KNOWLEDGE AND SKILLS OF MIDWIVES ON ANTENATAL CARE IN LIVINGSTONE DISTRICT, SOUTHERN PROVINCE, ZAMBIA.

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DECLARATION

This dissertation is original work of Linda Muleya Libingi. It has been done in accordance with the guidelines for the University of Zambia. It has not been submitted elsewhere for a degree at this or another university

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I, **Dr. Catherine M Ngoma** having supervised and read this dissertation is satisfied that this is the original work of the author under whose name it is being presented.

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CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of Linda Muleya Libingi in partial fulfillment of the requirements for the award of the degree of Master of Science in Midwifery Women's and Child Health.

Examiners

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ABSTRACT

Livingstone District in Southern Province of Zambia has a high number of maternal deaths. This study was exploring midwives' knowledge and skills on antenatal care (ANC).

A descriptive cross-sectional study comprising 89 respondents conveniently sampled from Livingstone Central Hospital and six (6) urban clinics was conducted. The data was collected using a self-administered questionnaire and clinical structured observational skills checklist and processed and analyzed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics was used to describe data. Chi-square test was used to test associations between the outcome variables (knowledge and skills) and other independent variables (midwives' characteristics; work organization and environment; and job satisfaction). The significant level was set at 0.05 with confidence interval of 95%.

Knowledge levels on first ANC were high 65 (73%). Surprisingly, 55 (61.8%) did not have the required clinical skills to offer ANC. Additionally, 62 (70%) of the respondents had received supervision within the last 6 months prior to data collection. However, less than half, 37 (41.6%), had undergone in-service training in reproductive health.

Possible enhancements include good and prompt ANC as an important activity that should be rendered to all pregnant mothers. The study revealed that the knowledge levels of midwives were high compared to the skills levels. The implications are that the midwives have more knowledge on ANC than the skills which can make them not to detect early the pregnancy related complications which leads to high numbers of maternal deaths. These include pre-eclampsia and ante partum haemorrhage.

Intensive onsite supportive mentorship and supervision to midwives should be strengthened to improve knowledge and skills so that they offer quality ANC by prompt identification, treatment and referral of any abnormality detected.

Key words: Antenatal, Antenatal care, Midwife, Knowledge, Skills

DEDICATION

This dissertation is dedicated to my dear mother Mrs. Martha Libingi who has always encouraged me to work hard in my postgraduate studies and moral as well as spiritual support she offered. I also dedicate to my dearest beloved daughter Lumba Lwiimbo Chiboola for her moral support and prayers. To my late father Mr. Paddy Libingi who educated and taught me to give my best in all that I do in life.

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LIST OF ABBREVIATIONS

ACCA	:	Association of Chartered Certified Accountants
ANC	:	Antenatal care
CCT	:	Controlled Clinical Trial
CMWs	:	Community Midwives
CPD	:	Continued Professional Development
EmONC	:	Emergency Obstetric and Neonatal Care
FANC	:	Focused Antenatal
FGDs	:	Focus Group Discussions
FIGO	:	Federation of Obstetrics and Gynaecology
GBAC	:	Group based Antenatal Care
GNC	:	General Nursing Council of Zambia
GPC	:	Group Prenatal Care
HB	:	Haemoglobin
HIV	:	Human Immune Deficiency Virus
ICM	:	International Confederation of Midwives
IPC	:	Infection Prevention and Control
IPTp	:	Intermittent Preventive Treatment for malaria during Pregnancy
MDGs	:	Millennium Developmental Goals
MgSO4	:	Magnesium Sulphate
MOH	:	Ministry of Health
OSCE	:	Objective Structured Clinical Examination

PMTCT	:	Preventing Mother to Child Transmission of HIV
PNC	:	Pakistan Nursing Council
RPR	:	Rapid Plasma Reaction
SBA	:	Skilled Birth Attendant
SC	:	Standard Individual Care
SDGs	:	Sustainable Developmental Goals
SMI	:	Safe Motherhood Initiative
UNZABREC	:	University of Zambia Biomedical Research Ethics Committee
WHO	:	World Health Organisation
ZDHS	:	Zambia Demographic and Health Survey

CHAPTER ONE

INTRODUCTION

1.1 Background

Antenatal care (ANC) refers to systematic assessment and anticipatory guidance of a pregnant woman (Noval & Broom, 2014). Livingstone District in Southern Province of Zambia has a high number of maternal deaths due to factors which could be related to pregnancy complications. These could be attributed to knowledge and skills rendered to pregnant women during the antenatal period by the attending midwives.

Some of the researchers' findings on antenatal care services offered globally, regionally and locally found different perceptions. Sword et al. (2014) in a study done in Canada revealed that the women and midwives expressed a high level of satisfaction with their Group Prenatal Care (GPC) experience. In Tanzania, the findings from Mwasha et al. (2013) highlighted that the respondents with sufficient level of competency to practice was 52.9%, out of the 52.9%, a few (9.4%) were highly competent, whereas, 47.1% respondents scored low in both knowledge, and skills.

The maternal death reviews showed that most pregnant women admitted at the hospital in the obstetrics department had birth preparedness cards which were either blank or partially filled in. The birth preparedness card is important because pregnant women ought to discuss and review this plan with a skilled attendant at every ANC assessment and one month before the expected date of birth. A birth and emergency preparedness plan includes identification of the following elements: the desired place of birth; the preferred birth attendant; the location of the closest appropriate care facility; funds for birth-related and emergency expenses; a birth companion; support in looking after the home and children while the woman is away; transport to a health facility for the birth; transport in the case. Therefore, to prevent maternal deaths adequate first ANC visit is very vital to detect any deviations from normal (Livingstone Central Hospital Maternal Review data, 2009 to 2015)

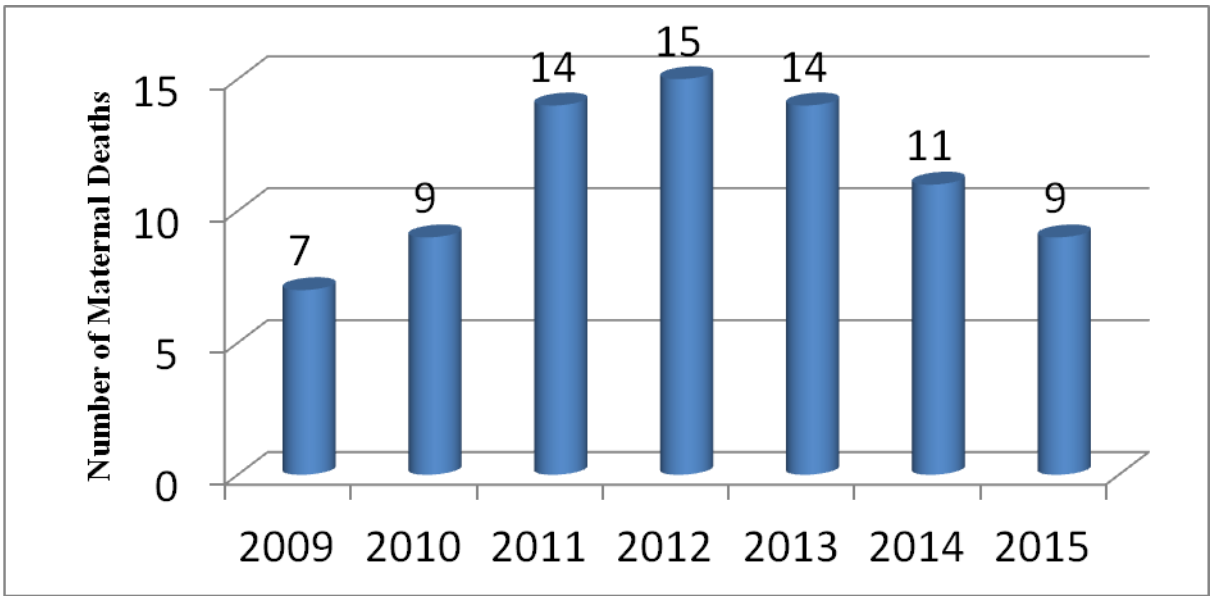
The general objective of this study, therefore is, to determine knowledge and skills among midwives in Livingstone District**.** This will inform the relevant authorities so that the midwives competencies are improved.

1.2 Statement of the Problem

A competent midwife can impact continuity of use of ANC services by pregnant women and pregnancy outcome. However, this is not the case in Livingstone. The maternal death reviews show that the clients received substandard care that which could be attributed to inadequate knowledge and skills by the midwives (Livingstone Central Hospital Maternal Review Data, 2009 to 2015). There are other health care providers that offer care to pregnant women but most of the antenatal care is provided by midwives.

Moreover, a significant proportion of women in Livingstone do not attend ANC clinics and the majority of those who seek routine care often do so only in late pregnancy and/or on a few occasions **(Livingstone District Health Management Information System, 2015).** Furthermore, the midwives' poor performance could cause pregnant women to shunning the antenatal care services hence increased number of maternal deaths. In the past years from 2009 to 2015 there have been an increasing number of maternal deaths at Livingstone Central Hospital indicated in the Figure 1.1. There was an increasing trend in maternal deaths between 2009 to 2015. It further shows a decreasing trend in maternal deaths between 2014 and 2015. Despite the decreasing trend in maternal deaths between 2014 and 2015, the District Health Office feels very concerned as no woman should die while giving birth.

Figure 1.1 Trend in Maternal Deaths.



Livingstone Central Hospital Maternal Review data, (2009 to 2015)

The figure above shows the trends of maternal deaths with the highest figure being 15 in 2012 and the lowest being 7 in 2009 respectively. It has been estimated that 25 percent of maternal deaths occur during pregnancy, with variability between countries depending on the prevalence of unsafe abortion, violence, and disease in the area. This evidenced by the high numbers of maternal deaths at Livingstone central Hospital that occur both during pregnancy and labour and delivery. Most of the maternal deaths reviewed were referred from Livingstone and Kazungula districts respectively. The maternal death reviews were done and the findings were that the pregnant women were receiving antenatal care late which contributed to the delay in detecting and managing some complications

(**Livingstone Central Hospital Maternal Review data, 2009 to 2015)**

Some of the pregnant women's antenatal cards had no record of antenatal care offered and worse still others just attended antenatal care either once or twice; other cards had inconsistent information on the services offered such as measurements of blood pressure and examination of urine. Some activities done during antenatal care services were missing such as blood group, body weight, results for haemoglobin levels, syphilis and parity evidenced by blank spaces on the card. In addition, the maternal death review indicated that history taking and physical examination were inadequate on first ANC contact. This could have led to missing the diagnosis, resulting in wrong management and delay in instituting appropriate management. Some of the interventions instituted or events were not documented from the referring facilities and sub-standard care was provided at the referring facilities, coupled with late referral (**Livingstone Central Hospital Maternal Review data, 2009 to 2015)**

The maternal death reviews showed that most pregnant women admitted at the hospital in the obstetrics department had birth preparedness cards which were either blank or partially filled in. The birth preparedness card is important because pregnant women ought to discuss and review this plan with a skilled attendant at every ANC assessment and one month before the expected date of birth. A birth and emergency preparedness plan includes identification of the following elements: the desired place of birth; the preferred birth attendant; the location of the closest appropriate care facility; funds for birth-related and emergency expenses; a birth companion; support in looking after the home and children while the woman is away; transport to a health facility for the birth; transport in the case. Therefore, to prevent maternal deaths adequate first ANC visit is very vital to detect any deviations from normal **(Livingstone Central Hospital Maternal Review data, 2009 to 2015)**

The identified causes of the maternal deaths at Livingstone Central Hospital recorded were hypertensive disorders (pre-eclampsia and eclampsia); pregnancy related complications and ante partum haemorrhage. Therefore, if investigations such as haemoglobin estimation, urinalysis, HIV testing, blood pressure, body weight and ultrasound are done, such conditions could have been prevented or management accordingly **(Livingstone Central Hospital Maternal Review data, 2009 to 2015)**

It is therefore imperative that the researcher conducts this study in order to determine knowledge and skills among midwives regarding first antenatal care services. The findings will help the relevant authorities to design interventions to update the knowledge and skills of midwives.

1.3 Aim of the Study

The aim of the study is to explore midwives' knowledge and skills on first antenatal care in order to provide quality care to pregnant women.

1.4 Study Objectives

1. To evaluate midwives' knowledge levels on first antenatal care.
2. To determine midwives' skills on first antenatal care provision.
3. To ascertain whether midwives are supervised when they are providing antenatal care to pregnant women.

1.5 Research Questions

Are the knowledge and skills of midwives on first ANC adequate to enable midwives to provide quality care to pregnant women?

1.6 Significance of the Study

The findings of the study will identify knowledge and skills gaps among the midwives in promoting a healthy pregnancy experience and preventing pregnancy related complications thereby reduce on the numbers of maternal deaths in Livingstone District.

The information will also be used to make recommendations that will enable the relevant key players in management of ANC clients in the Livingstone district to take action that will help

improve nursing midwifery practice, enhancing the competent and proficient nurse midwives, thus the Livingstone District health care system may be improved. The information will also be used by Ministry of Health to plan trainings for the identified gaps in knowledge and skills levels among midwives. Furthermore, the study might generate areas of researchable topics.

The study will improve the knowledge and skills among midwives hence contribute to the reduction of high maternal deaths in Livingstone District. The factors that contribute to the disparities in the ANC program will be corrected.

1.7 Scope of the Study

1. There is scarce literature on the research topic done locally and hence the researcher has used literature from researches done in other places which are related to the local situation.
2. The study was conducted in Livingstone district, this limited generation of findings to other settings.

1.8 Operational Definitions

Antenatal care is an offer of assistance given to pregnant women from the time she discovers the pregnancy until to the delivery of the baby.

Midwife a qualified health care professional in midwifery- a practitioner in his/her own right who offers assistance to a woman expecting a baby.

Pregnant woman a person who carries an unborn baby in the womb.

Clinical observation is seeing a midwife provide care to the pregnant woman within a given healthcare setting such as antenatal clinic or antenatal ward.

Knowledge is the ability to use the specific concerned matter by an individual

Skill is the ability to carry out a task which can be easily assessed which has been taught or through working for a specified period of time.

Good quality ANC is defined as having attended at least the recommended four ANC visits with a skilled provider and received at least eight (8) antenatal interventions.

Moderate quality ANC is defined as required four (4) visits with a skilled provider and five (5) to seven (7) antenatal interventions.

