Factors associated with quality antenatal care services in Lusaka

By

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Dissertation submitted in partial fulfillment for the requirement of Master of Public Health in Population Studies Degree

University of Zambia
Lusaka

November, 2017

DECLARATION

I, Brave Maxwell Katemba hereby declare that this dissertation is my original work and has not been presented for any other awards at the University of Zambia or any other University.

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CERTIFICATE OF APPROVAL

The Board of Examiners has approved the dissertation of Brave Maxwell Katemba as partial fulfilment of the requirements for the award of the Master of Public Health at the University of Zambia.

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ABSTRACT

The quality of antenatal care (ANC) that pregnant women receive in Zambia continues to be poor despite several interventions. Research has shown that only 29% of women in Zambia receive high quality antenatal care. The quality of ANC a woman receives during pregnancy is crucial to both the child and the mother's life. It has been established that providing high quality ANC can save lives and has a positive impact on postnatal health care services. However, the quality of ANC in Zambia requires attention as maternal and neonatal mortality rates are still unacceptably high with Lusaka district not being left out of the bottleneck.

Using a cross sectional study design, the main aim of this study was to determine factors associated with high quality antenatal care among pregnant women in Lusaka. The study population comprised of all pregnant women aged 15-49 years attending ANC either in the first, second or third trimester. A multi-stage sampling technique was used to select the 380 study participants. The study estimated the proportion of women who received high quality ANC during their last antenatal visit. The research further used a backward elimination method by removing all variables with the least significant global p-values. This process was repeated until the model only had variables with a p-value of < 0.05. Data analysis of this study was done in STATA 13.1.

It was established that only 47.1% of pregnant women received high quality ANC while 52.9% received low quality. Six key ANC interventions were considered, urine (36.7%) and blood (46.8%) testing were the least received basic components of ANC. After adjusting for the effect of other factors, women with secondary education had higher odds of receiving high quality ANC than women with primary level of education (OR = 1.93; 95% CI: 1.17 to 3.15). Women who received ANC services from midwives and nurses were less likely to receive high quality ANC compared to those who received ANC from a doctor (OR = 0.18; 95% CI: 0.05 to 0.59) and (OR = 0.13; 95% CI: 0.04 to 0.41) respectively.

Generally, the quality of antenatal care received by pregnant women in Lusaka is unacceptable. It is therefore imperative that in the short run, continued effort to improve the delivery of basic services such as blood and urine testing is required and consequently in the long run, there is need to improve the quality of health care services provided by medical personnel at all levels.

Keywords: Antenatal Care, Maternal Mortality and Quality of antenatal care

DEDICATION

Dissertation dedicated to my parents Elias Katemba and Getrude Katemba for their dedicated support throughout my study period.

ACKNOWLEDGEMENTS

Firstly, I thank God for seeing me through my entire academic journey.

I would like to thank the Lusaka District Medical Office team for making it easy for me to conduct this study in the district. I further extend my thanks to all the medical staff at facility level for the critical role they played in ensuring that study participants were made available when needed. I would also like to express my sincere gratitude to my supervisors Mrs. Choolwe Jacobs, Dr. Phoebe Bwembya and Mrs. Nkweendenda Twaambo for their valuable and unreserved technical assistance in the development of the proposal and the final report.

To be precise, I would like to appreciate Nyuma Nyirenda, Kazembe Kalombe and Matthews Chambisha for their durable work and professional skills exhibited during data collection.

My special thanks also go to Dr Samuel Bosomprah and Mr Tato Nyirenda for their critical help at data analysis stage. Finally, I wish to thank my parents and friends for their support throughout the study period.

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ABBREVIATIONS

ANC	Antenatal Care
CSO	Central Statistical Office
DMO	District Medical Office
FANC	Focused Antenatal care
IBP	Individual Birth Plan
ITN	Insecticide Treated Nets
LDMO	Lusaka District Medical Office
HIV	Human immune-deficiency virus
MDG	Millennium Development Goals
MM	Maternal Mortality
MOH	Ministry of Health
TA	Technical Assistance
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey

CHAPTER ONE: INTRODUCTION

1.1 Background

Worldwide, more than 830 women die every day from pregnancy or childbirth-related complications. Almost 66% of these deaths occur in the sub-Saharan African countries compared to 22% in Southern Asia and only 0.6% in developed countries (World Health organization (WHO), 2015). Good quality antenatal care (ANC) has the potential to reduce maternal morbidity and mortality and perinatal mortality (WHO, 2005).

The quality of ANC that pregnant women receive in Zambia continues to be poor. Previous studies show that although more than 90% of mothers reported for at least one antenatal visit with a skilled worker, only 29% of mothers in Zambia received high quality of antenatal care (Nicholas et al., 2012).

Having received "high quality ANC" in this study is defined as having received at least five antenatal interventions among the following six; blood testing, urine testing, blood pressure measurements, abdominal examination, weighing measurement and information on pregnancy related complications (Central statistical office (CSO), 2015; Nyamtema et al., 2012; Ministry of Health, 2006). While low quality will be defined as having received less than five of the six ANC interventions.

Due to low quality of ANC in Zambia, the national maternal mortality rate is unacceptably high with 323-474 deaths per 100,000 live births (CSO, 2015). In 2014, Lusaka district was topping the Maternal Mortality (MM) list contributing over 70% of total deaths resulting from pregnancy related complications (Ministry of Health (MOH), 2015).

Health care use is yet another important indicator of quality of health care services provided. It has been shown that ANC coverage is extremely high in the industrialized countries where quality of services provided is good, with 98% of women having at least one ANC visit (United Nations (UN),2012). In Sub-Saharan Africa only 72% of pregnant women attend at least one visit while only 42% routinely attended the recommended four visits (UN, 2012). In Zambia, with more than 96% mothers receiving ANC at least once, only 55.5% pregnant women have all the four ANC visits, which is a reduction from 60.3 % recorded in 2007 (CSO, 2015).

Studies evidently indicate that countries with high maternal mortality as well as low routine ANC visits have inadequate and poor quality of antenatal care services (WHO, 2015; Simkhada, 2008). Donabedian proposed a framework for assessing quality of care which distinguishes between the demand and supply side attributes (Donabedian, 1966). The demand side attributes mainly focus on the factors that influence the clients' decision to demand for a particular service. Literature provides a wide range of factors that influence the quality of ANC. These include education level of a pregnant woman, parity, marital status, employment status, birth order, age, time taken to the health facility as well as client's perception of the service provided (Mayura, 2013; Ikeoluwapo et al. 2013).

In Zambia, very little is known of the demand side factors that affect the quality of antenatal care. Client perception during ANC not only ensures compliance but also re-enforces continuous demand and utilization of the services provided (Degley, 2012). This means that there is a need and increased emphasis to be placed on the standards as well as mechanisms to address factors that influence the demand for quality ANC. Therefore, suggesting a definite study to examine factors influencing the demand for quality of antenatal care services among pregnant women in Lusaka.

1.2 Statement of the problem

Research has shown that quality of ANC in Zambia is poor. A study by Nicholas in 2012 showed that only 29% of women in Zambia received high quality of antenatal care (Nicholas et al., 2012). Little is known about the factors that influence the quality of ANC pregnant women receive during ANC visits.

Quality of antenatal care in Zambia has since remained poor despite a number of interventions that have been put in place to curb the situation. For instance, the government through the Ministry of Health adopted the Focused antenatal care (FANC) known to improve quality and utilization of ANC services. Therefore, it is expected that antenatal care should go along with the reduction in maternal mortality (MM) as well as influencing routine antenatal care attendance by women (Baffour et al., 2015). However, MM still continues to be unacceptably high with 323-474 per 100,000 live births in 2015. Additionally, the number of pregnant women routinely attending the four required antenatal visits is very low (55.5 percent) compared to those attending the first visit (96 percent) (CSO, 2015)

The maternal mortality rate for Lusaka district has been increasing since 2013 with over 70% of the deaths in the province recorded under the district. On the other hand, ANC visits in Lusaka district are significantly low. The trend has been decreasing, in 2013 (65%), while in 2014 and 2015 it was 61% and 60%, respectively (MOH, 2015).

A number of factors influencing quality health care have been cited, among which are the demographic, social and economic factors. However, there is little known about the demand factors influencing the quality of ANC in Zambia. Therefore, purpose of this study was to determine the demand side factors associated with quality antenatal care in Lusaka district.

1.2 Justification

A research gap exists relating to factors associated with the quality of ANC in Zambia. Different factors influencing quality of antenatal care have been cited; among them is the education level of a pregnant woman, parity, marital status, employment status, birth order, age, time taken to the health facility as well as client's perception of the service provided. However, there was little known about factors associated with quality of antenatal care in Zambia and how these factors

could potentially cause disparities in the quality of services that women receive. This information may help the government to initiate special programs for certain subgroups of women receiving low quality of ANC. Further, knowledge on the factors of quality antenatal care is a prerequisite for improving the delivery of health care.

