. P. (2013). National health insurance, social influence and antenatal care use in Ghana. *Health economics review*, *3*(1), 1-12.

Pandey, S., & Karki, S. (2014). Socio-economic and Demographic Determinants of Antenatal Care Services Utilization in East Nepal. *International Journal*, *2*(2), 212-219.

Paudel. D. P, Dr. Nilgar B. R., Dr. Bhandankar M. (2013). Antenatal care service utilization and contributing factors: a community based study in rural Belgaum, Karnataka, India. *IOSR Journal of Dental and Medical Sciences.* Volume (9): PP 25-31.

Pell, C., Meñaca, A., Were, F., Afrah, N. A., Chatio, S., Manda-Taylor, L., & Pool, R. (2013). Factors affecting antenatal care attendance: results from qualitative studies in Ghana, Kenya and Malawi. *PloS one*, *8*(1), e53747.

Resty N. 2011. Factors affecting the utilization of antenatal care services among adolescent pregnant mothers. Case study of Naguru Teenage Health Center, Kampala, Uganda. *Int. Statistical Inst.: Proc. 58th World Statistical Congress, 2011, Dublin (Session CPS001)*

Rogan S. E. B., & Olveña V. R. (2004). Factors affecting maternal health utilization in the Philippines. 9th National Convention on Statistics (NCS)

Sakala, M. (2011). Assessment of the barriers to the utilization of antenatal care services in Kazungula district, Zambia (Doctoral dissertation).

Samson, G. (2012). Utilization and Factors Affecting Delivery in Health Facility among Recent Delivered Women in Nkasi District (Doctoral dissertation), Muhimbili University of Health and Allied Sciences).

Say, L., & Raine, R. (2007). A systematic review of inequalities in the use of maternal health care in developing countries: examining the scale of the problem and the importance of context. *Bulletin of the World Health Organization*, *85*(10), 812-819.

Sharma, M. B. R. (2002). Factors affecting utilization of antenatal care services in Nepal (Doctoral dissertation, Mahidol University).

Shrestha, G., & Shrestha, G. (2012). Statistical analysis of factors affecting utilization of antenatal care in Nepal. *Nepal Journal of Science and Technology*, *12*, 268-275.

Simkhada, B., Teijlingen, E. R. V., Porter, M., &Simkhada, P. 2008. Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *Journal of advanced nursing*, *61*(3), 244-260.

Singh, A., Kumar, A., & Pranjali, P. (2014). Utilization of maternal healthcare among adolescent mothers in urban India: evidence from DLHS-3. *PeerJ*, *2*, e592.

Sohag, A., Memon, S., Bhatti, M., Abdul Azeem, M. (2013). Factors affecting utilization of antenatal care: *The Opinion of Pregnant Women.* Physiology United Medical & Dental College, Karachi, Pakistan.

South Sudan Ministry of Health (SSMOH). 2009. Basic package of health and nutrition services for Southern Sudan. Downloaded from http://www.unicef.org/southsudan/South_Sudan_Basic_package_of_health_services.pdf

Tewodros, B., Mariam, A. G., & Dibaba, Y. (2009). Factors affecting antenatal care utilization in Yem special Woreda South-western Ethiopia. *Ethiop J Health Sci*, *19*(1), 45-51.

Titaley, C. R., Dibley, M. J., & Roberts, C. L. (2010). Factors associated with underutilization of antenatal care services in Indonesia: results of Indonesia Demographic and Health Survey 2002/2003 and 2007. *BMC Public Health,10*(1), 485.

Tshabalala, M. F. (2012). Utilization of antenatal care (ANC) and prevention of mother-to-child transmission of HIV (PMTCT) services in east Ekurhuleni sub-district, Gauteng Province, South Africa.

Tura, G. (2009). Antenatal care service utilization and associated factors in Metekel zone, northwest Ethiopia. *Ethiopian Journal of Health Sciences*, *19*(2).

UNFPA. 2013. Realizing the potential, annual report 2013. Downloaded from https://www.unfpa.org/webdav/site/global/shared/documents/publications/2014/UNFPA%20AR%202013_LR_FINAL.pdf

UNICEF. 2008. The state of the world's children 2009: *Maternal and Newborn Health*. UNICEF publication.

van Eijk, A. M., Bles, H. M., Odhiambo, F., John G Ayisi, J. G., Blokland, I. E., Rosen, D. H., Adazu, K., Laurence Slutsker, L., and Kim A Lindblade, K. A. (2006). Use of antenatal services and delivery care among women in rural western Kenya: a community based survey. *Reproductive Health*, 3:2.

Varma, G. R., Kusuma, Y. S., & Babu, B. V. (2011). Antenatal care service utilization in tribal and rural areas in a South Indian district: an evaluation through mixed methods approach. *Journal of the Egyptian Public Health Association*, 86:11–15.