1.11 Variables

1.11.1 Dependent Variables

Knowledge and skills

1.11.2 Independent Variables

Midwife Characteristics

a) Professional Qualifications – Advanced Nurse Practitioner, Registered Midwife, Enrolled Midwife, Certified Midwife

b) Duration working in the ANC

Work Organization and Environment (Tools and Equipment)

a) Adequacy of ANC space

b) Facility – that offers ANC (health center or hospital)

c) Availability of necessary equipment, instruments and supplies

Job Satisfaction

a) Standards for performance have been set (guidelines, written materials and protocols)

b) Supervision

c) In- service training

Table 1: 1 Variables, Indicators and Cut Off Points

Variable	Indicator	Cut off point	Question number
Dependent Variable			
Knowledge	High	Score above 75% and below 75% will be considered high and low respectively.	8 to 29 (Section B)
	Low		
Skills	Skillful	Score above 75% and below 75% will be considered skillful and not skillful respectively.	1 to 36 (Section D)
	Not skill full		
Independent Variable			
Midwife Characteristics			
Professional Qualification	Advanced Nurse Practitioner	The higher the qualification the higher the knowledge and skills acquired**.**	3 (Section B)
	Bachelor of Science in Nursing		
	Registered Midwife,		
	Enrolled Midwife,		
	Certified Midwife		
Years of working in the ANC clinic	• Less than one (1) year • More than one (1) • year but less than two (2) years • Two (2) years to less than three • (3) years • More than three (3) years. • **Three (3) years**	The number of years of working in the ANC clinic will indicate experience levels	6 (Section B)

Work organization and environment (tools and equipment)			
Facility	Hospital Health Center		4 (Section B)
Adequacy of ANC space	Adequate Inadequate	Scores above 75% will indicate adequate ANC space whilst below 75% will be considered inadequate ANC space.	27 (Section C)
Availability of necessary equipment, instruments and supplies	Adequate Inadequate	Score above 75% will indicate adequate availability of necessary equipment, instruments and supplies whilst below 75% will be considered inadequate availability of necessary equipment, instruments and supplies.	37 to 53 (Section E and F)
Job Satisfaction			
Standards for performance have been set (guidelines, written materials and protocols)	Available Not available	Score above 75% will indicate availability of standards for performance and below 75% will be considered non-availability of standards for performance.	36 (Section D)
Supervision	Clinical Administration	Scores above 75% if has received clinical three (3) or more or two (2) on knowledge and skills on antenatal and below 75% if has received administration.	22 to 23 (Section C)
In service training	Adequate Not adequate	Scores above 75% if attended three (3) or more or two (2) and scores below 75% - if attended one (1)	24 to 26 (Section C)

The next chapter will review the literature on knowledge and skills of midwives on first antenatal care.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter two discusses the literature on Midwives knowledge and skills on antenatal care. The literature review provides the researcher with a background for understanding current knowledge on midwives' knowledge and skills on antenatal care and illuminates the significance of the current study (Polit and Beck 2014). The sources of literature review included electronic data bases such as Pub med, Medline and Google scholar and print sources such as Journals, textbooks etc. The chapter on literature will review information on both the study variables.

2.2 Knowledge on Antenatal Care

Borgren (2010) conducted a baseline study in Bangaladesh aimed at assessing the knowledge of the nurse-midwives providing midwifery services in twelve different health facilities. This was conducted at twelve different health facilities in Bangladesh, using a questionnaire adapted from John Hopkins University (JHPIEGO), Maternal Health Programs, and Guidelines for Assessment of skilled providers and modified into the context of Bangladesh. The survey recruited 38 respondents and data was compiled and analysed manually. A large proportion of participants (79%) had correct knowledge about the health promotion information such as nutrition, danger signs, hygiene, rest and exercise during pregnancy, to be conveyed to pregnant mothers. About 63% of the respondents could mention correctly what tests are required to be carried out to pregnant women during ANC visits. However, the survey highlighted a vast gap in their knowledge of basic midwifery skills. And majority of them had a significantly low score of knowledge related to antenatal care, normal labour, and management of complications, childbirth and immediate new born care as well as in postpartum care. Furthermore, researcher discovered that the midwifery knowledge of the respondents did not fulfil the International standards based on International Confederation of Midwives (ICM) competencies. However, not only further training was needed, they needed to be posted in a maternity unit to maintain their skills so therefore, creations of separate

A study conducted in Sudan by Elkhalif and Kuppuswamy (2014) assessed midwifery knowledge with special emphasis on antenatal care. This was an observational, descriptive, hospital - based study conducted on midwives working at Omdurman Maternity Hospital,

Sudan. The study population consisted of 56 midwives, which was the total population of midwives working at the hospital during the period of the study. Standardized, administered pre-tested semi structured questionnaire was used for data collection. The study revealed that, the majority of the midwives were between 40 - 49 years. Most of them had studied up to the high school level and had undergone a 2-year midwifery training period. A good number of them had also worked as midwives for more than 15 years. The study also showed that, the midwives theoretical knowledge on danger signs of pregnancy, nutrition and diseases that can be transmitted by contaminated delivery instruments was poor. Advices given to mothers by the midwives were found to be of good quality in reference to several important issues during and after pregnancy. A clear need for more intensive training for the midwives with emphasis on antenatal care and strengthening of the training by frequent follow - up evaluation of their performance in - service training courses came up as the main recommendation.

Ayiasi et.al. (2014) a cross-sectional study of 183 health workers (general nurses, midwives and nursing assistants) aimed to determine the level of knowledge related to prenatal and immediate newborn care in Masindi, Uganda. The data collection tool was adapted from Erickson et.al (2009) and pre- tested in a neighboring District of Hoima. The findings were that about 70% of health workers correctly mentioned the expected observations and important health education messages routinely offered during prenatal consultations. However, less than 40% could mention the correct timing for the first ANC visit, the optimal number of visits and basic interventions that are offered during prenatal consultations. However, knowledge regarding prenatal and newborn care was very low. The researcher discovered that health workers who attend to prenatal and postnatal mothers need to be knowledgeable in preventive and curative care for pregnant women and their newborn babies.

In a study carried out by (Ali el.al 2015), aimed at reviewing the midwifery knowledge and skills of Community Midwives (CMWs); introduce them to evidence based midwifery practices and the concept of respectful maternity care; strengthen their financial management skills, enable them to establish and sustain their birth centers independently; and, most importantly, to provide hands - on practice under the mentorship of clinicians. 42 CMWs from ten districts across Sindh participated in the training; they were divided into three cohorts. A theoretical practice gap was noticed by CMWs) indicated by the lower knowledge scores on quality, confidence and in midwifery concepts**.** In the pre-test knowledge assessment, almost all the participants scored below 50%. Following the pretest, the CMWs were taught on how to operate a computer and use the Microsoft office tools and search for

midwifery related resources from the internet. The facilitators provided them with a list of midwifery related websites for future reference. They also helped the CMWs to identify alternatives of personal computers; for example, CMWs with android phones practised searching the web on their own mobile phone. In the post training assessment, the participants' scores range to 80%. From the researcher's point view, the theoretical gap that was noticed in the CMWs was addressed as evidenced by the pretest knowledge assessment and post training assessment with scores below 50% and 70% to 80% respectively. Based on the CMWs' limited knowledge and inappropriate practices regarding Infection Prevention and Control (IPC), and low-cost disinfection and sterilization techniques were discussed at length, and was given high importance as well-being emphasized throughout the training period.

Sword et. al., (2014), used a qualitative descriptive study design to understand women's and care providers' experiences of participating in Group Prenatal Care (GPC) at a midwifery clinic in Ontario, Canada. Nine (9) Women and five (5) midwives were recruited in April, 2013 and a purposeful criterion sampling approach was used. Focus Group Discussions (FGDs) were conducted using semi structured interview guide. In the GPC model 8 to 12 pregnant women of similar gestational age, often with their partners or support persons, meet together with certified nurse midwives, certified midwives, nurse practitioners or physicians. The study revealed that the women and midwives expressed a high level of satisfaction with their GPC experience. This study gained insight into previously unexplored areas of the GPC experience, perceptions of processes that contribute to positive health outcomes, strategies to promote GPC and elements that enhance the feasibility of GPC. The midwives identified other benefits including the reduction in workload, the shift in social dependency and helped reduce their workload. Rather than discussing pregnancy topics with each client, the midwives were able to present the information once in the group setting. The midwives also noted that they were no longer seen as the only "experts" in that the pregnant women began to turn to each other for information and learning, which reduced the need for individual attention by the midwives.

Another study on initial assessment of Community Midwives (CMs) in rural Pakistan was conducted by Wajid, Rashid and Mirs (2010) to assess the community midwifery services in order to provide necessary evidence for future decisions regarding the training, practice and placement of community midwives. The study subjects were 174 midwives from six (6)

Districts in Pakistan. The findings on CMs were that 88% had completed their training in 2008 and seven (7) % in 2009. The knowledge of CMWs was assessed on different aspects of maternal health such as knowledge of danger signs of pregnancy (30 % of midwives spontaneously knew three or more danger signs of pregnancy, three (3) % of midwives did not know any danger signs of pregnancy and no midwife knew all of the danger signs of pregnancy); management of eclampsia (20%) of midwives knew three steps of eclampsia management, six (6%) of midwives did not know any steps of eclampsia management. Furthermore, the findings were that no midwife knew all steps of eclampsia management, prompt recognition and referral of obstetrical complications (27% of midwives knew nine (9) obstetrical complications requiring referral. Interestingly, the researcher found that 15% of midwives knew five (5) obstetrical complications requiring referral and no midwife knew all obstetrical complications requiring referral. This shows the importance of knowledge on maternal health especially antenatal care services especially in the management of pre-eclampsia and obstetrical complications requiring referral are some of the contributing factors of the causes of maternal deaths.

Amosu et. al., (2011), a cross-sectional study of 600 health care providers highlighted on primarily on the knowledge of a comprehensive and integrated system of reproductive health care that offers an integrated set of services and within a four (4) visit model called focused antenatal care. The study consisted of nurses and doctors in five (5) public hospitals the South-West Zone of Nigeria. The study revealed that of the 600 validated semi-structured questionnaires administered, 500 were found usable for data analysis using descriptive statistics. The results showed that 42% of the respondents considered frequent routine as the norm and that women should be classified by risk category, 52% identified ignorance as one of the factors affecting focused antenatal care. Furthermore, 66% accepted that focused antenatal care is not enforced by their healthcare facility as a result of lack of policy concerning the practice of focused antenatal care. Only six (6) % of the respondents disagreed that early detection and prevention of diseases are a major component of focused antenatal care. It was observed that establishing link between the community and the facility in order to increase utilization of the services offered by the new WHO package can enhance its practice. In addition, proper supervision by a skilled, trained healthcare provider will also be effective in enhancing its practice. The package is accepted by the health care workers but not practised. The researcher will utilize this information to assess the midwives on

knowledge levels on focused antenatal care an approach currently used in the health facilities in Zambia.

The Association of Chartered Certified Accountants (ACCA), (2013) at a conference held in Zambia on the utilization of first trimester ANC services highlighted that the government has set itself the ambitious target 'To provide equitable access to cost effective, quality health services as close to the family as possible' (MOH 2011: page 10). The conference gave politicians, health policymakers and senior ACCA members employed in the field of health the opportunity to discuss some of the key health challenges facing Zambia, to debate potential solutions and then to consider the role that ACCA accountants can play in supporting the government to achieve its goal of improving the health of the population. Ministry of Health (MOH) plans to address maternal deaths through: expansion of the focused antenatal care programme and scaling up the Preventing Mother to Child Transmission of HIV (PMTCT) programme. PMTCT can be transmission from mother to baby during pregnancy, birth or breastfeeding. The vast majority of pregnant women who seek antenatal care (98.9%) are counseled and tested for HIV. The Central Statistical Office Zambia reported that although 94% of women sought antenatal care during their pregnancy, only 19% presented in their first trimester, resulting in the omission of key interventions. Fewer than half of the women (46.5%) had a delivery assisted by a nurse, midwife or physician and only 39% sought postnatal care within two (2) days of the birth. The information shows that only 19% of the pregnant women present in their first trimester and as result key interventions are omitted. The researcher used this information to assess the knowledge given to pregnant women concerning the importance of antenatal care services especially within 16 weeks of gestation period. The study does not show the transmission rates of PMTCT. This is important as this will help the midwives to scale up PMTCT programme and now the country has adopted option B+ strategy which offers long term antiretroviral treatment. Therefore, most midwives need to orientated on the new strategy.

In a study on Quality of antenatal care in Zambia: a national assessment by Kyei, Chansa and Garbrysch (2012) revealed that little conceptual or empirical work exists on the measurement of ANC quality at health facilities in low-income countries. Analysis two national datasets with detailed antenatal provider and user information, the 2005 Zambia Health Facility Census and the 2007 Zambia Demographic and Health Survey (ZDHS) were used, to describe the level of ANC service provision at 1,299 antenatal facilities in 2005 and the

quality of ANC received by 4,148 mothers between 2002 and 2007. The findings were that although 94% of mothers reported at least one (1) ANC visit with a skilled health worker and 60% attended at least four (4) visits - the indicators tracked by "Countdown to 2015", only 29% of mothers received good quality ANC, and only 8% of mothers received good quality ANC and attended in the first trimester. Moreover, the quality of ANC remains insufficiently studied. Health worker should be present during ANC and should have the necessary knowledge and skills, and that they actually provide the recommended interventions. So far, hardly any published studies have assessed quality of ANC provided at health facilities. Having received "good quality ANC" was defined as having attended at least the recommended four ANC visits with a skilled provider and received at least eight (8) antenatal interventions, while the definition of "moderate quality ANC" required four (4) visits with a skilled provider and five (5) to seven (7) antenatal interventions. Evaluating the level of ANC provision at health facilities is an efficient way to detect where deficiencies are located in the system and could serve as a monitoring tool to evaluate country progress.

2.2.1 Summary

The studies conducted on knowledge on ANC consisted of general nurses, midwives, community midwives, doctors and nursing assistants as respondents (range between 38 and 600) from different countries both locally and international. Moreover, the study sites were health facilities both urban and rural including hospitals. Focus Group Discussions of 8 to 10 members was used and descriptive studies using both structured questionnaire and semi-structured questionnaires were administered.

The findings from different studies on ANC showed that there was a vast gap in the knowledge of basic midwifery skills and majority of them had a significantly low score of knowledge related to antenatal care, theoretical knowledge on danger signs of pregnancy, nutrition and diseases that can be transmitted by contaminated delivery instruments was poor. Advices given to mothers by the midwives were found to be of good quality in reference to several important issues during and after pregnancy. However, another finding in one of the studies revealed that less than 40% general nurses, midwives and nursing assistants could mention the correct timing for the first ANC visit, the optimal number of visits and basic interventions that are offered during prenatal consultations. The midwives also noted that they were no longer seen as the only "experts" in that the pregnant women began to turn to each other for information and learning, which reduced the need for individual attention by

the midwives. The other information showed that that only 19% of the pregnant women present in their first trimester and as result key interventions are omitted. Descriptive statistics was used to analyze data both manually and electronically.