Different studies done in most developing countries have revealed that quality of ANC services that pregnant women receive is generally poor. Despite other studies being done elsewhere, there is insufficient data on the quality of antenatal care services that Zambian women receive. In order to ascertain specific interventions of poor ANC quality services, there is need for more rigorous examination of the demand side factors that affect the quality of ANC.

There is an urgent need to compare the services that women receive at different ANC visits, as this would help health care providers develop better communication strategies during ANC health talks. It is hoped that findings of this study will be significant in providing the Zambian health care system with relevant knowledge that can be strategically used to improve the quality of ANC for all Zambian women.

It is further hoped that findings of this study will provide vital information for the Ministry of Health through the district medical office to develop a consolidated ANC quality assessment tool. Academically, the study will add to the existing body of knowledge on the quality of ANC services that pregnant women receive.

We finally believe that results of this study will provide baseline data on the quality of antenatal care services received by pregnant women in Lusaka District.

CHAPTER TWO: LITERATURE REVIEW

As a preliminary step for this study, a variety of literature from different search engines where reviewed, among such is Google scholar, Cochrane Library and Pub MED. The main key terms used for the search is antenatal care, prenatal care, quality of antenatal care, maternal health services, and factors to quality antenatal care.

Services received by pregnant women

It is important that all the required information and services that pregnant women are supposed to receive are rendered to them. Although this is supposed to be the case, some studies have shown that pregnant women do not receive certain services as well as the necessary information. For instance, according to a study by Mohamed et al (2012) in Sudan, it was shown that blood pressure measurement was only carried out on 34% of pregnant women in the study. It has also been emphasized that blood pressure measurement during pregnancy is crucial in order to diagnose pregnancy induced hypertension and other peculiar diseases of pregnancy. Therefore, it is a requirement for every pregnant woman to have their blood pressure measured during pregnancy.

In a similar study conducted in Zambia at a national level, results showed that most screening tests were not commonly available: only 16% of ANC facilities provided hemoglobin testing which is helpful in diagnosing anemia, and only half provided syphilis testing. Urine protein testing, which is important for detecting hypertensive complications of pregnancy such as pre-eclampsia, was performed by less than a quarter of ANC facilities, thereby compromising the quality of services provided in health facilities (Kyei et al. 2012).

According to the new WHO ANC model, blood pressure and weight measurement of a pregnant woman should be done in the ANC visits. However, different studies have shown that most countries insufficiently conduct these services. A study in Ethiopia showed that 43.7% of weight and 59.2% of blood pressure measurements of study mothers respectively were not taken in Amhara Region. According to the study, this made it difficult to identify pregnant women who needed special medical attention such as subsequent medical follow-up and management (Tadese et al. 2013).

Despite different studies showing inadequacy in the provision of blood pressure and weight measurements being done. A study done in Tanzania shows a different picture as some examinations such as weighing, auscultation of the fetal heartbeat, and palpation of the fundus were done to 99% of ANC clients. The study further attributed lack of awareness, workload of health personnel and negligence as some of the factors leading to poor ANC quality (Christoph et al. 2003).

Factors associated with quality antenatal care

Education level

A number of studies have shown that education level of a pregnant woman has an influence on the number of antenatal visits she would make. The number of visits defines an opportunity for a pregnant woman to receive quality antenatal care. Banalola (2014) in her study conducted in three African countries: Kenya, Malawi and Nigeria established that a lot of women attending ANC did not receive all the essential components of ANC. However, it was shown that women's educational level has an effect on the quality of care above and beyond its association with a number of ANC visits as well as quality of services that they received. An explanation obtained from these results is that, educated women were more knowledgeable about the procedures to expect when they attend ANC, hence more likely to request for such procedures than the low educated women. It is also shown that ANC service providers were more likely to discriminate low educated mothers from the highly educated mothers. Hence the provision of comprehensive information on pregnancy related risk, performing all the required tests and offering preventive medication (such as iron tablets) was not routine for most of them.

In Nepal, it was established that education status of a woman was critical towards receiving high quality antennal care. A study to investigate factors associated with quality of antenatal care in Nepal found that women with higher levels of education were more likely to receive high quality antennal care than women with low education level (Chandni et al. 2014).

A study done in three African countries (Kenya, Malawi and Nigeria) showed that women's education level has an effect on the quality of ANC above and beyond its association. Educated women were more knowledgeable about the procedures to expect during ANC, hence more likely to request for such procedures than the low educated women (Banalola, 2014).

A qualitative study done in Ghana, Kenya and Malawi suggested that level of education plays an important role as more educated women are able to approach health providers on "relatively equal terms, to pose questions and, potentially, to seek care with lesser concern about any possible reprimands" (Pell C 2013, p. 8).

Education has further been cited by different studies to be one of the key factor that contributed to high quality health care services. For instance, a study done in Ethiopia revealed that women's educational level increased the odds of completing the four ANC visit which increases the chances of receiving high antenatal quality (Toan et al. 2012). In Vietnam, Colombia and Brussels Metropolitan region women's education level as an important indicator for various factors attached to health seeking behavior. When educated women were compared to uneducated women, it was found educated women had better access to information, high level of health literacy which empowered them to make autonomous decisions and as a result they able to break certain cultural barriers (Babalola et al. 2009 and Greenaway et al. 2012). Lack of education further leads to poor quality interactions between antenatal care provider and pregnant women (Adamson et al. 2012).

Antenatal health teaching and counselling are important components of high quality ANC (Kirkham et al., 2005; Sword et al., 2012; Wheatley, Kelley, Peacock, & Delgado, 2008). In most cases, ANC health talks involve educating pregnant women on the physiological changes that occur during pregnancy and discussing dietary guidelines for pregnant women, appropriate weight gain, and perhaps nutritional supplements. For women to fully understand and practice what they are taught, education then plays an important role.

Client's perception

Client's perception on the quality of services and their satisfaction with care may influence patient's willingness to utilize skilled care, comply with treatment and referral recommendations and delivery seeking behaviors and ultimately the effectiveness of such care (Moore et al., 2002). Women with a poor quality perception at first ANC visit would end up not making all the recommended ANC contacts resulting in a compromised ANC package delivery. A study in Kenya showed that 89.9 % of women perceived ANC services to be good and as a result, most women (76.2%) were reported to have received high quality ANC services. This notion is further supported by Leonard's work in Tanzania. His study showed that health seekers do not only not play a passive role as consumers, but that they actively evaluate the quality of services that they

receive as a result they tend to go for the best known health providers. Thus, perception of quality is critical to health seekers in making decisions of attendance (Leonard, 2002).

Client's perception is an important attribute to quality ANC services as women who feel satisfied with the services provided during their ANC visits are more likely to continue with ANC visits than women who are not satisfied with the services. A study in Ethiopia found that less than half (47.7%) of the pregnant women scored above the mean satisfaction score. This had a high potential of making women abscond subsequent ANC visits hence compromising the quality of services they received (Tadese et al. 2013).

Despite other studies emphasizing on the importance of client's perception on the provision of health services, a study in Namibia and Kenya revealed that patient's perception was not consistently associated with quality of clinical services (Diamond-Smithet et al. 2016).

Inequalities in ANC quality provision

In an international context, inequities in antenatal care quality have been recognized. In 2004, a study conducted in Pelotas, Brazil, analyzed discrepancies in antenatal care quality focusing on the variables of "family income, self-assessed skin color, parity, age and type of provider" (Victora et al., 2010). Study findings revealed lower quality of antenatal care among women who received care in the public sector, women with lower family incomes, and mothers aged below 20 years. On the contrary, a study done by Oladapo and Osiberu (2008) showed that employment status, woman income, woman educational level, ethnicity, marital status, and frequency of prenatal visits were not associated with perception of antenatal care quality.

Different studies have shown that quality of ANC can highly be influenced by the qualification of the care provider. For instance, a study done in Nepal found that the type of a health provider played an important role in determining whether a pregnant woman received high or low quality of ANC. The study further highlighted the importance of skilled health providers such as doctors, midwives and nurses in the provision of antenatal services. The results of the study showed that the odds women accessing ANC services from skilled providers where high compared to those who received services from relatively less skill ANC providers such as female community volunteers, Auxiliary health workers and village volunteers (Chandni et al. 2014).

Skills acquired by an ANC provider plays an important part to quality of ANC provided. A study done in Nigeria showed that women who received ANC services from a skilled provider were more likely to receive better quality of services than those who received services from a less skilled provider (Fagbamigbe and Idemudia, 2015). Skilled ANC attendants spent more time with pregnant women hence comprehensively attending to all the necessary requirements.

Income disparities

Equity is an important concern in the provision of healthcare services. However, different studies have shown disparities in the quality of health care provided to high income class than the low income class. A study done in Taiwan showed that people from low income populations were less likely to receive high quality health care services due to failure to approach high quality health care providers (Tsung et al. 2014). These results are consistent with the study that was done in Taiwan were women from higher income households had higher odds of receiving good quality ANC (Joshiet al.2014). In Uganda, women from a high wealth quintiles were more likely to utilize ANC services than women from low wealth quintile (Bbaale, 2011).