Villar, J., Merialdi, M., Gülmezoglu, A. M., Abalos, E., Carroli, G., Kulier, R., & de Onis, M. (2003). Nutritional interventions during pregnancy for the prevention or treatment of

maternal morbidity and preterm delivery: an overview of randomized controlled trials. *The Journal of nutrition*, *133*(5), 1606S-1625S.

Wablembo, S. M., & Doctor, H. V. (2013). The influence of age cohort differentials on antenatal care attendance and supervised deliveries in Uganda. *Journal of Nursing Education and Practice*, *3*(11), p101.

World Health Organization, 2012.Trends in maternal mortality: 1990 to 2010*: WHO, UNICEF, UNFPA and The World Bank estimates*.

World Health Organization. (2003). The world health report: 2003: *shaping the future*.

Yalem, T. A. (2010). Determinants of Antenatal Care, Institutional Delivery and Skilled Birth Attendant Utilization in Samre Saharti District, Tigray, Ethiopia.

Yar'Zever, I. S., & Said, I. Y. (2013). Knowledge and barriers in utilization of maternal health care services in Kano State, Northern Nigeria. *Eur J Biol Med Sci Res*, *191*, 1-14.

Ye, Y., Yoshida, Y., & Sakamoto Junichi, J. (2010). Factors affecting the utilization of antenatal care services among women in Kham district, Xiengkhouang province, Lao PDR. *Nagoya journal of medical science*, *72*(1-2), 23-33.

Yohannes, B., Tarekegn, M., Paulos, W. (2013). Mothers ‟ utilization of antenatal care and their satisfaction with delivery services in selected public health facilities of Wolaita Zone, Southern Ethiopia. *International Journal of Scientific & Technology Research* Volume 2, Issue 2.

Yousuf, F., Haider, G., & Shaikh, R. B. (2010). Factors for inaccessibility of antenatal care by women in Sindh. *J Ayub Med Coll Abbottabad*, 22(4).

Zelalem Ayele, D., Belayihun, B., Teji, K., & Admassu Ayana, D. (2014). Factors affecting utilization of maternal health care services in Kombolcha District, Eastern Hararghe Zone, Oromia Regional State, Eastern Ethiopia. *International Scholarly Research Notices*.

Zhao Q., Huang, Z. J., Yang, S., Pan, J., Brian Smith, B., and Biao Xu, B. (2012). The utilization of antenatal care among rural-to-urban migrant women in Shanghai:a hospital-based cross sectional study. *BMC Public Health* 12:1012.

Alikhasi, N., Khadivi, R., & Kheyri, M. (2014). The utilization rate of antenatal care after health sector reform implementation in rural areas of Islamic Republic of Iran. *Iranian journal of nursing and midwifery research*, *19*(6), 613.

Chandhiok, N., Dhillon, B. S., Kambo, I., & Saxena, N. C. (2006). Determinants of antenatal care utilization in rural areas of India: A cross-sectional study from 28 districts (An ICMR task force study). *J Obstet Gynecol India*, *56*(1), 47-52.

Jalal, S., & Shah, N. A. (2011). Ante Natal Care (ANC) seeking behaviour among women living in an urban squatter settlement: results from an ethnographic study. *Italian Journal of Public Health*, *8*(3), 261-267.

Nketiah-Amponsah, E., Senadza, B., & Arthur, E. (2013). Determinants of utilization of antenatal care services in developing countries: Recent evidence from Ghana. *African Journal of Economic and Management Studies*, *4*(1), 58-73.

Rooney, C. (1992). Antenatal care and maternal health: how effective is it? A review of the evidence

W. H. O. (2014). Health Situation. Region Africa.

Lawn, J., & Kerber, K. (2006). Opportunities for Africa's newborns: practical data policy and programmatic support for newborn care in Africa.

Thangaratinam, S., Rogozińska, E., Jolly, K., Glinkowski, S., Roseboom, T., Tomlinson, J. W., ...& Khan, K. S. (2012). Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *Bmj*, *344*.

Mlilo-Chaibva, C. N. (2007). Factors Influencing Adolescents' Utilization of Antenatal Care Services in Bulawayo, Zimbabwe. *University of South Africa*

(Banda C, 2013) Banda, C. (2013). Barriers to utilization of focused antenatal care among pregnant women in ntchisi district in Malawi. Downloaded from https://tampub.uta.fi/bitstream/handle/10024/84640/gradu06772.pdf?sequence=1

(Banda I. 2012) Banda, I. (2012). Factors associated with late antenatal care attendance in selected rural and urban communities of the Copperbelt province, Zambia (Doctoral dissertation, The University of Zambia).

Khan, K. S., Wojdyla, D., Say, L., Gülmezoglu, A. M., & Van Look, P. F. (2006). WHO analysis of causes of maternal death: a systematic review. *The lancet*, *367*(9516), 1066-1074.

International Fund for Agricultural Development. (2013). Enabling poor rural people to overcome poverty in South Sudan.

Shimeles, A., and Verdier-Chouchane, A. (2012). Poverty Situation and prospects in South Sudan. AFDB. Africa Economic brief. 3(8)

Appendix I: Ethics Approval