2.3 Skills on Antenatal Care

Mwasha et al (2013) conducted a study on assessment of clinical competency of Nurse-Midwives: Implications for Maternal and Neonatal Health Care in Tanzania. The purpose of the study was to determine whether the midwifery practice standard guidelines stipulated by Tanzania Nursing and Midwifery Council are utilized in the health facilities and explore the level of clinical competence of nurse-midwives by identifying the existing knowledge and skills gaps. This was an explorative descriptive study involving 55 nurse-midwives recruited by systematic sampling technique. The study was conducted at two public health care facilities in the Ilala district. Data was collected in June, 2010, by test of knowledge of nurse-midwives, through a structured objective examination, and direct observation of participants while, performing procedures using structured skill check list. The data were analysed, expressed in frequencies and percentages. Respondents with sufficient level of competency to practice 52.9%, of the 52.9% a few (9.4%) were highly competent whereas, 47.1% respondents scored low in both knowledge, and skills. Those who performed poorly had experience of less than three (3) years and those who had not attended any retraining course in the past four (4) years. These results underpin the need for improvement on clinical competency of nurse-midwives.

Group based antenatal care - expectations, attitudes and experiences from parents´ and midwives´ perspective was a study done by Andersson (2014) in Sweden. The purpose was to study women's´ expectations of antenatal care and parents' experiences of Group based antenatal care (GBAC) in Sweden and midwives' attitudes and thoughts about GBAC and their work and Standard Individual Care (SC) were also investigated. The Controlled Clinical Trial (CCT) was conducted in 12 clinics in different geographical areas in Sweden between 2008 and 2010. The design of the study consisted of midwives who were randomized to GBAC or SC and women in both groups evaluated the given care. Structured interviews were used to explore 56 midwives' attitudes to GBAC. Descriptive statistics and quantitative content analysis were used. The results revealed that 80% of the midwives were satisfied with their work in antenatal care but had reservations when it came to the lack of time and dissatisfaction with the parent groups. Over half (55.4 %) of the midwives expressed an

interest in starting with GBAC. The midwives who worked in major cities reported the greatest dissatisfaction with their work whilst showing the greatest interest in GBAC. Of the 56 midwives involved, 48 commented on the question of whether they wanted to try GBAC as a working method. The study also revealed that the midwives in antenatal care play two (2) roles: being active in carrying out certain tasks and being a passive recipient as a listener. Part of antenatal care involves monitoring health, and this task has been formulated within the medical sphere. This can contribute to expanded work procedures. Repetition creates routine, which simplifies and increases efficiency; a structured approach that is governed by time. It is asserted that through repetition, this builds on evidence without needing to have grounds for this. One example of such a routine that is based on small amounts of empirical evidence is the symphysis fundus measurements, which measure the growth of the unborn child.

Interestingly, Ali et.al (2015) in training on enhancement of knowledge and skills of CMWs in Sindh, Pakistan showed that the skills score was lower than the knowledge score. The study findings also showed that refresher training of midwives, particularly training quality, influenced the midwives' confidence and practice. That is why through this training, the CMWs were able to review the important midwifery concepts and skills. The skills included ante partum care, ante partum history and examination, prescription and interpretation of laboratory investigations, and care of women with minor pregnancy disorders, and how to operate a computer and use the Microsoft office tools. These skills were done through Objective Structured Clinical Examination (OSCE) with a return demonstration, watched videos, prepared an obstetrical wheel (EDD calculation circle, prescription of investigations and to interpret and discuss care management for the pregnant woman, case studies were used to review the resource material for midwifery care and identification of high risk clients through these case studies, and preparation and safe administration of Injection magnesium sulphate (MgSO4) injection to eclamptic women, using the World Health Organisation protocol. These skills will be used by the researcher to assess the midwives during antenatal care services.

A study conducted by Amosu et. al., (2011) highlights that with the awareness created by the facility through the health professionals to the community, the practice of Focused Antenatal Care (FANC) was encouraged and enhanced. In addition, it means that focused antenatal care can be enhanced by employing a skilled healthcare provider to supervise the activities of the unskilled healthcare providers during antenatal care. It was observed that visits were often

irregular with long waiting time, little feedback to mothers and little or no communication with obstetrical or labour units. This is a component of the traditional antenatal care resulting from lack of knowledge and practice. In Kenya, the frontiers programme found out that inadequate staff training and shortages of equipment and supplies inhibit the full provision of services. According to the frontiers program in Kenya, it was observed that the new model did increase the quality of specific components of care, such as detection of diseases and counselling on family planning use postpartum. The implication is that the health providers were not aware of the components of focused antenatal care.

In the same study conducted by Amosu et. al., (2011), the Researcher observed that the study concentrated on skilled health care providers. This means that the midwives were inclusive as they are mentioned on the list of skilled health workers. WHO Progress Report on Nursing and Midwifery 2013-2015, states that forging strong interdisciplinary health teams to address health and health priorities can be done by enhancing knowledge and expertise of nursing and midwifery researchers. One of the health priorities is maternal, newborn, child and health of which FANC is one of the approaches adopted.

In the study on initial assessment of Community Midwives in rural Pakistan skills levels of the midwives were done by Wajid, Rashid and Mirs (2010) who concluded that assessing anemia were satisfactorily accomplished by Community Midwives (CMWs), whereas performance for the rest of the skills related to maternal health was poor. The study further outlined that the midwives were assessed for the antenatal care services on how to conduct an examination for anemia and oedema, abdominal examination and washing hands. All midwives performed assessment of anemia through the examination of eyes, and all except three (3) performed it correctly. Slightly fewer (97/106) midwives attempted to assess anemia through nails; out of these, 90 CMWs were able to do it correctly (Wajid et. al., 2010). The assessment of anemia through inspecting the palms of the pregnant woman was the least attempted method: less than half (37 CMWs; 35%) could perform this task correctly. Thereafter, the CMWs were taught to correctly perform an assessment of the swelling of feet and hands on the pregnant women. The findings were that more than three-quarters of the midwives (81%) performed this assessment correctly. This shows that skills need to be practiced regularly to gain competency. One of the most frequent examinations during pregnancy is the examination of the abdomen which provides information regarding various aspects of gestation. The findings were that half of the midwives (53%) completed the examination of the abdomen for assessing the size of the uterus correctly. And about two-

thirds of the midwives (70%) completed the task of assessing fetal position correctly. Successful performance of assessing the fetal heart rate was slightly lower than that of fetal position (Wajid et. al., 2010). CMWs were asked to demonstrate proper technique for washing hands: seven steps were assessed. Out of the seven steps, only drying of hands, using soap and washing of hands were completed correctly by a majority of the midwives. The skills assessed in this study will used to assess the midwives in Livingstone District as well.

According to a study done by Amosu et. al., (2011) aimed to determine how the health workers can enhance its practice of focused antenatal care, 66% accepted that focused antenatal care was not enforced by their healthcare facility as a result of lack of policy concerning the practice of focused antenatal care. In addition, proper supervision by a skilled, trained healthcare provider will also be effective in enhancing its practice. The package is accepted by the health care workers but not practiced. Focused antenatal care is an approach that has been adopted by developing countries in the world including Zambia. From the study it shows that health workers were not fully practising focused antenatal care due to lack of policy and lack of practice. The researcher will assess the skills of the midwives on focused antenatal care services.

The Association of Chartered Certified Accountants (2013) highlighted that the Central Statistical Office Zambia reported that although 94% of women sought antenatal care during their pregnancy, only 19% attended ANC presented in their first trimester, resulting in the omission of key interventions. Around three-quarters of maternal deaths are caused by complications such as obstructed labour, eclampsia or haemorrhage; problems that could have been treated with skilled care. A key factor in reducing maternal mortality rates, therefore, is access to antenatal care and presence of a trained nurse, midwife or physician at the birth. As a country, the presence of a midwife who is skillful during antenatal care is important as key interventions are conducted in the first trimester.

Kyei, Chansa and Garbrysch (2012) mentioned that although 94% of mothers reported at least one ANC visit with a skilled health worker and 60% attended at least four (4) visits - the indicators tracked by “Countdown to 2015”, only 29% of mothers received good quality ANC, and only eight (8%) of mothers received good quality ANC and attended in the first trimester. It was noted that a health worker should be present during the antenatal care services and should have the necessary knowledge and skills, and that they actually provide the recommended interventions.

Schoon and Motlolometsi (2016), highlights that huge training efforts are required from health departments to ensure that all the staff have the required skills to provide the services. The integrated approach to training of nurse professionals, which includes midwifery as a part of undergraduate training, has a devastating effect on the quality of midwifery. Training in midwifery is unfocused and forced upon those who have no interest in improving maternal outcomes. Maternal care is provided by professionals who are not equipped with appropriate skills. The study further states that unless this systems design error is corrected, and a single-output training model introduced to professionals providing maternal care, there will be no marked major change in the maternal outcomes. The findings were that women want pregnancy follow-up as close to home as possible, as long as there are no problems. When they know that advanced skill is required to manage pregnancy complications, they are prepared to travel long distances to obtain the appropriate care. If someone provides basic antenatal care, they must have a certificate indicating that they are qualified and skilled to do so. If they manage complicated pregnancies in the antenatal period, they should possess an advanced antenatal care certificate. The current service platform design does not allow a single professional to provide comprehensive antenatal. Maternal outcomes depend on achieving and maintaining a high level of skill. This multi-professional debate concluded that the entity of a 'skilled midwife' does not currently exist in South Africa, with the exception of a few enthusiasts.

2.4 Characteristics of the Midwives

A study done Ali et.al (2015) consisted of 42 CMWs as participates from 10 districts across Sindh were. The characteristics of the participants was that they had graduated as CMWs from different midwifery schools of Sindh, and all had an active license to practice, provided by the Pakistan Nursing Council (PNC) which made them eligible to work as an independent practitioner. The Nursing Council is a professional body that regulates the standards of the nursing body in any given settings in the world through issuance of practicing license renewed according to each country's policies. In addition, most of the participants' age was above 25 years with work experience ranging from six (6) months to 3.5 years. Interestingly, most of them were working in their own birthing centers, whereas a few of them were working in other maternal and child health care centers. The training consisted of midwives with the same characteristics and with working experience from six (6) months to 3.5 years. In the Zambian settings, the practicing licenses are renewed yearly by the General Nursing Council of Zambia by obtaining 20 points using a Continuous Professional Development.

The researcher used this information for the midwives to be included in the study to having been licensed and worked from six (6) months to 3.5 years. Moreover, most of the midwives had worked in the Maternal and Child Health care centers in which the researcher's study was focusing on.

According to Wajid, Rashid and Mirs (2010), 174 midwives in the study were asked about specific characteristics, which included age, education, and marital status, language spoken in the household and work other than midwifery. The total duration of training reported by all midwives was 18 months divided into two main phases: school and hospital based training for 15 months and community based training for three (3) months.

In a study done in Sweden by Andersson (2014) showed that the midwives were all women, of an average age of 53.3, and had worked an average of 23 years as a midwife, 13 years of which in antenatal care.

Elkhalif and Kuppuswamy (2014) did a study in Sudan which assessed midwifery knowledge with special emphasis on antenatal care. The study revealed that, the majority of the midwives belonged to the age group of 40 -49 years. Most of them had studied up to the high school level and had undergone a two (2) year midwifery training period. A good number of them had also worked as midwives for more than 15 years.

According to the study done by Ali et.al (2015), all the CMWs were assigned and rotated in the designated primary and secondary care sites, located in the urban and semi urban parts of Sindh. This was done for clinical experience in the triage in ante partum areas in history taking and assessment in order to improve the competency of CMWs.

In the study conducted by Ayiasi et.al. (2014), consisted of general nurses, midwives and nursing assistants) respondents were predominately females 94% (pre- service entry requirements for general nurses and midwives level of education is eleven). Midwives (3-year training are instructed on prenatal, postnatal and newborn, they learn to conduct normal deliveries, recognize danger signs and initiate timely referrals). General midwives (3-year training bedside nursing including but also aspects of midwifery (offer comprehensive prenatal care, delivery care and immediate postnatal care and new born care. Nursing assistants had not undergone in any formal of training. Education levels were from seven (7) to eleven (11) years. Uganda supply 50% of these cadres to the health care system. Therefore, Ministry of Health decided to offer a three (3) month comprehensive training on general

nursing and midwifery skills to those already enrolled in service. The years of service was five (5) years or less or six (6) years or more. It was a cross-sectional study of 183 health workers (general nurses (39.3% 72), midwives (21.9% 40) and nursing assistants (38.8% 71).

The studies show the type and number of participants included in the study including the duration of the midwifery trainings, work experience and some specific characteristics such as age, marital status and clinical practicum like the antenatal clinic. In some studies, the sample size was small that implies that the midwives in that particular studies are not well represented.

2.4.1 Summary of the Characteristics of the Midwives

The characteristics of the respondents included midwives, general nurses, midwives, doctors, community midwives and nursing assistants' who were predominately females 94% with active license to practice paid to the General Nursing Council in their various countries.

The age group of the respondents were between 25 to 53 years with work experience between six (6) months and 23 years. Additionally, the working settings include maternal and child health centers, and antenatal clinic. Some of the community midwives were assigned and rotated in the designated primary and secondary care sites, located in the urban and semi urban parts urban and semi urban health facilities. This was done for clinical experience in the triage in ante partum areas in history taking and assessment in order to improve their competency.

The training period varied according to the cadres. Some of the respondents had studied up to the high school level and had undergone a two (2) year midwifery training period. In other settings all the midwives fulfilled the requirement educational criteria for recruitment. The total duration of training reported by all midwives was 18 months divided into two main phases: school and hospital based training for 15 months and community based training for three (3) months.

Furthermore, in some settings the pre- service entry requirements for general nurses and midwives level of education is eleven (11). The midwives undergo a three (3) year training on prenatal, postnatal and newborn, they also learn how to conduct normal deliveries, recognize danger signs and initiate timely referrals. Whilst, the General midwives undergo a three (3) year training bedside nursing including but also aspects of midwifery (offer comprehensive prenatal care, delivery care and immediate postnatal care and new born care.

Finally, the Nursing assistants had not undergone in any formal of training. Their education levels were from seven (7) to eleven (11) years. The Ministry of Health in some settings decided to offer a three (3) month comprehensive training on general nursing and midwifery skills to those already enrolled in service.

The Focused Group Discussions (FGDs) used in some settings by recruiting nine (9) pregnant women and five (5) midwives and a purposeful criterion sampling approach was used. FGDs were conducted using semi structured interview guide. In the Group Prenatal Care (GPC) model 8 to 12 pregnant women of similar gestational age, often with their partners or support persons, meet together with certified nurse midwives, certified midwives, nurse practitioners or physicians to assess their high level of satisfaction with their GPC experience.