A study done in Indonesia found a strong association between family income and the preference of Traditional birth attendants and preference for midwives. It was further established that women from high income families adequately utilized ANC services than women from poor families (Yenita and Shigeko, 2011).

CHAPTER THREE: RESEARCH QUESTIONS AND OBJECTIVES

3.1 Research Questions

1. What is the proportion of pregnant women who receive high quality antenatal care services?

2. What are the demographic, social and economic factors associated with quality antenatal care services among pregnant women?

3.2 General Objective

The main aim of this study was to determine factors associated with quality antenatal care among pregnant women in Lusaka district.

3.3 Specific Objective

1. To estimate the proportion of women who had high quality antenatal care services during their last ANC visit.

2. To determine the demographic, social and economic factors associated with quality antenatal care services in Lusaka district.

3.4 Conceptual Framework

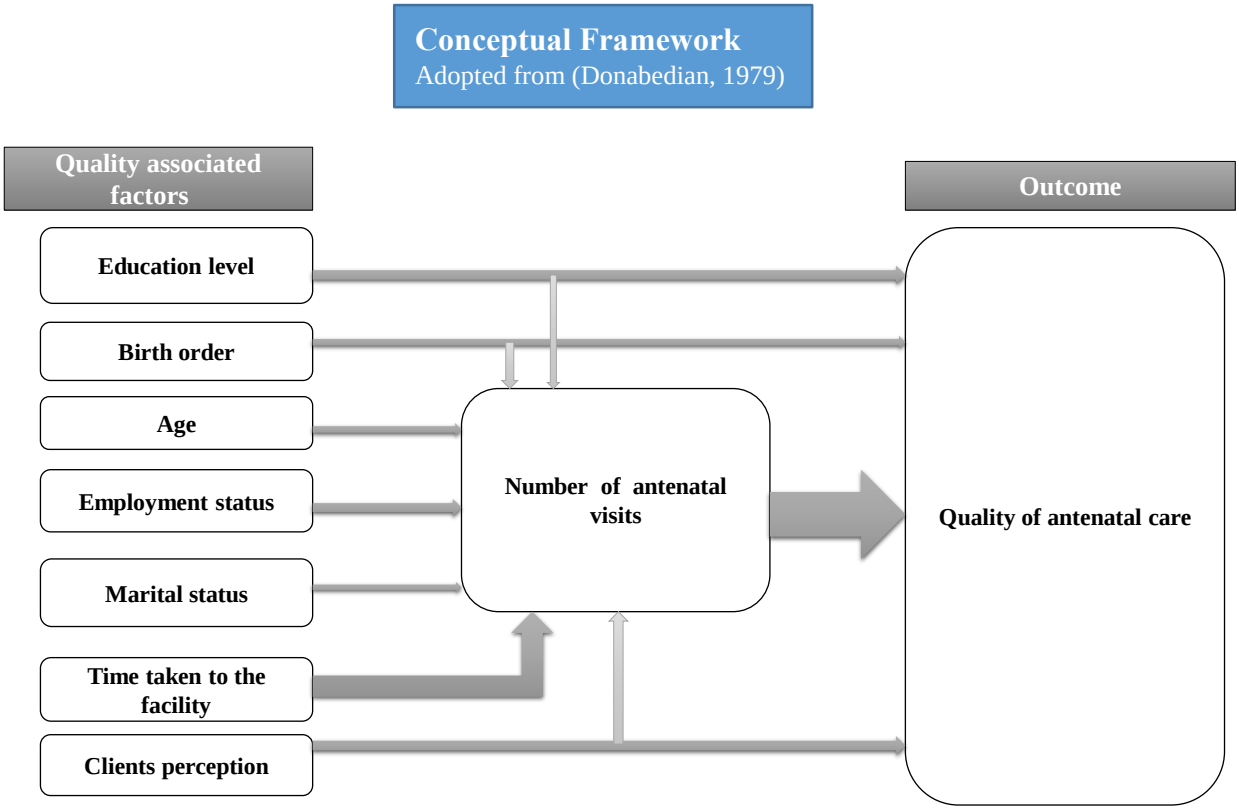

Figure 1 Conceptual framework of factors that influence quality of antennal care

To understand the factors that influence the quality of antenatal care, this study adopted the Donebedian (1979) framework of quality of health care. The framework suggests that educational level of a woman would either influence high or low quality of ANC directly or indirectly through influencing the number of ANC visits made. Additionally, the birth order would also influence her ability to demand for certain services during ANC. Other risk factors that would affect quality of antenatal care would be the age of the woman, marital status, employment status and also the time taken to the health facility.

3.5 Operational Definitions

1. **High quality ANC** is defined as having received at least five antenatal interventions among the following six; blood testing, urine testing, blood pressure measurements, abdominal examination, weighing measurement and information on pregnancy related complications.
2. **Low quality** ANC is defined as having received less than five of the six following ANC interventions; blood testing, urine testing, blood pressure measurements, abdominal examination, weighing measurement and information on pregnancy related complications.
3. **Maternal Mortality ratio**: is the number of maternal deaths during given time period per 100,000 live births during the same time.
4. **Antenatal care:** Care given to a pregnant woman from the time of conception to the onset of labor.
5. **Providers:** Health staff at selected public Mother and Child Health (MCH) facilities serving in ANC at the time of study or have served in the last one year preceding the study and available for interview.

CHAPTER FOUR: METHODOLOGY

4.1 Study Design

A cross sectional study design was used in which quantitative data was collected from consenting pregnant women attending antenatal care.

4.2 Study Site

This study was conducted in Lusaka district; the district has been described in details elsewhere (Rene L, 2017). However, it suffices to describe here that the district has a total number of 39 health facilities providing primary health care. Geographically, the 39 health facilities are placed in zones based on the geographic setting of the district. According to the district health information systems (2014), the districts are clustered into 8 zones with a total population coverage of 2,045,546 people.

4.3 Study Population

The study participants were pregnant women attending ANC either in the first, second or third trimester. The study included all pregnant women aged 15-49 years attending antenatal care in the sampled health facilities. The study excluded all pregnant women admitted at the health facility, women referred to the general hospital as well as all women who did not consent participating in the study.

4.4 Sampling Technique And Sample Size Determination

A multi-stage sampling technique was used to select the study participants. In the first stage, simple random sampling method using a lottery approach was used to select one health facility from each of the 8 zones. The calculated sample size was uniformly distributed to the 8 randomly selected health facilities. In the second stage, systematic sampling was used to select women for exit interviews until the required sample size for a particular health facility was met.

Sample size calculation

$$\boldsymbol{n = \frac{z^2 p(deff)(1-p)}{e^2}}$$

z = Is standard normal variate (at 5% type 1 error (0.05). This was set at 1.96 to correspond to 95% confidence level.

p = Is the proportion used in the estimation formula (in our case the p value used is 0.29 (29%), based on previous studies, the proportion of women who had high quality antenatal care services was estimated to be 29 percent in Zambia (Nicholas et al., 2012).

e = Is a measure of precision, thus the margin of error. In this study the margin of error is set at 0.05

Deff = is the design effect set at 1.5, this was chosen arbitrarily because no literature was found on the similar study (factors associated with quality of ANC) in Zambia.

The estimated sample size was: $$\boldsymbol{n = \frac{1.96^2 0.29(1.5)(1-0.29)}{0.05^2} = 475}$$

Adjusting the sample size upwards for assuming non-response rate (r), the sample size was adjusted as follows:

$n_f = \frac{n}{r}$ Where n_f is the final sample size and r is the response rate in decimals which is 95.8% (0.958) for urban women in the ZDHS of 2013-2014, (CSO, 2015).

$$n_f = \frac{475}{0.958} \approx 495 \text{ (total sample size)}$$

The total sample size was uniformly distributed in the 8 sampled health facilities. Considering the cost, the margin of error and scientific validity factors, the overall sample size of 495 was large enough to give reliable results.

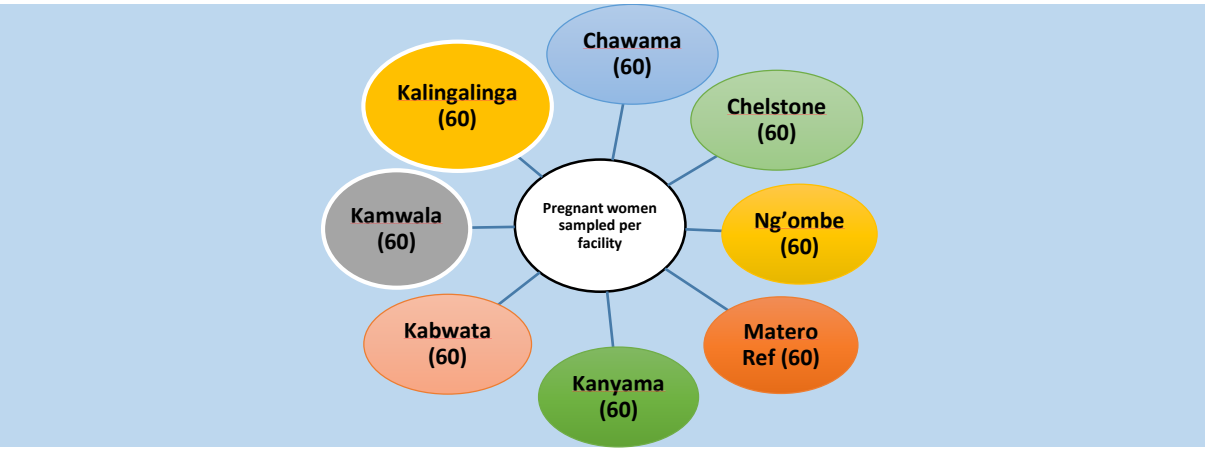

Figure 2 Sampled health facilities and number of pregnant women interviewed

4.5 Data Collection Methods

Data was collected through exit interviews using a structured questionnaire administered by research assistants. Additionally, a checklist was used to track services or interventions that pregnant women received during their recent antenatal care visit.