2.5 Work Organization and Environment

In Kenya, the Frontiers Programme found out that shortages of equipment and supplies inhibit the full provision of services during the antenatal care (Amosu et. al., 2011). This shows that in order for the midwives to offer adequate antenatal care services, the availability of the necessary equipment, instruments and supplies should be readily available. This will help the researcher to assess and evaluate the availability of the named resources using a checklist and on spot checking at the health facilities.

2.6 Job Satisfaction

According to the study conducted by Common (2015) on homebirth in England: factors that impact on job satisfaction for community midwives. This study explored the uptake of homebirth by healthy pregnant women from the perspective of community midwives (CMs). It also included factors that CMs expressed contributed to and/or detracted from their job satisfaction. Interviews were conducted with four (4) practising CMs who were employed by a large acute NHS Trust in England providing a non-continuity model of care. Data were analyzed thematically and were presented in two (2) categories: one (1) continuity of care and two (2) working relationships and workloads. Findings suggest that if maternity service providers attended to factors that enhanced the job satisfaction of CMs inclined to support homebirth, this may contribute to increasing its uptake by pregnant women.

Rouleau et.al (2012) in a longitudinal study done in Senegal on the effects of midwives' job satisfaction on burnout, intention to quit and turnover had a cohort of 226 midwives from 22 hospitals. Their job satisfaction was measured from December 2007 to February 2008 using a multifaceted instrument developed in West Africa. Three (3) expected effects were measured two (2) years later: burnout, intention to quit and turnover. Descriptive statistics were reported for the midwives who stayed and left their posts during the study period. A series of multiple regressions investigated the correlations between the nine (9) facets of job satisfaction and each effect variable, while controlling for individual and institutional characteristics. Overall the midwives reported themselves moderately satisfied; least contented with their "remuneration" and "work environment" and most satisfied with the "morale" and "job security" facets of their work. On the three (3) dimensions of the Maslach Burnout Inventory, very high levels of emotional exhaustion (80.0%) and depersonalization (57.8%) were reported, while levels of diminished personal accomplishment were low (12.4%). Burnout was identified a little in more than half of the sample (55%). Experiencing emotional exhaustion was inversely associated with "remuneration" and "task" satisfaction, actively job searching was associated with being dissatisfied with job "security" and voluntary quitting was associated with dissatisfaction with "continuing education". This study found that although midwives seem to be experiencing burnout and unhappiness with their working conditions, they retain a strong sense of confidence and accomplishment in their work. It also suggests that strategies to retain them in their positions and in the profession, should emphasize continuing education.

In a related study on job satisfaction done in entitled burnout and use of HIV services among health care workers in Lusaka District, Zambia: a cross-sectional study (Kruse et. al 2009) studied occupational burnout and utilization of HIV services among health providers in the Lusaka public health sector. The study of 483 active clinical staff from 13 public clinics were given a 36-item, self-administered questionnaire and invited for focus group discussions and key-informant interviews. The findings were that 84% response rate, 51% reported occupational burnout, 50 staff participated in six (6) focus groups, and four (4) individuals gave interviews. Focus group participants described burnout as feeling overworked, stressed and tired. In conclusion the study highlighted that in Lusaka primary care clinics, overwork; illness and death were common reasons for attrition. Programmes to improve access, acceptability and confidentiality of health care services for clinical providers and to reduce workplace stress could substantially affect workforce stability.

2.7 In Service Training

The study carried out by Ali et.al (2015) showed the importance of in service training for midwives that could improve skills pertaining to antenatal care services. To achieve the competency associated with ante partum each step of the assessment using Objective Structured Clinical Examination (OSCE) was demonstrated with a return demonstration. The participants also watched the video, prepared an obstetrical wheel (Expected Date of Delivery (EDD) calculation circle) for estimating the gestational age and were comfortable in performing the skill. Finally, the midwives learned to operate a computer, use the Microsoft office tools and to search for midwifery related resources from the internet.

Ali et al. (2015) also cited that the factors which were identified that can affect the ability of a midwife to contribute towards the Millennium Developmental Goals (MDGs) then, but now are called Sustainable Developmental Goals (SDGs) effectively are the quality of pre-service training and to participate in the Continued Professional Development (CPD) once they have graduated from the midwifery schools. Therefore, one of the interventions was the capacity building trainings of CMWs to improve their midwifery competency in knowledge and skills. As part of job satisfaction, pre-service which is inclusive in the in-service trainings is of great importance as new trends are being introduced in antenatal care services. For instance, the focused antenatal care is a new concept which has been introduced to the developing countries by World Health Organisation. This meant that this new trend needed to orientated to the midwives as some at the time of the midwifery training the antenatal care services had more visits than the recommended four visits unless a risk is detected then more visits are arranged. GNC has now introduced CPD which has been implemented in some districts but will roll out.

In same study done by Amosu et al., (2011) in Kenya, highlighted that the frontiers programme found out that there was inadequate training of health care providers on the advantages of focused antenatal care. Moreover, due to shortages of equipment and supplies contributed to inadequate provision of antenatal care services.

These studies above show that in-service training is important to improve and update the competencies of the midwives as they offer antenatal care services.

2.8 Conclusion

The literature review has shown that several studies have been conducted on midwives knowledge and skills on antenatal care. However, most of the studies have been conducted in other countries other than Zambia**.** Evidence shows that midwives have a significantly low score of knowledge and skills, and did not fulfil the International standards based on International Confederation of Midwives (ICM) competencies.

However, not only further training was needed, they needed to be posted in a maternity unit to maintain their skills. Advices given to mothers by the midwives were found to be of good quality in reference to several important issues during and after pregnancy. It was also observed that there was limited knowledge and inappropriate practices regarding Infection Prevention and Control (IPC), and low-cost disinfection and sterilization techniques. Moreover, midwives expressed a high level of satisfaction with their GPC experience.

The results on FANC showed that 42% of the respondents considered frequent routine as the norm and that women should be classified by risk category, 52% identified ignorance as one of the factors affecting focused antenatal care. On skills on antenatal literature underpin the need for improvement on clinical competency of nurse-midwives. Additionally, midwives who worked in major cities reported the greatest dissatisfaction with their work whilst showing the greatest interest in GBAC. The skills included ante partum care, ante partum history and examination, prescription and interpretation of laboratory investigations, and care of women with minor pregnancy disorders, and how to operate a computer and use the Microsoft office tools. Some studies found out that inadequate staff training and shortages of equipment and supplies inhibit the full provision of services.

Literature shows that health workers were not fully practicing focused antenatal care due to lack of policy guidelines and lack of practice. Finally, these studies also show that in-service training is important to improve and update the competencies of the midwives as they offer antenatal care services. It is against this background that the researcher wishes assess the knowledge and skills of the midwives on focused antenatal care services offered in the first antenatal care and identify gaps so that appropriate strategies can be implemented. In the next chapter, the research method used to investigate the midwives' knowledge and skills is discussed.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Introduction

This chapter will outline the design of the research and the methods used to explore midwives' knowledge and skills of first antenatal care in order to provide quality care to pregnant women. The use of simple random sampling to select the study sample from the target population, inclusion criteria and the process of data collection will be discussed in details. The study sites are described in details. Moreover, how the data was processed, analyzed including ethical and limitations of the study are also discussed**.**

3.2 Research Design

A research design is a plan, structure, and strategy of investigations of answering the research question. It's the overall plan the researcher selects to carry out the study (Lobiondo-Wood and Haber, 2006). The researcher used a quantitative method using descriptive cross section because it gave a clear overview of application of knowledge and skills levels among midwives in Livingstone District. This research design led to a comprehensive description of factors that would influence the improved antenatal care services contributing to the reduction of on maternal deaths.

3.3 Study Area

Research setting is a place or area where the research study will be conducted (Basavanthappa, 2014). This study was conducted in Livingstone District at Livingstone Central Hospital and six (6) health centers within the district namely Victoria Falls, Boma, Mahatma Ghandi, Maramba, Libuyu and Linda respectively.

3.3.1 Livingstone District

Livingstone Central Hospital is a second level hospital based in Southern Province with a bed capacity of 325. The hospital serves a population of 1,653,266. It is the main referral centre for Southern Province and Sesheke district of Western Province. It also serves as a first level for Livingstone and Kazungula districts respectively. There are four major clinical services/ departments namely: internal medicine, surgery, pediatrics and child health, obstetrics and gynecology.

There is a comprehensive HIV program that encompasses voluntary counseling and testing (VCT), prevention of mother to child transmission of HIV/AIDS (PMTCT) and provision of antiretroviral therapy. The hospital has among others stakeholders working at the ART clinic such as Center for Disease Control (CDC) and CIRDZ.

The study was conducted at the ANC clinic and obstetrics and gynecology department because these are the areas where the desired study population is located. Moreover, these sites were easily accessible to the researcher.

In addition, it was easier for the researcher to administer the' questionnaires to the midwives as the clinic is conducted daily and obstetrics and gynecology department is operational 24 hours daily. The ANC clinic has a data system in place which made it easier for the researcher to collect the necessary data for the research. This information was relevant as it helped the researcher obtain information to give a picture of knowledge and skills levels of midwives regarding to antenatal care services provided for pregnant women.

Six (6) health centres offering ANC were included in the study namely: Victoria Falls, Boma, Mahatma Ghandi, Maramba, Libuyu and Linda respectively.

3.4 Study Population

The study population is the total group of individual people or things meeting the designated interest to the researcher (89). The study population was all midwives working at Livingstone Central Hospital and six (6) health centers in Livingstone District because the midwives are allocated in different departments in obstetrics, gynaecology and antenatal clinics respectively. The study population included the "target population" and "accessible population".

3.4.1. Study Sample

The target populations were all male and female midwives working at the Livingstone Central Hospital and in the six (6) health centers in Livingstone District with working experience of six (6) months and above; and with a valid nurse practicing license. This population was the target for the study because they have knowledge and skills of antenatal obtained during the midwifery training and through practice in the clinical practicum.

3.4.2 Accessible Population

The accessible population consisted of all male and female midwives working at the Livingstone Central Hospitals and at six (6) urban health centers in Livingstone District during the study which was conducted from 1st July, 2016 to 31st March, 2017. Furthermore, the midwife should have worked for six (6) months and more and with a valid nurse practicing license

3.5 Sampling Techniques

3.5.1 Selection of the Respondents

The study respondents were chosen by simple random sampling which is a probability technique of sampling. The sampling was made from the daily appointment for all male and female midwives. The sampling frame (appointment list) contained the names of all male and female midwives who had worked for six (6) months and more at a health center/hospital. The midwives were randomly drawn comprising of 89 participants and in each study site 50 from the six urban health clinics in the district and 39 from Livingstone Central Hospital.

3.5.2. Selection of the Hospital/Clinic

Livingstone Central Hospital and six (6) health clinics within Livingstone district were conveniently selected because they were easily accessed by the researcher as they are only about 200 meters away from where the researcher will be residing during the period of the study.

3.5.3 Inclusion Criteria

- The inclusion criteria for this study are:
- Midwives working at Livingstone Central Hospital (Zambia) and six (6) urban health centers from Livingstone district that were willing to give consent and in possession of practicing license where be included in the study.
- Male or female midwives who had worked for six (6) months and more were included in the study. This is because all the midwives are made to rotate to work in different departments and if need be, they might be asked to work in any department which has a shortage which includes antenatal clinics.

3.5.4 Exclusion Criteria

- Non-Midwives
- Midwives who participated in the pilot study were not be included in the main study

3.6 Sample Size

A sample size of 89; 39 from Livingstone Central Hospital and 50 from the six (6) health centers at ANC clinic or has worked in ANC clinic for more than one (1) year were used. The sample size of 89 respondents were used because of limited time, financial and inadequate human resources. Additionally, since the target population of midwives is finite that is less than 1000 (thus 115).

Calculation of Sample Size

$$n = \frac{Z^2 P (1-P)}{d^2}$$

Where **P** = proportion of midwives who have knowledge and skills on antenatal care equals 50% or 0.5 since no study has been done on the subject before.

Z = 1.96 is the standard normal variate at 95% confidence level

d = ± 5% = ± 0.05 is the precision

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

Since the target population of midwives is finite that is less than 1000 (thus 115). 115 represent 50 midwives from the Livingstone health 6 (six) urban clinics and 65 midwives from Livingstone Central Hospital. The number of midwives from both the health facilities and the hospital represent the actual number of midwives in the district 50 and hospital 65 respectively. The total of midwives was 115. Therefore, the population size was adjusted to get the final "n" as follows:

Where N = population size = 115

Final n = $\frac{n}{1+\frac{n}{N}}$

Final n = $\frac{384}{1+\frac{384}{115}} = \frac{384}{4.34} =$ **89**

Therefore, the sample size will be 89 respondents.

3.7. Instruments for Data Collection

Data collection tools that were used for this study is a semi-administered questionnaire and an observational checklist.

3.7.1 Semi-Administered Questionnaire

A semi-administered questionnaire was used to collect data from the midwives. The tool had both closed and open-ended questions. The questionnaire was adapted from Fort and Voters 2004; Lincetto et al. 2006; Ayiasi et al.2014 and WHO, 2015.

The questionnaire comprised five (5) sections. Section A had demographic data; Section B had questions assessing knowledge on antenatal care, supervision of antenatal care, in-service training, work and organizations.

3.7.2 Clinical Observation Checklist

The researcher used a structured observational checklist to collect data from the midwives which were observed during antenatal care services. Non-participant direct observation technique was employed to ensure accurate data collection. This is easy to use because most of the major aspects of information needed was covered in the questionnaire. This permitted the researcher to watch and note actions and reactions of the respondents. The observational checklist included Section C with questions evaluating the respondents' skills and Section D consisted of the checklist for equipment and supplies available at the facility regarding antenatal care services.

3.8 Procedure for Data Collection

Procedure for data collection was that before distributing the semi- structured questionnaire to the respondents, the researcher obtained consent from the respective health institutions and the health workers on duty. The researcher introduced herself to the respondent and explained the reasons, risks and the benefits for conducting the research study. The respondents were assured of confidentiality and informed that participation was voluntary and are free to withdraw during the interview. Subsequent to all the explanation, the midwife was asked to voice any questions and whether or not he/she would consent to participate. Midwives were then asked to sign the consent form if they agree to take part in the study. Each respondent was provided with a questionnaire to fill in.

Each questionnaire and its matching informed consent form was assigned a three-digit identifier. In order to uphold midwives′ confidentiality, the three-digit identifier number, as opposed to the midwives' name, was used for further analyses. The researcher collected the completed questionnaires at the end of the respondents working shift. The researcher edited all the responses in the questionnaire at the end of the day and the study period to ascertain completeness.

3.8.1 Clinical Observation Technique

The researcher observed and recorded the findings of the midwives as they render the antenatal care services using a checklist. A scoring sheet was used. The researcher was in attendance during the ANC services at the health centers/ clinics and also during an admission of antenatal pregnant women in obstetrics department. The researcher observed the activities which were done throughout the session without the midwives not knowing what the researcher's interest according to the checklist. This was done to avoid the midwives feeling uneasy and later affect the data that was collected. At the end of the day, the observational checklist was counterchecked on all the areas in the paper to ascertain completeness.

3. 9 Data Analysis

After data collection, all the interview schedules were edited for accuracy, completeness, uniformity and consistency. Data was entered into SPSS version 22. Chi-square test was used to test associations among the dependent variable (midwives' knowledge and skills of first antenatal care) and the independent variables (midwives' characteristics, work organization

and environment tools and equipment and job satisfaction). The level of significance was set at 0.05% at 95% confidence interval with a p value 0.05. Only a p value less or equal to 0.05 was considered statistically significant thereby rejecting the null hypothesis.

3.10 Ethical Considerations

Ethical approval was sought from the University of Zambia Biomedical Research Ethics Committee (UNZABREC). Written consent was obtained from each respondent. In the study, respondents were asked to sign a consent form after the purpose of the study was explained to them. Those that would not consent to participate in the study were reassured that they will suffer no consequences as a result of not participating. Those who consented were asked to sign the consent form, which was explained fully to them.

A written permission was sought from the Senior Medical Superintendent for Livingstone Central Hospital and Livingstone District Medical Officer for the six (6) health centers in within Livingstone District but were not have access to the collected data. The respondents were not remunerated in any way. Study respondents were told that they are free to withdraw from the study at any time without suffering any consequences. Questionnaires and discussions were conducted in privacy that were offered by the respondents and the researcher respectively. After data collection, the questionnaires and observational checklist were kept under lock and key for security and confidentiality. Respondents were not subjected to any physical harm as the study did not involve invasive procedures.

Anonymity and confidentiality was observed during the interview by ensuring that codes were used instead of names and that each respondent was interviewed one by one in a private room. The completed interview schedules and observational checklist were kept under strict safety to keep away from unauthorized access to the information gathered.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4. 1 Introduction

The general objective of the study was to determine midwives' knowledge and skills on first antenatal care offered to pregnant women by midwives in Livingstone District.

A total of 89 midwives were sampled from Livingstone Central Hospital and at six (6) other health centers in Livingstone District.

4.2 Data Analysis

After data collection, all the interview schedules were edited for accuracy, completeness, uniformity and consistency. Data was entered into SPSS version 22. Chi-square test was used to test associations among the dependent variable (midwives' knowledge and skills of first antenatal care) and the independent variables (midwives' characteristics, work organization and environment tools and equipment and job satisfaction). The level of significance was set at 0.05% at 95% confidence interval with a p value 0.05. Only a p value less or equal to 0.05 was considered statistically significant thereby rejecting the null hypothesis.

4.3 Presentation of Findings

The study findings were presented according to the sequence of the semi structured interview schedule and were presented in frequency tables, pie charts and cross tabulations. The cross tabulation of variables helped show relationships between the major study variables.

4.3.1 Section A: Demographic Data

In this section, the respondents' demographic data is presented. The variables considered include sex, age, qualifications, supervision, in-service training, work organization and environment for antenatal care services.

Table 4. 1. **Demographic attributes of the sampling distribution (n= 89)**

Variable	Category	n (%)
Sex of participant	Female	81 (91.0)
	Male	8 (9.0)
Age, years	mean±SD	39.7±12.4
Qualification	BSc. in Nursing	2 (2.2)
	Registered midwife	27 (30.3)
	Enrolled midwife	34 (38.2)
	Certified midwife	26(29.2)
Received supervision in the last 6 months	Yes	62 (69.7)
	No	27 (30.3)
Received clinical supervision	Yes	58 (65.2)
	No	31 (34.8)
Received administrative supervision	Yes	19 (21.3)
	No	68 (76.4)
Had in service training in reproductive health	Yes	37 (41.6)
	No	52 (58.4)
Work organization and environment have adequacy job place for antenatal services	Yes	60(67.4)
	No	29(32.6)
Satisfied with organization of antenatal program	Yes	60 (67.4)
	No	29 (32.6)

Table 4.1 shows that 81 (91.0%) of the participants were female and 8 (9.0%) were male. These participants had mean age of 39.7±12.4 years. From these participants only 2 (2.2%) had a Bachelor of Science qualification in nursing, 27 (30.3%) were registered midwives, 34 (38.2%) were enrolled midwives and 26 (29.2%) were certified midwives. The mean duration these midwives worked in the antenatal clinic was 5.6±7.0. Only about 70% of the midwives received supervision in the last six months of the collection of this data. Less than half (41.6%) did some service training in reproductive health.

4.3.2 Section B: Midwives Knowledge Levels on First Antenatal Care

Section B presents information on midwives' knowledge levels on first antenatal care.

Table 4: 2. Knowledge levels of midwives on objectives and routine interventions of Antenatal Care (ANC) (n=89)

Variable	**Category**	**n (%)**
Defined ANC correctly	Yes	84 (94.4)
	No	5 (5.6)
Knew that objectives of ANC are		
Promoting health and wellbeing of pregnant women	Yes	88 (98.9)
	No	1 (1.1)
Health promotion	Yes	54 (60.7)
	No	35 (39.3)
Medical and psychosocial interventions	Yes	50 (56.2)
	No	39 (43.8)
Follow up including a variety of routine regular examinations	Yes	59 (66.3)
	No	30 (33.7)
Knew that timing of first antenatal visit as one month	Yes	48 (53.9)
	No	41 (46.1)
Knew the recommended number of ANC visits	Yes	76 (85.4)
	No	13 (14.6)
Understood routine interventions during ANC as		
History taking	Yes	74(83.1)
	No	15(16.9)
Physical examination	Yes	85(95.5)
	No	4(4.5)
Laboratory investigations	Yes	77(86.5)
	No	12(13.5)
Assessment for referral	Yes	55(61.8)
	No	34(38.2)

As indicated in Table 4.2 above, most of the midwives were able to correctly define Antenatal care (ANC) thus about 94%. Surprisingly 46% of midwives did not know that timing of first antenatal visit is one month. Thirty-nine percent (39%) did not know that one of the objectives of ANC is to provide health promotion. About 44 (39%) of them did not know that another objective of ANC was medical and psychosocial interventions. Thirty-eight percent (38%) of the respondents did not know that assessment for referral is one of the routine interventions during ANC

Table 4: 3. Knowledge levels of midwives on danger signs and advice given to pregnant women on supplements (n=89)

Variable	Category	n (%)
Knew danger signs of pregnancy as		
Abdominal pain	Yes	62(69.70
	No	27(30.3)
Vaginal bleeding	Yes	88(98.9)
	No	1(1.1)
Fever	Yes	79(88.8)
	No	10(11.2)
Headache	Yes	80(89.90
	No	9(10.1)
Swelling of the hands and legs	Yes	76(85.4)
	No	13(14.6)
Blurred vision	Yes	82(92.1)
	No	7(7.9)
Fits	Yes	85(95.5)
	No	4(4.5)
Knew advices given to pregnant mothers on supplements to be taken as		
Iron	Yes	85(95.5)
	No	4(4.5)
Calcium	Yes	43(48.3)
	No	46(51.7)
Folic acid	Yes	85(95.5)
	No	4(4.5)
Iodised salt	Yes	23(25.8)
	No	66(74.2)
Fortified sugar	Yes	19(21.3)
	No	70(78.7)

According to Table 4:3 above, almost all of them were however able knew the danger sign in pregnancy. Interestingly about 27 (30.3%) did not know that abdominal pain was one of the danger signs of pregnancy. More than two thirds (78.7%) of the midwives did not know how to give advice on the importance of using fortified sugar.

Table 4: 4 Knowledge levels of midwives on investigations and medications (n= 89)

Variable	Category	n (%)
Knew investigations done during the first antenatal visit as		
RPR	Yes	85(95.5)
	No	4(4.5)
Urinalysis	Yes	83(93.3)
	No	6(6.7)
Blood group	Yes	62(69.7)
	No	27(30.3)
HIV testing	Yes	86(96.6)
	No	3(3.4)
Gravindex	Yes	56(62.9)
	No	33(37.1)
Ultra sound	Yes	32(36.0)
	No	57(64.0)
Knew medications given during antenatal period as		
IPT Fansidar starting after second trimester (three doses)	Yes	76(85.4)
	No	13(14.6)
Folic acid tablets	Yes	88(98.9)
	No	1(1.1)
Ferrous sulphate tablets	Yes	88(98.9)
	No	1(1.1)
Deworming tablets (Mebendazole)	Yes	82(92.1)
	No	7(7.9)

Table 4:4 above, shows that most of the midwives knew the investigations which were done during the first antenatal visit, except for ultra sound and gravidex. For ultra sound

investigation 57(64%) did not know about it while 33(37.1%) did not know about gravidex investigation.

Table 4: 5. Knowledge levels of midwives on HAART n = 89

Variable	**Category**	**n (%)**
HAART	Yes	75(84.3)
	No	14(15.7)
Septrin for HIV prophylaxis for HIV positive women	Yes	67(75.3)
	No	22(24.7)
Knew at what gestation age routine ultrasound is done	Yes	28(31.5)
	No	61(68.5)
Knew the purposes of routine ultrasound done in the first trimester of pregnant women		
Establish pregnancy is viable and intrauterine	Yes	83(93.3)
	No	6(6.7)
Establish gestational age	Yes	66(74.2)
	No	23(25.8)
Establish fetal number and chorionicity or amionicity in multiple pregnancies	Yes	47(52.8)
	No	42(47.2)
Establish detection of gross fetal abnormalities such as anencephaly	Yes	31(34.8)
	No	58(65.2)

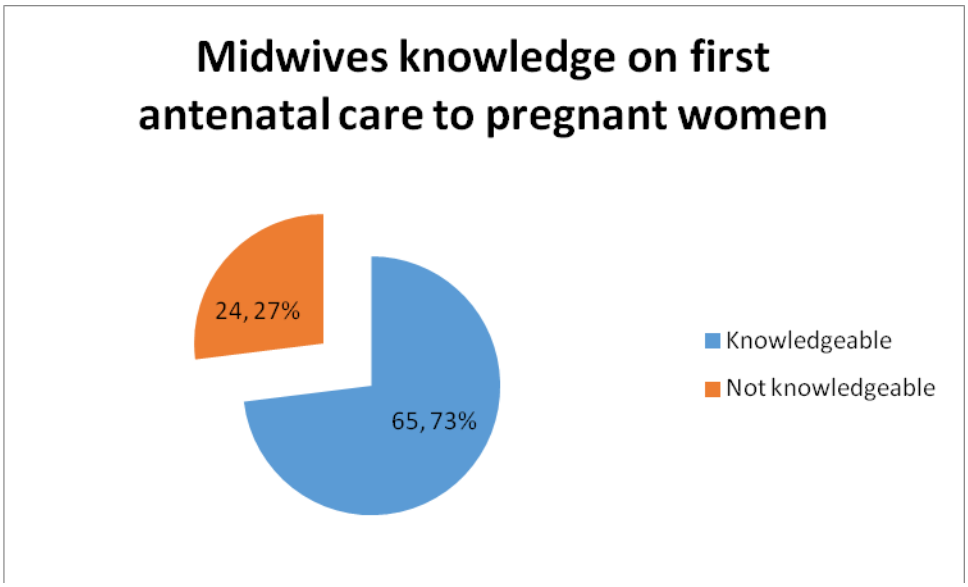
Table 4: 5 above indicates that 61(68.5%) of the respondents did not know at what age routine ultrasound is done. Furthermore, about two thirds of them 58(65.2%) did not know that one of the purposes of routine ultrasound done in the first trimester of pregnant women is for establishing detection of gross fetal abnormalities such as anencephaly. Furthermore 42(47%) did not know that this ultra sound is used to establish fetal number and chronicity or amionicity in multiple pregnancies.

Table 4: 6 Knowledge levels of midwives on frequency and topics on information, education and communications (n=89)

Variable	Category	n (%)
Knew frequency of health education	Yes	88(98.9)
	No	1(1.1)
What they Knew as important information and education to the pregnant women		
Danger signs in pregnancy	Yes	88(98.9)
	No	1(1.1)
Birth preparedness	Yes	83(93.3)
	No	6(6.7)
Care of newborn	Yes	61(68.5)
	No	28(31.5)
Health facility delivery	Yes	80(89.9)
	No	9(10.1)

As indicated in Table 4:6 above, almost all the midwives knew about the frequency of health education, danger signs in pregnancy and health facility delivery when it comes to giving important information and education to pregnant women whilst 10% of respondents did not know the importance of health facility delivery.

Figure 4. 1: Midwives knowledge on first antenatal care to pregnant women (n=89)



As indicated in figure 4.1, 65 (73%) of the midwives were knowledgeable on first antenatal care to pregnant women while 24 (27%) were not.

4.3.3 SECTION C: MIDWIVES CLINICAL OBSERVATIONAL SKILLS

In section C of the data collection tool, observational skills of midwives on first antenatal care were recorded and the necessary equipment instruments and supplies used.

Figure 4.2: **Observational skills of midwives (n = 89)**

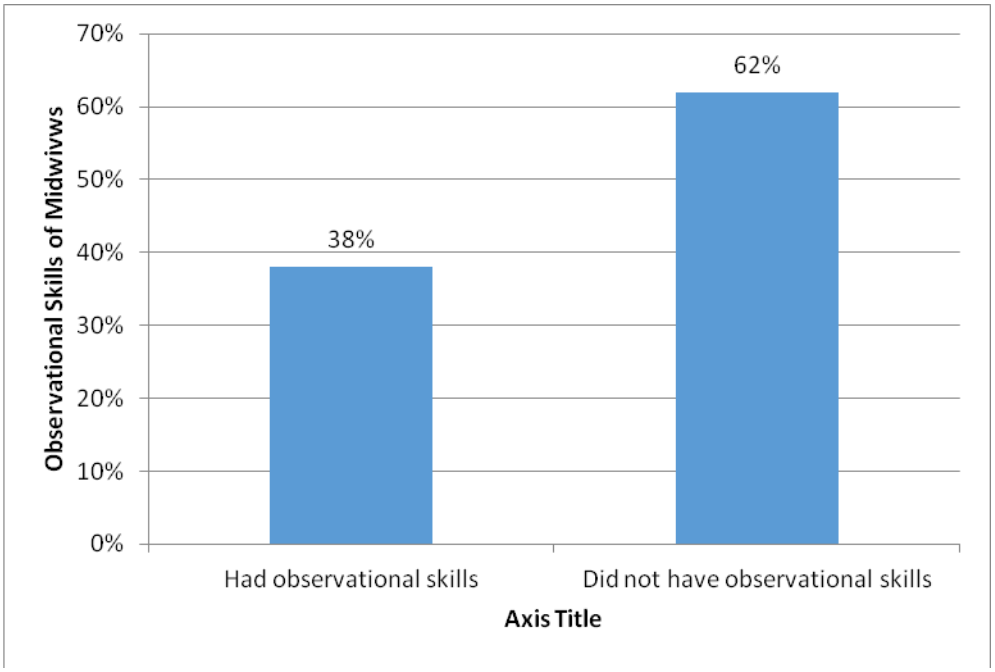


Figure 4.2 below shows that 55 (61.8%) of the midwives had no observational skills while 34 (38.2%) had the skills.