Study Variables

Table 1: Study Variables

Dependent Variable	Independent Variables
Quality of ANC (High/Low)	Woman's age Woman Education Level Parity Marital Status Employment status Time taken to the facility Clients perception Attitude of health workers

Table 2: Operational definitions and measurements of variables

Independent variables	Indicator	Measurement scale
Marital Status	Single Married Widowed Divorced Separated	Nominal
Marital Status (For analysis purposes, the data was also presented as)	Married Not Married	
Education Level	Primary Secondary More than secondary (tertiary)	Ordinal
Employment status	Self-employed Government Employee Private organization Employee	Nominal
Employment status (For analysis purposes, the data was also presented as)	Formal Informal	
Area of residence	Low density Medium density High Density	Ordinal
Household level of income	Less than K500 K500-K900 K1000-K1900 K2000-K3000 Above K3000	Ordinal
Parity	0 1 2 3+	Ordinal
Age group	Below 20	Ordinal

	20-24 25-29 30-34 35-39 40+	
Dependent variable		
Quality of antenatal care received	Low High	Ordinal

4.6 Data Management

4.6.1 Quality control

In order to ensure quality in the data that was be collected, research assistants were trained thoroughly for two days. The supervisor monitored the research assistants in all data collection sessions in order to ensure that data was really collected from the participants.

Data on the services that pregnant women received was validated by checking for uniformity on pregnant women's ANC cards. Data accuracy and completeness was checked by the supervisor on a daily basis. Quantitative data that was collected was coded immediately and entered into MS Excel and simple frequency tables were made to check for data inconsistencies.

4.6.2 Data storage

After data collection from the respondents, the principal investigator collected all the raw data and the signed consent forms from the research assistants. Completed questionnaires were kept under a locked filing cabinet that was only accessed by the research team. Data that was entered in the computer was password protected and only the research team had the password to the data.

4.6.3 Data cleaning

Raw coded data from hard copy questionnaires were electronically entered into MS excel sheet were a pick from the list rule was applied to limit the type of data entered in each cell. Data cleaning was carried out using two major data cleaning approaches; spot check and logic check.

4.7 Data Analysis

Data on the check list was scored in excel to determine whether a pregnant woman received high or low ANC quality. This data helped in the generation of the dependent variable.

Data cleaned in excel was exported to STATA 13 for analysis. Descriptive statistics of background characteristics was produced. Categorical variables were presented as proportions and frequencies. Continuous variables were presented using means, standard deviation and confidence intervals. Chi-square test was used to establish association between the dependent and independent variables.

Multiple logistic regression analysis was performed to examine the specific contribution of one independent variable on the dependent variable.

4.8 Ethical Considerations

Prior to the initiation of the study, ethical clearance was obtained from the University of Zambia Biomedical Research Ethics Committee. Written permission was requested from Lusaka district medical office before data collection began.

All participants were informed about the purpose of the study and informed that they had the right to decline from participating as well as the right to withdraw at any stage of the study; and that their decision would not affect services they would receive. Pregnant women who declined to participate in the study were not discriminated in any way. Participants were assured that no information pertaining to their identity was going to be recorded during data collection and reporting stages of the study, hence ensuring confidentiality. Each study participant completed a consent form before participating in the study. Information on the study as well as all possible risks of participating in the study were communicated to participants in order to respect their autonomous decision on whether to participate in the study or not.

Since this study was on pregnant women, it is possible that certain women felt some basic common pregnancy discomforts such as headache and indigestion problems. In a case of such, pregnant women were at liberty to stop the interview without any attached consequences. The presence of a male research assistant had the potential of making respondents uncomfortable to respond to certain questions; hence participants were free to withdraw from the study anytime they felt uncomfortable.

The study did not provide any direct benefits to the study participants. This was clearly indicated on the consent form so as to ensure that participants who were uncomfortable with revealing information would be free to pull out from the study.

4.9 Dissemination of Results

Upon completion of the research, findings of the study will be presented during graduate forums in the School of Public Health and the University of Zambia. Results will also be communicated to the Lusaka District Medical Office as well as the Ministry of Health. In addition, a hard and soft

copy of the findings will be made available to the University of Zambia library for graduate students and other concerned readers. Findings will also be published in a reputable journal.

CHAPTER FIVE: PRESENTATION OF RESULTS

This chapter highlights the findings of the study to determine the factors associated with quality antenatal care services in Lusaka. The estimated sample size for this study was 495 pregnant women. However only 480 women completed the survey indicating a response rate of 97%.

Table 3: Social-demographic characteristics

Variables	Respondents n=480	Percentage (%)
Age group		
Below 20	84	18.3
20-24	141	30.8
25-29	94	20.5
30-34	90	19.7
35-39	33	7.2
40+	16	3.5
Mean age	**25.6 years**	**(SD 1.5)**
Marital status		
Not married	151	31.9
Married	232	68.1
Area of residence		
Low density	28	5.9
Medium density	120	25.2
High density	328	68.9
Employment Status		
Formal	82	40.8
Informal	119	59.2
Ever attended school		
Yes	305	84.7
No	55	15.3
Highest level of school attended		
Primary	189	51.5
Secondary	133	36.4
Tertiary	45	12.3
Number of children		
None (first pregnancy)	177	37.7
1	112	23.9
2	82	17.5
3+	98	21
Mean number of children	1.4	
Household level of income		
Less than K500	34	10.2
K500-K900	52	15.6
K1000-K1900	91	27.3
K2000-K3000	91	27.3
Above K3000	66	19.8

Table 3 presents the socio-demographic characteristics of the 480 women who completed the exit interviews. About one third (30.8%) of the respondents were aged between 20-24 years while only 3.5% women were aged above 40 years. The average age for the study population was 26 years while the average number of children a woman had was one child (SD 1.5). Over two thirds (68.1%) of the women were married and residing in high densely populated areas (69.8%). The study also shows that 8 in 10 (84.7%) women interviewed had attended school at some point in their life time although slightly above half (51.5%) only went as far as primary level. About 59.2% women were informally employed with K1000-K3000 being the average household income. Over one third (37.7%) of the women had no children yet by itself being the first pregnancy.

5.1 Antenatal care services

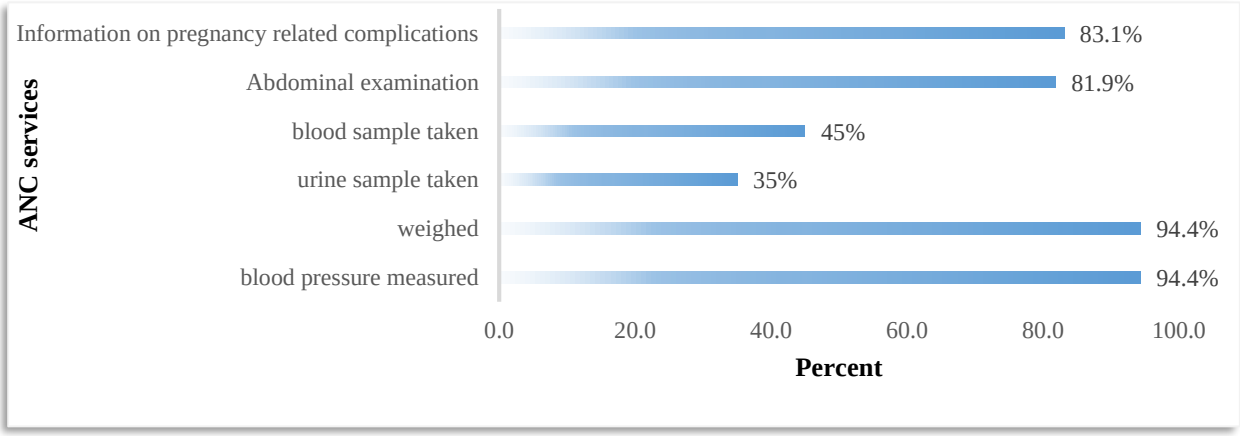

Figure 3 Antenatal care services received by pregnant women

Table 4 also shows the proportion of pregnant women who received high and low quality of ANC. As defined in this study, having high quality ANC is receiving at least five ANC interventions of the following six; blood testing, urine testing, blood pressure measurements, abdominal examination, weighing measurement and information on pregnancy related complications as shown in figure 3. Only 47.1 % of the women received high quality antenatal care while the 52.9% received low quality.

Table 4: ANC services received by pregnant women

	Pregnant women n=478	***Percent***
ANC quality proportion		
High quality	225	47.1
Low quality	253	52.9

Table 5: Factors associated with quality antenatal care

	Quality of ANC received		P-value
	High	**Low**	
Age			
Below 20	60.7 (51)	39.3 (33)	
20-24	47.5 (67)	52.5 (74)	
25-29	41.5 (39)	58.5 (55)	<0.001*
30-34	67.7 (33)	63.3 (57)	
35-39	27.3 (9)	72.7 (24)	
40 +	813 (13)	18.8 (3)	
Marital status			
Not married	54.3 (82)	45.7 (69)	
Married	43.3 (140)	56.7 (183)	0.026*
Area of Residence			
High Density	43.4 (114)	56.7 (149)	
Medium Density	51.1 (45)	48.9 (43)	0.242
Low Density	31.2 (5)	68.8 (11)	
Number of children			
None (first pregnancy)	54.3 (83)	45.7 (70)	
1	39.8 (33)	60.2 (50)	0.013*
2	30.2 (13	69.8 (30)	
3+	40 (34)	60 (51)	
Household level of income			
Less than K500	20.6 (7)	79.4 (27)	
K500-K900	44.2 (23)	55.8 (29)	
K1000-K1900	36.3 ((33)	63.7 (58)	0.009*
K2000-K3000	50.6 (46)	49.4 (45)	
Above K3000	53 (35)	57 (31)	
Currently living with partner			
Yes	39.5 (109)	60.5 (167)	0.001*
No	56 (79)	44 (141)	
Currently employed			
Yes	45.1 (88)	54.9 (107)	0.500
No	48.3 (128)	51.7 (137)	
ANC attendant			
Doctor	80 (60)	24 (19)	<0.001*
Midwife	49.4 (42)	50.6 (43)	
Nurse	38.6 (117)	61.4 (186)	
Ever attended school			
Yes	42.6 (130)	57.4 (175)	0.101
No	54.6 (30)	45.4 (25)	
School Level attained			
Primary Level	38.1 (72)	61.9 (117)	
Secondary Level	54.9 (73)	45.1 (60)	0.012*
More than secondary (tertiary)	46.7 (21)	53.3 (24)	
Time taken to get to the Facility			
Less than 20 minutes	45.6 (26)	54.4 (31)	
20 to 40 minutes	41.4 (53)	58.6 (75)	
40 to 60 minutes	51.8 (58)	48.2 (54)	0.284
Over 1 hour	38.8 (26)	61.2 (41)	
Attitude of service provider			
Good	34.9 (91)	65.1 (170)	0.036*
Bad	50 (27)	50 (27)	

Source: field data – 2016 **** p<0.05***

Table 5 shows the chi square test of association between the demographic and socio-economic factors and the quality of antenatal care. There was an association between a pregnant woman's age and the quality of ANC they received during their last ANC visit at 95% CI, (P<0.001). The other factors associated with quality antenatal care were marital status (p=0.026), number of children a woman has (p=0.013), household level of income (p=0.009), living with partner (P=0.001), ANC attendant (P<0.001), school level attained by the pregnant woman (P=0.012) and the perceived attitude of the service provider (P=0.036). The other demographic and socio-economic factors listed in the table were not statistically significant.

Bivariate logistic regression analysis

Table 6 shows the predictor variables to quality ANC received by pregnant women during their last ANC visit. Predictor variables included all demographic, social and economic variables.

Table 6: Predictors of high quality ANC received by pregnant women

Characteristics/factors	Study sample (%)	Proportional Odds Ratio (POR) (95% CI)	P-value
Age			
Below 20	18.3	1.0	
20-24	30.8	0.57 (0.32-1.01)	0.058
25-29	20.5	0.38 (0.19-0.75)	0.006*
30-34	19.7	0.38 (0.19-0.74)	0.004*
35-39	7.2	0.27 (0.11-0.68)	0.006*
40+	3.5	3.03 (0.62-14.9)	0.079
Marital status			
Not married	31.9	1.0	
Married	68.1	0.52 (0.34-0.80)	0.003*
Area of residence			
High density	68.9	1.0	
Medium density	25.2	1.37 (0.84-2.22)	0.205
Low density	5.9	0.59 (0.20-1.76)	0.347
Employment Status			
Formal	40.8	1.0	
Informal	59.2	1.12 (0.50-2.47)	0.781
Ever attended school			
No	15.3	1.0	
Yes	84.7	0.62 (0.35-1.10)	0.103
Highest level of school attended			
Primary	51.5	1.0	
Secondary	12.3	1.42 (0.74-2.74)	0.292
tertiary	36.4	1.97 (1.26-3.10)	0.003*
ANC attendant			
Doctor	6.8	1.0	
Midwife	21.9	0.20 (0.06-0.65)	0.006*
Nurse	71.3	0.12 (0.41-0.37)	<0.001*
Currently living with partner			
No	35.2	1.0	
Yes	64.8	0.47 (0.30-0.74)	0.001*
Number of children			
0 (none)	42	1.0	
1	22.8	0.56 (0.32-0.96)	0.034*
2	11.8	0.37 (0.18-0.75)	0.006*
3+	23.4	0.56 (0.34-0.96)	0.036*
Family household income			
Less than K500	10.2	1.0	
K500-K900	15.6	3.06 (1.13-8.28)	0.028*
K1000-K1900	27.3	2.19 (0.86-5.59)	0.099
K2000-K3000	27.3	3.95 (1.56-9.97)	0.004*
Above K3000	19.8	4.35 (1.66-11.39)	0.003*

Source: field data – 2016 **** p<0.05***

The findings in table 6 shows that women in the age groups ranging from 20-39 years had lower odds of receiving high quality ANC compared to women aged below 20 years. However, women aged 40 years and above were 3 times more likely to receive high quality ANC compared to the women aged below 20 years (OR = 3.03; 95% CI:0.62 to 14.9).

Married women were 0.52 times less likely to receive high quality ANC compared to women who were not married (OR = 0.52; 95% CI: 0.34 to 0.80). With regards to education, women with secondary school education were two times more likely to receive high quality ANC than women with primary education (OR = 1.97; 95% CI: 1.26 to 3.10).

The specialty of the health personnel was found to be one of the predictors of high quality of ANC received by pregnant women. When compared to women who received ANC services from a doctor, those who received services from a midwife and nurse were less likely to receive high quality ANC (OR = 0.20; 95% CI: 0.06 to 0.65) and (OR = 0.12; 95% CI: 0.41 to 0.37) respectively.

Women who were currently living with their partners were less likely to receive high quality ANC compared to those who were not living with their partners (OR = 0.47; 95% CI: 0.30 to 0.74). High parity reduced the odds of a women receiving high quality ANC as women with more than three children were half times less likely to receive high quality ANC than women who were pregnant for the first time (OR = 0.56; 95% CI:0.34 to 0.96).

An increase in household income increased the odds of a women receiving high quality ANC. Women from the richest households were four times likely to receive high quality ANC compared to women from lower earning households (OR = 4.35; 95% CI: 11.66 to 11.39).

5.2 Factors associated with quality of antenatal care

In this study, quality of antenatal care is associated with a number of social, economic and demographic factors. However, in order to assess the contribution of all these factors to the overall variance, it was important at this stage to control for confounding by conducting a multiple logistic regression analysis. Table 7 shows the final multivariate model. A backward investigator led logistic elimination method was used to come up with the final model that best explains the factors associated with quality of ANC. Table 8 (Appendix) shows all the steps performed to come up

with the final model in which education level and ANC medical attendant were the only factors that affected the quality of ANC received by women.

Table 7: Multivariate analysis on factors associated with receiving high quality of antenatal care

Characteristics/factors	Study sample N (%)	Proportional Odds Ratio (POR) (95% CI)	P-value
Highest level of school attended			
Primary	189 (51.5)	1.0	
Secondary	133 (36.4)	1.98 (1.24 – 3.14)	0.004*
More than secondary (tertiary)	45 (12.3)	0.76 (0.35 – 1.65)	0.493
ANC attendant			
Doctor	25 (6.8)	1.0	
Midwife	80 (21.9)	0.17 (0.05 – 0.54)	0.003*
Nurse	261 (71.3)	0.09 (0.03 – 0.31)	<0.001*

Source: field data – 2016 **** p<0.05***

After adjusting for the effect of other factors, women with secondary education had higher odds of receiving high quality ANC than women with primary level of education (OR = 1.93; 95% CI: 1.17 to 3.15). Women who received ANC services from midwives and nurses were less likely to receive high quality ANC compared to those who received ANC from a doctor (OR = 0.18; 95% CI: 0.05 to 0.59) and (OR = 0.13; 95% CI: 0.04 to 0.41) respectively.