Figure 4.3: Availability of necessary equipment, instruments and supplies (n = 89)

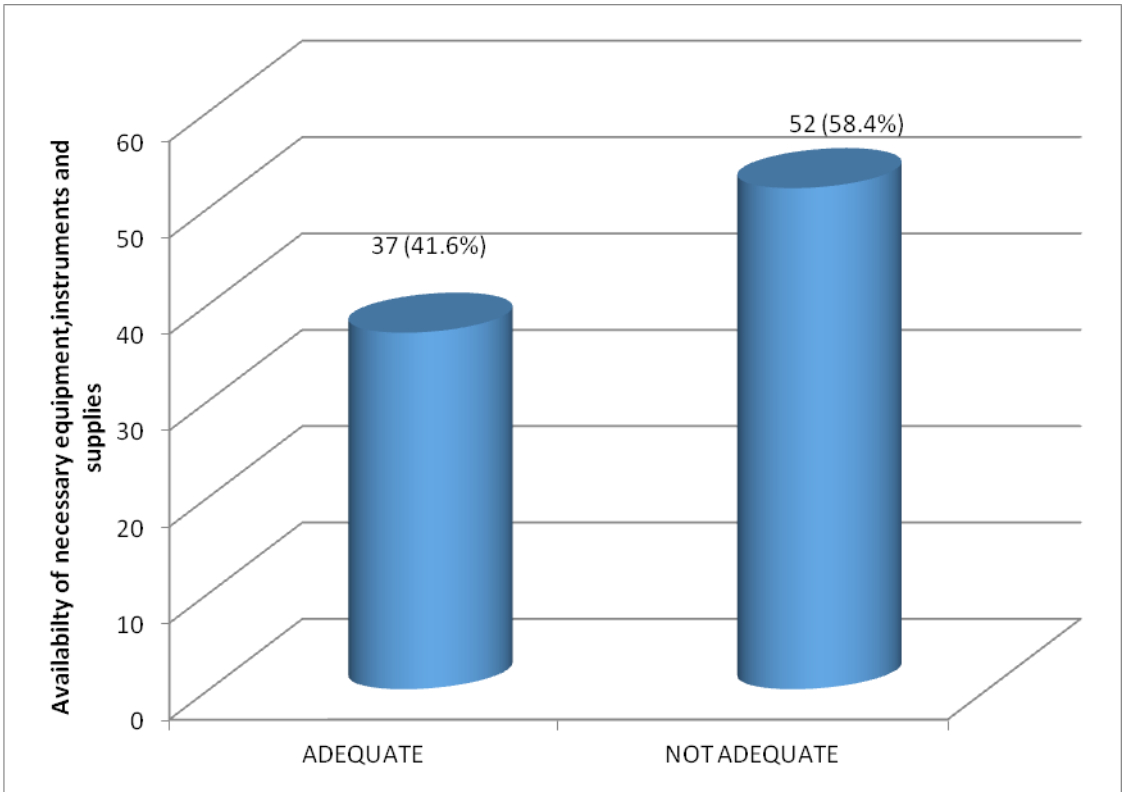


Figure 4.3 above shows that 52 (58.4%) of the respondents reported that necessary equipment instruments and supplies were adequate and 37 (41.6%) reported the opposite

Table 4: 7 Skills levels of midwives on History taking and Physical Examination

(n = 89)

Variable	Category	n (%)
History taking		
Social history taking	Yes	72(80.9)
	No	17(19.1)
Obstetric history	Yes	82(92.1)
	No	7(7.9)
Menstrual history	Yes	77(86.5)
	No	12(13.5)
Medical history taking	Yes	77(86.5)
	No	12(13.5)
Surgical history	Yes	81(91.0)
	No	8(9.0)
Family history	Yes	69(77.5)
	No	20(22.5)
Physical Examination		
Head to toe	Yes	83(93.3)
	No	6(6.7)
Body weight measurement	Yes	41(46.1)
	No	48(53.9)
Blood pressure measurement	Yes	74(83.1)
	No	15(16.9)
Urinalysis	Yes	70(78.7)
	No	19(21.3)
Gravidex	Yes	11(12.4)
	No	78(87.6)
HIV testing	Yes	54(60.7)
	No	35(39.3)

Table 4: 7 above shows the observed skills for the midwives on history taking and physical examination. The findings show that 72 (80.9%) of the respondents were able to record the following parameters from the clients, social history 82(92.1%), obstetric history, 77(86.5), menstrual history, 77(86.5%), medical history 77(86.5%), surgical history 81(91.0%) and family history 69 (77.5%).

With regards to physical examination, 83(93.3%) of the respondents were able to conduct head to toe examination, 48(53.9%) were not able to take body weight measurements, 74(83.1%) were able to take blood pressure measurements, 70(78.7%) were able to test urine, 78(87.6%) were able to do gravidex test and 54(60.7%) were able to HIV testing.

Table 4: 8 Skills levels of midwives on abdominal examination, Calculation of expected date of delivery, Collection of specimens and information, education and communication (IEC (n = 89)

Variable	Category	n (%)
Abdominal examination		
Inspection	Yes	76(85.4)
	No	13(14.6)
Pelvic	Yes	89(100.0)
	No	0(0.0)
Presentation	Yes	88(98.9)
	No	1(1.1)
Auscultation	Yes	86(96.6)
	No	3(3.4)
Calculation of expected date of delivery (EDD)		
Naegele's rule	Yes	54(60.7)
	No	35(39.3)
Obstetrical rule	Yes	57(64.0)
	No	32(36.0)
Collection of specimens		
HB	Yes	58(65.2)
	No	31(34.8)
RPR	Yes	44(49.4)
	No	45(50.6)
Blood group	Yes	35(39.3)
	No	54(60.7)
Giving information, education and communication (IEC)		
Danger signs in pregnancy	Yes	64(71.9)
	No	25(28.1)
Birth preparedness	Yes	54(60.7)
	No	35(39.3)
Nutrition	Yes	60(67.4)
	No	29(32.6)
HIV/AIDS	Yes	66(74.2)
	No	23(25.8)
Health facility delivery	Yes	51(57.3)
	No	38(42.7)

As indicated in table 4: 8 above, 76(85.4) of the respondents were able to carry out abdominal inspection of the pregnant woman, 89(100.0%) were able to do pelvic examination, 86 (96. 6%) were able to do auscultation, 88(98.9%) were able to identify the presentation of the fetus, 54(60.7%) calculated the EDD using Naegele's rule and 57 (64%) calculated EDD using Obstetrical rule formula. With regards to specimen collection, 58(65.2%) knew how to collect Hb specimen, 45(50.6%) did not know how to do RPR and 54(60.7%) did not know blood groups. Most 64 (71.9%) respondents gave information to clients on danger signs of pregnancy, 60(67.4%) gave information on birth preparedness and 60(67.4%) gave information on nutrition. Most of the midwives (74.2%) were skilled at giving information about HIV/AIDS.

Table 4: 9 Skills levels of midwives on HIV/AIDS, administration of medications, and documentation (n = 89)

Variable	**Category**	**n (%)**
Administration of medications		
Folic acid	Yes	69(77.5)
	No	20(22.5)
Ferrous sulphate	Yes	69(77.5)
	No	20(22.5)
Deworming tablets	Yes	45(50.6)
	No	44(49.4)
IPT Fansidar	Yes	45(50.6)
	No	44(49.4)
HIV positive pregnant	Yes	31(34.8)
	No	58(65.2)
Septrin	Yes	25(28.1)
	No	64(71.9)
Documentation		
Antenatal card	Yes	53(59.6)
	No	36(40.4)
Tetanus toxoid card	Yes	32(36.0)
	No	57(64.0)
Birth preparedness card	Yes	23(25.80
	No	66(74.2)
Standard guidelines	Yes	46(51.7)
	No	43(48.3)

Table 4: 9 above, on the administration of drugs most of the midwives had observational skills when it comes to administering folic acid, ferrous sulphate, deworming tablets and IPT Fansidar. However, most of the respondents 58(65.2%) did not have skills in administering medications for HIV positive pregnant women and in the administration of Septrin 64(71.9%). More than two thirds of midwives 66(74.2%) did not have skills in documenting birth preparedness card.

Table 4: 10 Supervision received by midwives when providing antenatal care (n = 89)

Variable	Category	n (%)
Supervision		
Received supervision in the last 6 months	Yes	62(70)
	No	27(30)
Received clinical supervision	Yes	58(65)
	No	31(35)
Received administrative supervision	Yes	21(28.7)
	No	52(71.3)

On the supervision in the last six (6) months the respondents were more than half of the respondents 62 (70%). Surprisingly, 52 (71.3%) of the respondents had not received administrative supervision (Table 4.3 (d).

4.3. 4. Section D: Associations Between the Dependent and Independent Variables

Section D shows the association between the dependent variables (midwives knowledge levels and skills) and the independent variable (sex, qualifications, received supervision in the last 6 months, received clinical and administrative supervision, had in service training in reproductive health, had adequate job place for antenatal services and had in-service training in reproductive).

Table 4:11 .Demographic factors associated with midwives' knowledge levels on first antenatal care to pregnant women (n = 89)

Variable	Knowledge		P-value
	Yes, n (%)	No, n (%)	
Sex			
Female	59 (90.8)	22 (91.7)	0.631
Male	6 (9.2)	2 (8.3)	
Age	40.5±12.0	37.5±13.4	0.333
Qualification			
Bachelor of Science in Nursing	2 (3.1)	0 (0.0)	0.630
Registered midwife	20 (30.8)	7 (29.2)	
Enrolled midwife	26 (40.0)	8 (33.3)	
Certified midwife	17 (26.2)	9 (37.5)	
Received supervision in the last 6 months			
Yes	45 (69.2)	17 (70.8)	0.884
No	20 (30.8)	7 (29.2)	
Received clinical supervision			
Yes	41 (63.1)	17 (70.8)	0.495
No	24 (36.9)	7 (29.2)	
Received administrative supervision			
Yes	16 (24.6)	5 (20.8)	0.709
No	49 (75.4)	19 (79.2)	
Had in-service training in reproductive			
Yes	30 (46.2)	7 (29.2)	0.149
No	35 (53.8)	17 (70.8)	
Said that work organization and environment had adequate job place for antenatal services			
Yes	38 (58.5)	18 (75.0)	0.152
No	27 (41.5)	6 (25.0)	
Those who are satisfied with organization of antenatal program			
Yes	42 (64.6)	18 (75.0)	0.354
No	23 (35.4)	6 (25.0)	

Table 4.11 above shows that those who said that work organization and environment had adequate job place for antenatal services were more likely to be knowledgeable than those who said work organization and environment had no adequate job place. However, this finding was not significant [81.8% Vs 67.9%, P=0.152]. There were significance differences in terms of knowledge levels and sex, age, qualification, receiving supervision and satisfaction with organization of antenatal care ($P < 0.05$).

Table 4: 12 Demographic factors associated with midwives' observational skills on first antenatal care to pregnant women (n = 89)

Variable	Observational skills		P-value
	Yes, n (%)	No, n (%)	
Sex			
Female	30 (88.2)	51 (92.7)	0.475
Male	4 (7.8)	4 (7.3)	
Age	39.7±12.4	39.7±12.5	09989
Qualification			
Bachelor of Science in Nursing	0 (0.0)	2 (3.6)	0.727
Registered midwife	11(32.4)	16 (29.1)	
Enrolled midwife	13(38.2)	21 (38.2)	
Certified midwife	10 (29.4)	16 (29.1)	
Received supervision in the last 6 months			
Yes	27 (79.4)	35 (63.6)	0.116
No	7 (20.6)	20 (36.4)	
Received clinical supervision			
Yes	28 (82.4)	30 (54.5)	0.007
No	6 (17.6)	25 (45.5)	
Received administrative supervision			
Yes	7 (20.6)	14 (25.5)	0.599
No	27 (79.4)	41 (74.5)	
Had in-service training in reproductive			
Yes	16 (47.1)	21(38.2)	0.409
No	18 (52.9)	34 (61.8)	
Said that work organization and environment had adequate job place for antenatal services			
Yes	23 (67.6)	33 (60.0)	0.468
No	11 (32.4)	22 (40.0)	
Those who are satisfied with organization of antenatal program			
Yes	22 (64.7)	38 (69.1)	0.668
No	12 (35.3)	17 (30.9)	

Table 4:12 above outlines that the midwives who received clinical supervision were significantly more likely to have observational skills on first antenatal care to pregnant women than those who did not receive supervision [48.3% Vs 19.4%, P=0.007] table 4.5. There was no significance difference in terms of observational skills for the variables sex, age, qualification, adequate job places for work organization and environmental for antenatal services and satisfaction with organization of antenatal care (P >0.05).

4.3.5 Summary of the Findings

The current study has revealed that 81 (91.0%) of the respondents were female with a mean age of 39.7±12.4 years. 34 (38.2%) of the respondents were enrolled midwives. The mean duration these midwives worked in the antenatal clinic was 5.6±7.0. 62 (69.7) of the midwives received supervision in the last six months of the collection of this data, 58 (65.2) received clinical supervision and 68 (76.4) received administrative supervision. 52 (58.4%) received reproductive health training. Majority 84(94%) of the midwives were able to correctly define Antenatal care (ANC), knew the danger signs in pregnancy and knew investigations which were done during the first antenatal visit except for ultra sound and gravidex. More than three quarters 70 (78.7%) of the midwives did not know how to give advice on the importance of using fortified sugar. Surprisingly 41(46%) of midwives did not know that timing of first antenatal visit is one month. Additionally, 35(39%) did not know that one of the objectives of ANC is to provide health promotion, medical and psychosocial interventions. The findings also revealed that 34(38%) of the respondents did not know that assessment for referral is one of the routine interventions during ANC.