CHAPTER SIX: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

6.1 Discussion

Antenatal care services provided

This study examined the quality of antenatal care that pregnant women received during their most recent ANC visit. From the results, we are able to demonstrate that although first ANC attendance is high in Lusaka district, insufficient provision of certain key components of ANC was limiting the quality of ANC women received. Among some ANC components not sufficiently provided was blood and urine testing, only 45% and 35% pregnant women received the mentioned test respectively. It can be widely observed that testing services are insufficient both at country and district level. A national study done in 2012 (Nicholas et al. 2012) found that only 60.8% and 22.6% of women provided blood and urine samples to be tested respectively. Blood testing during pregnancy is done to determine the risk of a fetus having defects such as down syndrome, trisomy and whether the woman is at risk of having a baby with genetic conditions among others risks. On the other hand, urine testing can help diagnose certain diseases such as diabetes and urinary tract infection of which both could cause serious problems not only to the pregnant woman but also the baby (www.health.wa.gov.au).

Quality of antenatal care

Although antenatal care coverage is a success story in Zambia, only 47.1% of pregnant women received the recommended quality of antenatal care in Lusaka. This proportion is too low to achieve the full life saving potential that antenatal care could provide. Similarly, Nicholas (2012) found that only 29% of the women received high quality ANC in 2012 at national level (Nicholas et al. 2012).

Level of education and quality of antenatal care

Women with higher levels of educational attainment are more likely to receive high quality ANC than their counterparts. For instance, the odds of receiving high quality ANC among women with secondary education were two times higher than women with primary education. Similarly, a study done in three African countries (Kenya, Malawi and Nigeria) showed that women's education level

has an effect on the quality of ANC above and beyond its association. Educated women were more knowledgeable about the procedures to expect during ANC, hence more likely to request for such procedures than the low educated women (Banalola, 2014). Another study conducted in south Asia suggested that education brings up new values and attitudes which upsurges the chances of a woman desiring skilled care and empowers them to access such care (Furuta, 2006).

It is however worth mentioning here that there was no association between someone attaining higher education other than secondary level and the quality of antenatal care. A review of other studies (Mayura, 2013; Ikeoluwapo et al. 2013) shows that the higher the educational attainment, the higher the odds of receiving high quality ANC.

A WHO (2003) study on the trends, levels and differentials of ANC established that more educated women were more likely to have four or more ANC visits than the less educated women. This increased the likelihood of receiving quality ANC. Although this was the case, a regional analysis showed that education appeared to have less effect on the use of ANC in sub-Sahara than other regions. The trend analysis was done for the period of 1990-2001, however, different studies done in the sub Saharan countries (Nigeria, Tanzania, Kenya, Malawi and Zambia) after the period of 2008 were able to show that education attainment of a women had an effect on the number of ANC visits a woman had hence increasing the chances of a woman receiving quality ANC. Our study further showed a link between educational attainment of pregnant woman and the quality of ANC they received during their last visit. The odds of receiving high quality ANC were high among women with secondary than primary education. A qualitative study done in Ghana, Kenya and Malawi suggested that level of education plays an important role as more educated women are able to approach health providers on "relatively equal terms, to pose questions and, potentially, to seek care with lesser concern about any possible reprimands" (Pell C 2013, p. 8). Our study further shows that there was no association between having tertiary education and receiving high quality of ANC, besides, the odds of women who attained tertiary education were lower than the odds of women who received primary education. Theoretically, the odds of receiving high quality ANC are supposed to increase as educational attainment increases.

Contrary to our findings, a study done in southwest Nigeria on sociodemographic characteristics that affect pregnant women's perception of quality of ANC found that there was no association between level of education and the quality of ANC. However, increasing parity, employment status

and religion were found to have an influence on the quality of ANC. The study proposed intensive health center-specific key interventions on such women in order for them to receive quality ANC (Oladapo & Osiberu, 2009).

With relatively low literacy and education levels among the female folk in Zambia (68%) (CSO, 2015), quality of ANC is expected to be low. Therefore, there is need to supplement existing educational policies in order to improve female education which is likely to improve the quality of antenatal care.

Service provider and the quality of antenatal care

Zambia is one of the African countries experiencing a crisis where doctor patient ratio is concerned (Emmanuel, 2008). Such a crisis can have serious consequences that may affect the quality of antenatal care. This study established a relation between medical ANC attendant and the quality of antenatal care received by a pregnant woman. Currently, Zambia has a doctor and nurse population ratios stands at 1 to 15,000 and 1 to 1,500 respectively. These ratios are way below the WHO recommended doctor population ratio of 1 doctor to 5,000 and a nurse to population ratio of 700 (Jolly et al., 2013). Besides the shortage of health care providers, women who received ANC services from a midwife and nurse were less likely to receive high quality ANC compared to those that received ANC services from a doctor.

A study done in Tanzania showed a link between the quality of health care and the level of qualification of the medical provider. Private health care service providers were found to be more qualified than government health care providers, and from the results, quality of care was high in private than government health institutions (Gilson et al. 1993).

Similarly, a study done in India showed that nurses provided poor ANC services than doctors. Results obtained showed that most women opted to bypass nurses in favor of much less available doctors. It must be noted that, theoretically, nurses should provide the same quality of services doctors provide particularly basic services like ANC. Although this should be the case, a study done in north and south India suggest that nurses provided poor clinical services which always needed regular follow-ups (Manju et al. 2007).

Another study done in Nepal showed that the odds women accessing ANC services from skilled providers where high compared to those who received services from relatively less skill ANC

providers such as female community volunteers, Auxiliary health workers and village volunteers. This study generally highlighted the importance of skilled providers such as doctors, nurses and midwives in the provision of ANC services (Chandni et al. 2014). Despite emphasis on the need for skilled service providers, our study highlights that even among the skilled ANC providers (doctors, midwives and nurses as the Nepal study suggests), a clear discrepancy in the quality of ANC exists between doctors, midwives and nurses. It is of the researcher's view that the difference noticed in this study could be highly due to qualification differences that exists between doctors, midwives and nurses. The higher the qualification of the service provider the higher the odds of providing high quality ANC (doctors, midwives and nurses respectively).

A close look at the study done in Tanzania by (Boller et al., 2003) shows a clear relation between the quality of ANC and the qualifications of a service provider. Highly trained personnel's provided high quality ANC services, for instance, doctors and medical assistants carried out more investigations than nurses. Generally, there was a difference in the length of consultation time between doctors and nurses. Doctor's consultation time was twice as long as midwives, nurses and auxiliaries. Most qualified service providers spend more time with clients which gives them ample time to perform regular checkups such as urine testing and carrying out other investigations.

6.2 Conclusion

In conclusion, the quality of antenatal care received by pregnant women in Lusaka is generally poor. Despite an interplay of various factors that contribute to high maternal and neonatal mortality, the proportion of women receiving high quality ANC is too low to see the much needed reduction in mortality at district level. However, in the short term, continued efforts at improving the delivery of basic services such as blood and urine testing is required. In the long term, there is need to improve the quality of health care services provided by medical attendants at all levels.

The study further examined the effect of different social, economic and demographic factors that influence quality of ANC. After subjecting the data to all necessary statistical tests, level of education and ANC attendant were found to be the major variables that affect quality of ANC. Women with secondary education had higher odds of receiving high quality ANC than women with primary education. Finally, women who received ANC services from midwives and nurses were less likely to receive high quality ANC compared to those who received ANC services from doctors.

6.3 Strengths and Limitations

The use of exit interviews for data collection as well as checking for correspondence of collected information on ANC cards enabled us to eliminate recall bias from our study. Though primary data collection method is relatively expensive, data presented in this study is of high accuracy and reliability.

The study results are limited to the fact that the sample size obtained only consisted of women from government health facilities. This presents a missed opportunity to compare the quality of ANC between private and government facilities. This assessment only considered the process as well as outcome and overlooked the structure parameters in determining quality of ANC.

The other limitation was that not all ANC components where considered, nonetheless, only six key components provided during ANC where measured in determining the quality of ANC.

6.4 Recommendations

The following are the key steps that need to be put in place in order to ensure uniformity in the quality of antenatal care women should receive. The first step is for the ministry of health to ensure that all medical schools provide the same content and standard of education where ANC services are concerned. Significant differences should not be noticed between health care providers especially where certain services are provided across all medical providers (Doctor, Midwife and Nurse). The second step is to ensure continuous monitoring of ANC processes at facility level. This process will allow the Ministry to channel technical assistance where it is most needed (Boller et al., 2003). The ultimate goal of these key steps is to improve the quality of ANC provided which may translate into a reduction of maternal and neonatal mortality.

MOH should come up with a tool to monitor and evaluate services provided from the end user perspective (patients). This will enable DMO to identify key areas that need capacity development and technical assistance (TA). For instance, if the tool is able to capture the attitude of health workers as reported from the end users, DMO would then prioritize its expertise to ensure that TA in line with changing attitudes of health workers at facility level is provided.