In this study, a structured checklist was used to observe skills for the midwives. The study almost three quarters 66(74%) revealed that the respondents did not document on the birth preparedness card. Furthermore, the findings also revealed that more than half 57(64%) of the respondents did not document on tetanus toxoid card as well. With regards to history taking, most of the respondents' had history taking skill. However, a little more than half 45(50.6%) of the respondents could not take specimen for RPR. Furthermore, 38(42.7%) of the respondents did not give information on the importance of health facility delivery.

Regarding the midwives´ knowledge on first antenatal care to pregnant women, 65(73%) knowledgeable while 24(27%) were not. Whilst 55(61.8%) of the midwives had no observational skills while 34(38.2%) had the skills. Moreover, 52(58.4%) of the respondents

reported that necessary equipment instruments and supplies were adequate and 37(41.6%) reported not adequate.

The findings showed that those who said that work organization and environment had adequate job place for antenatal services were more likely to be knowledgeable than those who said work organization and environment had no adequate job place. However, this finding was not statistically significant [81.8% Vs 67.9%, P=0.152]. There were significance differences in terms of knowledge levels and sex, age, qualification, receiving supervision and satisfaction with organization of antenatal care ($P < 0.05$).

The midwives who received clinical supervision were more likely to have observational skills on first antenatal care to pregnant women than those who did not receive supervision [48.3% Vs 19.4%, P=0.007] table 4.12. About 70% of the midwives received supervision in the last six months' prior data collection. Less than half (41.6%) had in service training in reproductive health. There was no significance difference in terms of observational skills for the variables sex, age, qualification, adequate job places for work organization and environmental for antenatal services and satisfaction with organization of antenatal care ($P > 0.05$).

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

The general objective of the study was to determine midwives' knowledge and skills on first antenatal care offered to pregnant women by midwives in Livingstone District in Zambia. The results were based on the analysis of the responses from eighty-nine (89) midwives sampled from Livingstone central hospital and six (6) other health centers. Chapter five (5) discusses the research findings.

5.2 Demographic Data

Section A of the questionnaire elicited information on the demographic characteristics of the respondents using a semi structured questionnaire. More than three quarters of midwives (91.0%) were female midwives (Table 4.1). This could be attributed to the fact that midwifery was regarded as a woman's career and was dominated by females until recently. This is in line with a study done in Sweden by Anderson (2014) which showed similar findings.

There are different types of midwifery programs in Zambia that offers formal training for more than one (1) and regulated by General Nursing Council (GNC). The researcher found participants with certificates in Registered Midwifery, Enrolled Midwifery, Certified Midwifery and Bachelor of Science Degree in Nursing with average work experience of mean age of 39.7±12.4 years (Table 4.1). All the participants had valid practicing licenses which are renewed yearly as required by GNC as a legal requirement. This is findings is in line with Pakistani study conducted by Ali et al (2015) which showed that all the midwives had an active license to practice, provided by the Pakistan Nursing Council (PNC).

The findings showed that most of the participants were above 25 years with wok experience ranging from six (6) months to 3.5 years (Table 4.1). The implication of having less years of experience in antenatal care has been associated with adverse effects on pregnancy outcomes. This will later affect the inability of the midwife to identify potential risks for pregnancy and provide prompt interventions and treatment. This is contrarily to a study done in Sweden by Anderson (2014) which showed that the midwives had an average age of 53.3 and had

worked an average of 23 years as a midwife and 13 years of which in antenatal care. In the study done by Ali et al (2015) it showed that the respondents had valid practicing license.

From all the participants in this study, only 2 (2.2%) had a Bachelor of Science qualification in nursing, 27 (30.3%) were registered midwives, 34 (38.2%) were enrolled midwives and 26 (29.2%) were certified midwives (Table 4.1). There were more enrolled midwives in this study because these are front liners in the level professionals are found at the Community Health facilities.

5.3 Midwives Knowledge Levels about First Antenatal Care

One of the specific objectives of this study was to assess the level of knowledge of midwives about first antenatal care. Section B consisted of information on midwives' knowledge levels about first antenatal care. The knowledge questions elicited information on objectives and routine interventions on ANC, danger signs and advice given to pregnant women on supplements, investigations and medications, HIV/AIDS, frequency and topics on IEC.

The study revealed that most (94%) of the midwives were able to correctly define Antenatal care (ANC) (Table 4.2). This could be attributed to the training they have had where concepts such as antenatal care are emphasized. This finding is in agreement with those of Ayiasi et al. (2014) 's study where most of the respondents were able to define the ANC concept.

In the current study 70% of the respondents correctly mentioned the expected observations and important IEC messages routinely offered during ANC consultations. This could be attributed to the type of trainings the participants received in that IEC given to ANC was part of the curriculum. Moreover, with the introduction Continuous Professional Development which aims at improving the nurses' knowledge and skills by identifying strengths and gaps in the care of ANC which are presented either in a symposium or clinical presentation.

The study shows that more than half (53.9%) of midwives did not know that timing of the first antenatal visit, the optimal number of visits and basic interventions that are offered during ANC consultations (Table 4.2). This could due to the current practice by midwives on ANC in that most pregnant mothers report for the first ANC after 20 weeks of gestation. This could contribute to not knowing the timing of antenatal visit. These findings are in line with Kyei, Chansa and Garbrysch (2012) who reported similar findings.

The current study identified a gap in knowledge on the objectives of ANC on health promotion among others (54 %) respondents (Table 4.2). Elkhalif and Kuppuswamy (2014) reveals that the midwives' theoretical knowledge on nutrition was poor. On the contrary, about 70% of midwives correctly mentioned the important health education messages routinely offered during ANC (Ayiasi et.al. 2014). This information is important for the midwives to know because the correct information will be given to the pregnant women. Health promotion include nutrition during pregnancy which include foods rich in proteins such as beans, kapenta, and meat, carbohydrates such as nshima, potatoes, rice and pasta, protective foods such as green leafy vegetables. The pregnant woman needs to eat a well-balanced diet for both fetal and maternal wellbeing. This will be detected during ANC when taking body weight and physical examination. During pregnancy, a woman is supposed to gain 12kg during the nine (9) month period of pregnancy. If such information is not given it predisposes the pregnant to medical conditions such as anaemia, diabetes mellitus and hypertension. These medical conditions are some of the interventions that addressed during antenatal clinic. During this period, the pregnant women's blood is investigated for haemoglobulin (Hb) levels, urine for protein and glucose, and blood pressure measurements. Normal ranges for is 12.1g/dl to 14g/dl, normal urine should not contain any proteins nor glucose. The normal blood pressure ranges are between 100 mmHg to 120 mmHg systolic and 70 mmHg to 90 mmHg diastolic **(Fraser et.al, 2012)**. The above-mentioned investigations are conducted during each visit but are scheduled according to the findings according to the standards.

Sixty-two percent (63%) of the respondents knew that assessment for referral was one of the routine interventions during ANC (Table 4.2). These findings are supported by Amosu et al. (2011) who recorded similar findings in Ghana. Assessment for referral is one of the activities done during antenatal period. Assessment is conducted using different parameters such a pregnant woman with previous caesarean sections will require referral for further

assessment for the plan of the delivery. Additionally, some other assessments for referral include the low Hb levels, presence of protein and glucose, high levels of blood pressure measurements. The assessments can be detected early during antenatal clinic.

Ninety percent (90%) of the respondents were knowledgeable of the importance of health facility delivery (Table 4.2). Healthy facility delivery is an important aspect of IEC because during antenatal clinic, pregnant women with risk pregnancies are detected such as previous caesarean sections. The antenatal card has a provision of a box where the midwife shades it with colour red which signifies danger sign of the pregnancy and health facility delivery preferably hospital. The pregnant women are given information on the importance of health facility delivery because of availability of experts and others services such as theatre and Laboratory department.

More than three quarters (88%) of respondents knew the danger sign in pregnancy (Table 4.3). Interestingly about 30.3% of the respondents did not know that abdominal pain was one of the danger signs of pregnancy. These result correlates with Wajid, Rashid and Mirs (2010)‘s findings in a study conducted rural Pakistan on initial assessment of Community Midwives.

Less than a quarter (21.3%) of the midwives did not know how to give advice on the importance of using fortified sugar (Table 4.3). This could be due to the different types of sugar being sold from different countries like Zimbabwe, Botswana and Namibia which does not contain vitamin A. Fortified sugar contains vitamin A which is essential for normal growth of the eyes. Fortified sugar means that vitamins such as vitamin A have been added to the sugar to improve health and prevent nutritional deficiencies.

The current study according to Table 4.4 revealed that most of the midwives knew the investigations which were done during the first antenatal visit except for ultra sound (64%) and gravindex (37.1%). Ultrasound is one of the services offered during antenatal clinic. However, this is a challenge as there is a fee attached to it and moreover it is not readily available in most health facilities except at the hospital. Ultrasound is only done when a midwife suspects an abnormality such multiple pregnancy. The researcher also observed that urinalysis was not being done routinely due to non-availability of urine containers and reagents. According to the American College of Obstetricians and Gynaecologist (2016), urine may be tested for red blood cells to detect any urinary tract infection, white blood cells to determine any presence of a urinary tract infection, and glucose (high levels may be a sign

of diabetes mellitus). The amount of protein is also measured. The protein level early in pregnancy can be compared with levels later in pregnancy. High protein levels in the urine may be a sign of pre-eclampsia, a serious complication that usually occurs later in pregnancy or after the baby is born.

The findings according to Table 4.5 revealed that about two thirds (68.5 %) of the respondents did not know that one of the purposes of routine ultrasound done in the first trimester of pregnant women is for establishing detection of gross fetal abnormalities such as anencephaly, establish fetal number and chronicity or amionicity in multiple pregnancies. This is important to so that necessary interventions are done promptly. Depending of the results from the ultrasound, the midwife will have an opportunity to give appropriate IEC to the pregnant women and the significant other for example if anencephaly is detected. Ancephaly is a cephalic (head) disorder that results from a neural tube defect that occurs when the cephalic end of the neural tube fails to close, usually between the 23rd and 25th day of pregnancy, resulting in the absence of a major portion of the brain, skull and scalp. Some of the causes during pregnancy include exposure to certain agents, diabetes (hyperglycemia), hyperthermia, drugs and medication (anti convulsants). And also, family histories of factors that place a woman at increased risk include family history of neural defects. Some of the findings indicative of neural tube defects are: lemon sign frontal notching. Fetal head looks like a lemon, banana sign: elongated cerebellum and small bi parietal diameter. It is one of the most common types of neural defect, but most of these pregnancies end in abortion.

As indicated in Table 4.6, almost all the midwives 88 (98.9%) knew about the frequency of health education, danger signs in pregnancy and health facility delivery when it comes to giving important information and education to pregnant women whilst 10% of respondents did not know the importance of health facility delivery. Health facility delivery is vital because high risk pregnancies could have been identified as a result of a medical condition present before pregnancy or one that develops during pregnancy. Factors include age of the pregnant mother such as below 15 years and above 35 years, height below 1.5 centimeters and medical history prior to caesarean section, preeclampsia and family history of genetic condition.

5.3.1 Conclusion

The study revealed that more than three quarters of the midwives were able to correctly define ANC. This could be attributed to the training they have had where concepts such as antenatal care are emphasized. However, more than half of the midwives did not know that the timing of the first ANC visit, the optimal number of visits and basic interventions that are offered during ANC consultations because most pregnant mothers report for the first ANC after 20 weeks of gestation.

The pregnant woman needs to eat a well-balanced diet for both fetal and maternal wellbeing. Therefore, health promotion nutrition during pregnancy is important with emphasis with foods rich in proteins such as beans, kapenta, and meat, carbohydrates such as nshima, potatoes, rice and pasta, protective foods such as green leafy vegetables. The health education messages routinely offered during ANC are important for the midwives to know because the correct information will be given to the pregnant women

Assessment for referral is one of the activities done during antenatal period. Assessment is conducted using different parameters such a pregnant woman with previous caesarean sections will require referral for further assessment for the plan of the delivery. Additionally, some other assessments for referral include the low Hb levels, presence of protein and glucose, high levels of blood pressure measurements. The assessments can be detected early during antenatal clinic.

Healthy facility delivery is an important aspect of IEC because during antenatal clinic, pregnant women with risk pregnancies are detected such as previous caesarean sections. The antenatal card has a provision of a box where the midwife shades it with colour red which signifies danger sign of the pregnancy and health facility delivery preferably hospital.

Hb estimation, blood group, urinalysis and RPR are some of services offered during antenatal clinic. However, ultrasound is not offered as a routine, it is only done when a midwife suspects an abnormality such multiple pregnancy. Urinalysis is an important test for red blood cells and white blood cells to detect and determine any urinary tract infection.

5.4 Midwives Clinical Observations

The second objective of this study was to determine midwives' clinical observation to observe the midwives' clinical skills, the researcher used a structured clinical observation

skills checklist comprising of history taking, Physical Examination, Abdominal Examination, Calculation of Expected Date of Delivery (EDD) Collection of specimens, Giving Information, Education and Communication (IEC), Administration of medications, Documentation

The findings on the midwives' observational skills showed that more than half 55 (61.8%) of the midwives had no clinical observational skills while 34 (38.2%) had the skills (Figure 4.2). The findings are in line with Schoon and Motlolometsi (2016) that the midwives should have the required skills to provide the services. On the contrary in the same study, maternal care is provided by professionals who are not equipped with appropriate skills. The researcher in the study found out that when it comes to history taking most of respondents had the clinical observational skills. The clinical observational skills included history taking in Social History, Obstetric history, Menstrual History, Medical History, Surgical History, Family History.

Table 4:7 shows that 72 (80.9%) of the respondents were able to record the following parameters from the clients, social history 82(92.1%), obstetric history, 77(86.5), menstrual history, 77(86.5%), medical history 77(86.5%), surgical history 81(91.0%) and family history 69(77.5%). With regards to physical examination, 83(93.3%) of the respondents were able to conduct head to toe examination, 48(53.9%) were not able to take body weight measurements due to non-availability of the adult weighing scale or non-functional. In some settings, the adult weighing was available but not used the midwives during ANC because in the most urban clinics the weighing was done by the community health workers or they just ignore it, 74(83.1%) were able to take blood pressure measurements, 70(78.7%) were able to test urine, 78(87.6%) were able to do gravidex test and 54(60.7%) were able to HIV testing. The researcher observed that although physical examination was done, certain parameters were not done such breast examination, inspection of the abdomen for the presence of any scar. These parameters are important because for breast examination, the breast is examined **if** ideal for breastfeeding by checking the nipples and give appropriate advice. As for inspection of the abdomen, this will help to detect any surgery relating to the pelvis and helps the midwife to make a decision on the type of delivery to prepare for such pregnant women. At times trial of scar or a caesarean section during delivery could be planned and hospital delivery is recommended.