Study findings further suggest that there is need to increase testing services. As it can be seen that blood and urine testing is only done to less than half of the pregnant women. A national assessment

done in 2012 further suggest a similar recommendation (Nicholas et al., 2012), indicating the need for a quick response from MOH.

The research findings show that there is a relationship between education and quality of ANC. As a long term measure, it can be recommended that there is need to develop strategies to help educationally disadvantaged women in order to help them improve the quality of ANC they receive. For instance, developing of certain policies and empowerment programs to ensure creation of demand for quality ANC services by disadvantaged women. Another way of improving quality of ANC is to come up with an ANC checklist that will clearly capture the number of women reporting for ANC and the services provided. This will help health workers and pregnant women to jointly monitor (participatory monitoring) services provided. The checklist will be used to verify if all ANC services are being provided or not. Women will therefore be at liberty to question why certain services are not provided. It is hoped that the joint monitoring will enhance the quality of ANC being provided to pregnant women.

REFERENCES

Adamson PC, Krupp K, Niranjankumar B, Freeman AH, Khan M, Madhivanan P. *Are marginalized women being left behind?* A population-based study of institutional deliveries in Karnataka, India. BMC Public Health. 2012;12:30.

Babalola S, Fatusi A. *Determinants of use of maternal health services in Nigeria-looking beyond individual and household factors.* BMC Pregnancy Childbirth. 2009;9:43.

Baffour A, Mwini N, Richter S (2015), *Enhancing focused antenatal care in Ghana: An exploration into perceptions of practicing midwives.* International Journal of Africa Nursing Sciences 2 (2015) 59–64

Bbaale E (2011): *Factors influencing the utilisation of antenatal care content in Uganda*. Australasian Medical Journal2011,4(9):516–526.

Boller C, Wyss K, Mtasiwa D, and Tanner M, (2003), *Quality and Comparison of antenatal Care in Public and Private Providers in the United Republic of Tanzania.* Bulletin of the World Health Organization, 81 (2) 116- 122

Centenary Gloria (2010), *Factors influencing the utilization of late antenatal care services in rural areas:* a case study of kisoro district. Uganda.

Central statistical office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International (2015). *Zambia Demographic and Health survey 2013-14*. Rockville, Maryland, USA: Central statistics office, Ministry of health, and ICF International.

Chandni Joshi, Siranda Torvaldsen, Ray Hodgson and Andrew Hayen (2014). *Factors associated with the use and quality of antenatal care in Nepal:* a population-based study using the demographic and health survey data

Christoph B, Kaspar W, Deo M, & Marcel T (2003). *Quality and comparison of antenatal care in public and private providers in the United Republic of Tanzania.* Bulletin of the World Health Organization 2003; 81:116-122

Degley, Joseph Kwami (2012). *Assessing the quality of antenatal care services in the Nkwanta south district.* Volta region, Ghana.

Diamond S, May S and Dominic M (2016). *Clinical and perceived quality of care for maternal, neonatal and antenatal care in Kenya and Namibia: the service provision assessment*. DOI 10.1186/s12978-016-0208-y

Donabedian A (1966): *Evaluating the Quality of Medical Care.* Milbank Mem Fund Q 1966, 44(3):166–206.

Fagbamigbe A and Idemudia E (2015). *Assessment of quality of antenatal care services in Nigeria: evidence from a population-based survey*. DOI 10.1186/s12978-015-0081-0

Furuta M, Salway S: *Women's position within the household as determinant of maternal health care use in Nepal.* Int Fam Plan Perspect 2006,32(1):17–27

Gilson L, Kitange H, Teuscher T. *Assessment of process quality in Tanzanian primary care*, Health Policy1993;26:119-3

Government of western Australia; *Prenatal screening and diagnostic tests* (http://www.health.wa.gov.au/docreg/Education/Prevention/Genetics/HP3131_prenatal.pdf Accessed March 2017)

Greenaway ES, Leon J, Baker DP. *Under -standing the association between maternal education and use of health services in Ghana: exploring the role of health knowledge.* J Biosoc Sci. 2012;44(6):733–47.

Ikeoluwapo O. Ajayi, Damilola C. Osakinle, Eunice O. Osakinle (2013), *Quality assessment of the practice of focused antenatal care (FANC) in rural and urban primary health centres in Ekiti State.* Open Journal of Obstetrics and Gynecology. Published Online May 2013 (http://www.scirp.org/journal/ojog/)

Jolly K, Grayson K, Jere M, Mutinta M, Richard B (2013), *Understanding the Labour Market of Human Resources for Health in Zambia.* (http://www.who.int/hrh/tools/Zambia_final.pdf Accessed March 2017)

Kiplagat Micah Kipronoh (2005). *Factors influencing the quality of antenatal care in public maternal and child health facilities in Nairobi province,* Kenya. Kenyata University. Kenya

Leonard KL, et al. 2002. *Bypassing health centers in Tanzania: revealed preferences for observable and unobservable quality.* Department of Economics, Discussion Paper Series. New York: Columbia University.

Manju Rani, Sekhar Bonu And Steve Harvey (2007); *Differentials in the quality of antenatal care in India*. 10.1093/intqhc/mzm052

Mayura Kandasamy (2013), *Do women's sociodemographic characteristics or type of prenatal care provider influence quality of prenatal care?* McMaster University. Hamilton, Ontario, Canada.

Ministry of Health 2011, *Introduction to Focused Antenatal care.* Maternal and neonatal Health. Lusaka.

Moses Tetui et al. (2012). *Quality of Antenatal care services in eastern Uganda: implications for interventions.* The Pan African Medical Journal.

Nicholas Kyei, Chansa C, Gabrysch S (2012), *Quality of antenatal care in Zambia: a national assessment*. BMC Pregnancy and Childbirth. 2012;12:151. doi:10.1186/1471-2393-12-151.

Nyamtema AS, Jong AB, Urassa DP, Hagen JP, van Roosmalen J (2012). *The quality of antenatal care in rural Tanzania: what is behind the number of visits? BMC Pregnancy and Childbirth.* 2012;12:70. doi:10.1186/1471-2393-12-70.

Oladapo, O. & Osiberu, M. (2008). *Do sociodemographic characteristics of pregnant women determine their perception of antenatal care quality?* Maternal Child Health Journal, 13, 505-511. doi: 10.1007/s10995-008-0389-2

Pell C, Meñaca A, Were F, Afrah NA, Chatio S, Manda-Taylor L, et al. (2013*) Factors Affecting Antenatal Care Attendance:* Results from Qualitative Studies in Ghana, Kenya and Malawi. PLoS ONE 8(1): e53747. https://doi.org/10.1371/journal.pone.0053747

Rene L, Clara M, Zulu I (2017). *Learning from international experience on approaches to community power, participation and decision-making in health. Case Study: Lusaka district health office,Zambia*.http://41.77.4.165:6510/www.tarsc.org/publications/documents/Short%20Case%20study%20rep%20Lusaka%20Mar2017.pdf

Stella Balalola (2014), *women's education level, antenatal visits and quality of skilled antenatal care: a case of three African countries. Journal of Health Care for the Poor and Underserved,* Volume 25, Number1, February 2014, pp. 161-179 (Article). The Johns Hopkins university press.

Sword, W., Heaman, M., Brooks, S., Tough, S., Janssen, P., Young, D., Kingston, D.,Helewa, M., Akhtar-Danesh, N., & Hutton, E. (2012). *Women's and care providers' perspectives of quality prenatal care: a qualitative descriptive study.* BMC Pregnancy and Childbirth, 12, 29-47. doi:10.1186/1471-2393-12-29

Tadese E, Mirkuzie W and Yibeltal K (2013). *Quality of antenatal care services at public health facilities of Bahir-Dar special zone, Northwest Ethiopia*. Ejiguet al. BMC Health Services Research2013,13:443

Toan K TranEmail author, Karin Gottvall, Hinh D Nguyen, Henry Ascher and Max Petzold (2012). *Quality of antenatal care services and completion of four or more antenatal care visits in Ethiopia: a finding based on a demographic and health survey:* https://doi.org/10.1186/1472-6963-12-40

United Nations Children's Emergency Fund (2014). *Monitoring the Situation of Children and Women.* [accessed: 8 February 2016]; Available from: http://data.unicef.org/maternal-health/antenatal-care.html#sthash.t26M189I.dpuf

Victora, C., Matijasevich, A., Silveira, M., Santos, I., Barros, A., & Barros, F. (2010). *Socio-economic and ethnic group inequities in antenatal care quality in the public and private sector in Brazil.* Health Policy and Planning, 25(4), 253-261.

Wheatley, R., Kelley, M., Peacock, N., & Delgado, J. (2008). *Women's narratives in quality in prenatal care: a multicultural perspective.* Journal of Qualitative Health Research, 18(11), 1586-1598. doi: 10.1177/1049732308324986

WHO, (2003). *Antenatal care in developing countries: Promises, achievements and missed opportunities.* An analysis of trends, levels and differentials, 1990-2001

World health organization (2015). *Global Health Observatory (GHO) data. Maternal mortality*. Geneva, Switzerland.

World health organization (2015). *Maternal mortality: Fact sheet N°348:* Updated November 2015.[accessed:8February2016];Availablefrom:http://www.who.int/mediacentre/factsheets/fs348/en

World Health Organization: *The world health report 2005 make every mother and child count*. [http://www.who.int/whr/2005/en/]

Yenita A ,and Shigeko H (2011). *Factors influencing the use of antenatal care in rural West Sumatra, Indonesia.* https://doi.org/10.1186/1471-2393-12-9

APPENDIX

Appendix 1: Model 1 to 7: Quality of ANC

Table 8: Predictors of quality ANC received by pregnant women

Characteristics/factors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
ANC quality							
School level							
Secondary	1.863*	1.846*	1.777	1.592	1.707*	1.934**	1.976
	0.047	0.049	0.051	0.096	0.049	0.008	0.004
More than secondary	1.211	1.198	1.024	0.944	0.888	0.663	0.763
	0.738	0.752	0.962	0.905	0.794	0.331	0.493
ANC attendant							
Midwife	0.318	0.313	0.323	0.319	0.220*	0.183**	0.169
	0.086	0.08	0.078	0.073	0.014	0.005	0.003
Nurse	0.265*	0.266	0.234*	0.237*	0.165**	0.126***	0.097
	0.05	0.051	0.026	0.026	0.004	<0.001	<0.001
Currently living with partner							
Yes	0.646	0.695	0.589	0.617	0.568	0.592	
	0.36	0.329	0.118	0.126	0.051	0.057	
Family household income							
K500-K900	4.066*	4.030*	3.816*	3.498*	3.338*		
	0.022	0.022	0.026	0.036	0.036		
K1000-K1900	2.395	2.386	2.449	2.435	2.245		
	0.137	0.138	0.124	0.124	0.145		
K2000-K3000	2.996	2.987	3.465*	3.731*	3.233*		
	0.068	0.068	0.035	0.024	0.037		
Above K3000	2.473	2.454	2.592	2.733	2.54		
	0.163	0.166	0.129	0.107	0.118		
Age							
20-24	0.838	0.84	0.926	0.868			
	0.679	0.683	0.856	0.704			
25-29	0.624	0.629	0.768	0.655			
	0.366	0.373	0.604	0.315			
30-34	0.496	0.504	0.634	0.69			
	0.228	0.236	0.417	0.373			
35-39	0.356	0.36	0.413	0.425			
	0.146	0.149	0.186	0.125			

40+	1.894	1.903	2.31	2.874		
	0.533	0.53	0.408	0.241		
Number of children						
1	0.814	0.815	0.876			
	0.62	0.62	0.738			
2	0.633	0.63	0.734			
	0.396	0.391	0.543			
3+	1.405	1.393	1.305			
	0.536	0.545	0.618			
Perception on medical attendant communication skills						
Good	0.807	0.785				
	0.676	0.628				
Marital status						
Married	1.112					
	0.806					
N	**296**	**296**	**312**	**317**	**320**	**343**

Exponentiated coefficients; p-values in parentheses

="* p<0.05 ** p<0.01 *** p<0.001"

Appendix 2: Questionnaire

Date of Interview: Day ☐☐ Month ☐☐ Year ☐☐☐☐ Questionaire Number ☐☐☐

Name of Interviewer: _____ Code ☐☐

Name of Health Facility: _____ ☐☐

Name of Community: _____ ☐☐

Instructions:
1. **This Research is for women attending atenatal care.**
2. **Complete all the sections in this questionaire**
3. **Ask the respondents the questions in the left column. Do not read anything in bold type aloud.**
4. **Insert responses in the right-hand column according to the instructions next to each question.**

QUE	QUESTIONS AND CATEGORIES	CATEGORIES AND CODES		GO TO QUES.
	SECTION 1: INDIVIDUAL CHARACTERISTICS			
	To the respondent: Now I am going to ask you some general questions about yourself.			
1	How old are you? **[IF ANSWER IS DON'T KNOW, ENTER 99.]**	**Years**	☐☐	
2	How many pregnancies have you had, including this pregnancy?	**Pregnancies**	☐☐	
3 3a	How many children do you have? How many children have died?	**Children living** **Children died**	☐☐ ☐☐	
4	Have you ever attended school?	**Yes** **No**	1 2	
5	How many years of schooling have you completed? **[IF ANSWER IS DON'T KNOW, ENTER 99.]**	**Years**	☐☐	
6	What is the highest level of school you have completed? **[RECORD ONLY ONE ANSWER.]**	**No schooling** **Some primary** **Completed primary** **Some secondary** **Completed secondary** **More than secondary** **Don't know**	1 2 3 4 5 6 9	
7	What is you marital status	**Single (never Married)** **Married** **Widowed** **Divorced** **Separated**	1 2 3 4 5	
8	What is your area of residence?	**Low density** **Medium density** **High Density**	1 2 3	
9	Are you currently staying with you partner?	**Yes** **No**	1 2	
10	Aside from your own housework, are you currently employed?	**Yes** **No**	1 2	
11	What is your Employment Status?	**Self-employed** **Government Employee** **Private organisation Employee**	1 2	
12	What is your best estimate of your monthly income?	**less than K500** **K500-K900** **K1000-K1900** **K2000-K3000** **Above K3000**	1 2 3 4 5	
13	What is the best estimate of your family monthly income?	**less than K500** **K500-K900**	1 2	

QUE	QUESTIONS AND CATEGORIES	CATEGORIES AND CODES		GO TO QUES.
		K1000-K1900	3	
		K2000-K3000	4	
		Above K3000	5	

SECTION 2. ANTENATAL CARE CHECKLIST

Tell the respondent: I am going to ask you some questions about the services they just received during antenatal care.

14 As part of your antenatal care during this pregnancy, were any of the following done in this last ANC attendance?

	1st Visit (<16 weeks)		2nd Visit (20-24 weeks)		3rd Visit (28-32 weeks)		4th Visit (36 weeks)	
	Yes	No	Yes	No	Yes	No	Yes	No
Was your blood pressure measured?	1	2	1	2	1	2	1	2
Were you weighed?	1	2	1	2	1	2	1	2
Did you give a urine sample?	1	2	1	2	1	2	1	2
Did you give a blood sample?	1	2	1	2	1	2	1	2
Abdominal examination?	1	2	1	2	1	2	1	2
Information on pregnancy related complications?	1	2	1	2	1	2	1	2
Fundal Height	1	2	1	2	1	2	1	2
Were you given an injection on the arm to prevent the baby from getting tetanus?	1	2	1	2	1	2	1	2
Danger signs in pregnancy	1	2	1	2	1	2	1	2
Shedule for return visit	1	2	1	2	1	2	1	2
Plans of delivery (emergency preparedness, place of delivery, trasportation and finacial arragments	1	2	1	2	1	2	1	2
Iron	1	2	1	2	1	2	1	2
Floric acide	1	2	1	2	1	2	1	2

SECTION 3. WOMAN'S KNOWLEDGE AND ATTITUDES TOWARDS ANC

Tell the respondent: I am going to ask you some questions about antenatal care. Antenatal care is medical care that a woman receives while pregnant. It is sometimes referred to as "ANC."

15 At what stage in a pregnancy should a woman start going for antenatal care?

[RECORD ONLY ONE ANSWER.]

- As soon as she knows she is pregnant 1
- Within the first three months (first trimester) 2
- Within the second three months (second trimester) 3
- Within the last three months of pregnancy (third trimester) 4
- Other _____ (SPECIFY) 5
- Don't know 9

16 How many times should a woman go for antenatal care?

[IF ANSWER IS DON'T KNOW, ENTER 99.]

Number of times..... ☐☐

17 Who attendent to you in your last ANC visit you recently had?

- Medical Doctor 1
- Midwife 2
- Nursing 3
- other specify.....

18 In your opinion, in last ANC visit you just had, do you think health health providers are communicating better and you uaerstand what was being communicated?

- Yes 1
- No 2
- Donk know 3

19 Since the time you become pregnant, have you ever opted not to attend and seek care at a health facility because of negative attitude of health workers at the facility?

- Yes 1
- No 2

20 Did your husband accompany you for any ANC visit?

- Yes 1
- No..... 0

21 How many months pregnant are you or were you when you first come for antenatal care for this pregnancy?

[IF ANSWER IS DON'T KNOW, ENTER 99.]

Months ..... ☐☐

22 How many times did you receive antenatal care during this pregnancy?

[IF ANSWER IS DON'T KNOW, ENTER 99.]

Number of times..... ☐☐

QUE	QUESTIONS AND CATEGORIES	CATEGORIES AND CODES		GO TO QUES.
23	What is the approximate distance between your home and the nearest place where you receive antenatal care?	Kilometres.....	☐☐☐☐	
24	What is the approximate time you take to reach the health facility?	<20 minuts.....	1	
		20-40 minutes.....	2	
		40-60 minutes.....	3	
		> 1Hour.....	4	
25	What is the name of your nearest place where you receive antenatal care?			
	Thank you for your time			