The researcher found that during physical examination assessment of anaemia was done. This is in line with Wajid, Rashid and Mirs (2010) in that in the study three-quarters of the midwives (81%) performed this assessment correctly.

In Figure 4.3 outlines that 52 (58.4%) of the respondents reported that necessary equipment instruments and supplies were adequate. Amosu et. al., (2011) highlights that shortages of equipment and supplies inhibit the full provision of ANC services**.**

With regards to HIV testing, most (61%) of the respondents were able to do it (Table 4.7). The observation by the researcher was that HIV testing in the urban clinics was being conducted by the trained community health workers. At the hospital the midwives were conducting the HIV testing to all the pregnant women who were admitted to the department depending of the HIV test result, for the women, who had an HIV negative result written on antenatal card will be offered a repeat HIV testing if it was last done three (3) months ago. It helps to detect any sero conversion and necessary interventions are instituted. All the MCH departments and obstetrics departments are able to initiate all the HIV positive pregnant women on highly active antiretroviral treatment after assessing the readiness of the client. This reduces the chances of mother to child transmission of HIV/AIDS.

In terms of collection of specimens (HB, RPR, HIV testing) 34% of respondents did not get the Hb and more than half (50.6%) could not take specimen for RPR (Table 4. 8). Hb collection is not being done in most of the urban clinics except where the laboratory services are available. The researcher found that the pregnant women from the urban health centers were sent to the hospital for Hb estimation or to the urban centers which had laboratory services. The other challenge why Hb estimation was not being done to the pregnant women were due to either distance to seek laboratory services either at the hospital or urban clinic. As result, the researcher observed that Hb results were not indicated on the antenatal cards and this complicates the pregnancy as the women have an increased risk of having a preterm or low birth-weight. Additionally, after delivery, if a woman losses blood of more than 500mls blood transfusion will be recommended. A pregnant woman might present with pallor in the eyes, mouth and nail beds detected during physical examination. This finding was confirmed by Wajid el. al. (2010) who outlined that majority of midwives performed assessment of anemia through the examination of eyes, nail beds and mouth due to

inadequate availability of the resources to be used. One of the most frequent examinations during pregnancy is the examination of the abdomen which provides information regarding various aspect of gestation.

The researcher used abdominal examination as one of the variables during clinical skills observations. The findings were that in order to find gestation age of the pregnancy during ANC, the midwife used either Naegele's rule or obstetrical wheel. 54 (60.7%) used Naegele's rule whilst 57 (64.0%) used obstetrical wheel. The challenge was non- availability of the obstetrical wheels in some MCH departments and use of Naegele's rule some midwives were using the calendars on their mobile as opposed to calculation of the expected date of delivery. The other interesting finding was that more than three quarters of the midwives were able to conduct abdominal examinations: inspection (76, 85.4%), pelvic (89, 100%), presentation (88, 98.9%) and auscultation (86, 96.6%).

On the contrary, Wajid el. al. 2010 outlined that all midwives performed assessment of anemia through the examination of eyes, nail beds and mouth however except three (3) performed it correctly. One of the most frequent examinations during pregnancy is the examination of the abdomen which provides information regarding various aspect of gestation.

As indicated in table 4.8, 45(50.6%) of the respondents did not know how to conduct RPR and 54(60.7%) blood groups. According to the observations by the researcher, most urban centers use the rapid testing kits for RPR which can be done through collecting blood by a finger prick. The rapid testing kits for RPR were out of stock at the time of the study and pregnant women were sent to the hospital. The blood groups are only done at the hospital and most pregnant could not manage due to distance. RPR and blood groups are important to prevent congenital syphilis and preterm labour. According to AFFP, 2016, false positive can occur with pregnancy, infections, or autoimmune disease. Pregnant women with a positive RPR result should undergo specific treponemal testing (for example Fluorescent Treponemal Antibody absorption (FTA-ABS). Furthermore, blood groups also give a rhesus (Rh) factor of the pregnant woman obtained during the first ANC visit which is used in the prevention of alloimmunization and haemolytic disease in the new born. If known from prior pregnancies, does not need to be repeated. Rh- negative pregnant women require Rh0 (D) immune globulin at 28 weeks gestation and within 24 hours within 24 hours after birth if the infant is Rh positive Antenatal Card, Tetanus Toxoid Card and Birth Preparedness Card are some of

the documents the researcher considered for the study. When it came to documentation of results more than half (74%) of respondents did not document on the birth preparedness card, 64% did not document on the tetanus Toxoid card and 40% did not document on the antenatal card (Table 4. 9). A birth preparedness card is given to all pregnant women during antenatal clinics. It prepares pregnant women on the danger signs in pregnancy, at delivery to the mother and the baby, and during postpartum period. These parameters are written on the birth preparedness. It also includes the preparation of funds by the pregnant women and the family to be used during labour and delivery and in case of referral to the next level and what type of transport to be used when going to the health facility.

During antenatal period the midwives highlights the importance of the birth preparedness and evidenced by the documentation and a card given to the pregnant woman. It also highlights where the woman prefers to deliver from and which midwife would deliver her. It is an important tool because it prepares the pregnant women for labour and delivery and to prepare for any complications pertaining to pregnancy, labour and delivery. The birth preparedness card is supposed to be filled in by the midwife and reviewed during each ANC. The researcher observed that the midwife did not review the birth preparedness cards neither was it recorded. In the study, the researcher's findings were that the respondents gave an explanation to the pregnant women and told them to have the birth preparedness card filled in with the significant other at home. Furthermore, the researcher found that the respondents at the hospital discovered that the pregnant women had the birth preparedness card put together with the antenatal card but it was found to be blank. When the pregnant women were asked by the respondents at the hospital about the birth preparedness card, it was found that they had no idea about the card as there just given during ANC visits. Meanwhile other pregnant women mentioned that they were told to have it filled up at home with the significant others after an explanation from the midwife.

Another interesting finding was an issue of the provision and documentation of tetanus Toxoid to pregnant women according to the acceptable standard. This is an injection of tetanus Toxoid given to pregnant women to prevent tetanus. The midwife needs to get information from the pregnant woman as to how many she has received during her reproductive period or during the previous pregnancy. Ideally five (5) injections is the standard to the given and if a woman receives all the five (5) injections it means she is fully protected against tetanus. This information is indicated on the Tetanus Toxoid card. Currently

the new antenatal card has an inclusion of Tetanus Toxoid section which needs to be filled by the midwife. If this part is omitted, it becomes difficult to determine how many doses of Tetanus Toxoid were given to the woman. More than half 57 (64.0%) of the respondents did not fill in on the section of Tetanus Toxoid on the antenatal card which makes it difficult for any midwife to determine how many Tetanus Toxoid injections had been given to pregnant woman or during the reproductive period.

An antenatal card is a tool used during antenatal clinic and has different indicators that should be filled accordingly and whenever a service is offered. The researcher observed that certain indicators were missing such as previous pregnancies, blood pressure and body weight measurements, Hb, HIV, RPR results. If these indicators are missing it endangers how the pregnant women affecting the maternal and fetal wellbeing.

The study revealed that most of the midwives (74.2%) were skilled at giving information about HIV and AIDS whilst 42.7% did not know the importance of health facility delivery (Table 4.8). HIV and AIDS information given to all pregnant women is the policy which addresses interventions to Prevent Mother to Child Transmission of HIV and AIDS. Highly active antiretroviral treatment is given to all HIV positive pregnant women regardless of the CD4 count which is not done routinely at the time of initiation but later after treatment has been commenced.

The drugs the researcher focused on were Folic acid tablets, Ferrous Sulphate tablets, Deworming tablets, IPT Fansidar starting after second trimester (three doses), Highly Active Antiretroviral Treatment (HAART) for HIV positive pregnant women and Cotrimoxazole (Septrin) tablets for prophylaxis for HIV positive pregnant women. With regards to drug administration, clinical observed was noted in most of the midwives such as administering folic acid, ferrous sulphate, deworming tablets and IPT Fansidar.

Folic acid tablets are one of the tablets given during ANC visit. It is important to get enough folic acid, the synthetic form of vitamin B9, also known as folate. Folic acid prevents neural tube defects (NTDs) - serious birth defect of the spinal cord (such as spina bifida) and the brain (such as ancephaly**) (NCBDDD, 2017)**. The neural tube is part of the embryo from which the baby's spine and brain develop. A shortage of (deficiency) folate appears to play a significant role. Studies have shown that women who take supplements containing this

vitamin before they get pregnant and very early in their pregnancy are significantly less likely to have a baby with encephaly or a related neural tube defect **(CDC, 2017).**

Intermittent Preventive Treatment (IPT) Fansidar three (3) tablets is given at an interval of four (4) weeks to all pregnant women beginning the second trimester of pregnancy as a Daily Observation Treatment (DOT). The researcher observed that Fansidar three (3) tablets was given as DOTs to all pregnant women according to the gestation age. Fansidar is an antimalarial agent that works by blocking the formation of folic acid within the malaria organism, which kills the parasite **(ZNF, 2013).**

Counselling on deworming in pregnancy was done by the midwives. Thereafter administered a single dose of tablet albendazole 400mg or mebendazole 500mg given as a start dose as per recommended guidelines and was be taken by the pregnant women in the presence of the midwife at the time of ANC visit to prevent Soil Transmitted Helminths (STH). Deworming should be done after the first trimester of pregnancy (preferably during the second trimester). STH infections are common worldwide, contributing to a high burden of malnutrition and morbidity in resource poor settings (WHO, 2016). The most common ones are roundworm and hook worms. Available scientific evidence establishes the fact that worm infestation during pregnancy is a major health issue and in some populations up to 41% of iron deficiency anaemia in pregnant women is attributed to hookworm infestation **(WHO, 2016).**

Ferrous sulphate an iron supplement is given during pregnancy to prevent low blood levels of iron. Iron is an important mineral that the body needs to produce red blood cells and keep good health. Some of the measures that are given to pregnant women are washing of fruits and vegetables before consumption, use of footwear to prevent hookworm infestations. The researcher observed that the following was administered to the pregnant women by the respondents, Folic acid tablets 5mg 88(98.9%), Ferrous Sulphate tablets 200mg 88(98.9%), deworming tablets 500mg stat 82 (92.1%) and IPT Fansidar three (3) tablets stat 76(85.4%).

The study revealed that more than half 58 (65.2 %) of the respondents did not have skills in administering medications for HIV positive pregnant women and in the administration of Septrin 64 (71.9%) (Table 4. 9). Septrin reduces chorioamnionitis a bacterial infection of the membranes that surround the infant in pregnancy) It is recommended to HIV positive pregnant women as prophylaxis and furthermore it is associated with a reduction in preterm

delivery and neonatal mortality in their HIV exposed infants **(MOH, 2016)**. It also provides protection against the opportunistic infection pathogen pneumocystis jirovecii and toxoplasma gondii and protection against malaria, bacterial pneumonia. Administration of medications for HIV positive pregnant women is the use of Combination Antiretroviral Therapy (cART) **(MOH, 2016).**

Elimination of Mother to Child Transmission of HIV (eMTCT) Option B+ is a new strategy in the care of HIV pregnant positive women (PMTCT Guidelines, 2015). The recommendation is the use of life-long triple ARV combination in HIV positive pregnant and breastfeeding woman (regardless of the woman's CD4 count or WHO clinical stage) for treatment and prevention of transmission of HIV to infants. The viral load is the best predictor of progression and prognosis. A pregnant HIV positive woman who has been on cART for more than six (6) months with good adherence is expected to have an undetectable viral load. cART is the use of effective combinations of three or more ARVs usually from two or more drug classes in order to achieve the greatest suppression of viral load for the most sustained period of time (previously referred to as HAART). Patients must take 95% or more of doses for greatest and most sustained viral suppression. cART decreases the risk of mother-to-child transmission of HIV (PMTCT Guidelines, 2015).

Other baseline investigations that need to be done include RPR, Hb, urinalysis at the time of initiation of HAART. The enrolment and initiation is currently being done in the MCH and Obstetrics departments including administration of the drugs.

The Central Statistical Office Zambia (2013) reported that the vast majority of pregnant women who went to seek ANC (98.9%) were counseled and tested for HIV. Furthermore, in the study by Kyei et al. (2012**)** highlighted that although 94% of women sought ANC during their pregnancy, only 19% presented in their first trimester, resulting in the omission of key interventions. Only 19% of the pregnant women present in their first trimester and as result key interventions are omitted. This is important as this help the midwives to scale up PMTCT programme and now the country has adopted option B+ strategy which offers long term antiretroviral treatment.

5.5 Supervision for Antenatal Care Services

The third objective of this study was to ascertain whether midwives are supervised when they are providing antenatal care to pregnant women. The findings on the supervision of the

respondents in the last six (6) months reveals that more than half 62 (70%) were supervised (Table 4. 9). Among the respondents who were supervised, 52 (71.3%) had not received administrative supervision whilst 58 (65%) had received clinical supervision (Table 4. 10). According to the marking key made by the researcher, scores above 75% which was considered for a midwife who had received clinical supervision of three (3) or more and two (2) or more on knowledge and skills on antenatal and scores below 75% if had received administration supervision. The clinical supervision also included in service trainings such as EmONC, Option B+, FANC among others. During clinical supervision, the above-mentioned trainings require practice to gain competency by the midwife. The clinical supervision includes such skills as they are used during ANC thereby addressing the reduction in the numbers of maternal deaths as most of the interventions are conducted and carried out.

5.6 Associations between the Dependent and Independent Variables

The associations between the dependent and independent variables shows that those who said that work organization and environment had adequate job place for antenatal services were more likely to be knowledgeable than those who said work organization and environment had no adequate job place (Table 4.11). However, this finding was not significant [81.8% Vs 67.9%, P=0.152]. Therefore, there was significance differences in terms of knowledge levels and sex, age, qualification, receiving supervision and satisfaction with organization of antenatal care ($P<0.05$).

The midwives who received clinical supervision were significantly more likely to have observational skills on first antenatal care to pregnant women than those who did not receive supervision. These findings were statistically significant [48.3% Vs 19.4%, P=0.007] table 4.5. Therefore, there was no significant differences in terms of observational skills for the variables sex, age, qualification, adequate job places for work organization and environmental for antenatal services and satisfaction with organization of antenatal care ($P>0.05$).

5.7 Implications to Nursing

5.7.1 Nursing Practice

Clinical observation showed that more than three quarters of the 55 (61.8%) of the midwives was not seen to carry out the required activities during ANC visits while less than three

quarters 34 (38.2%) had the skills required during ANC visits. Clinical Observation skills should be reinforced in the clinical areas as they are important in saving the lives pregnant women and their unborn babies' lives.

In order to provide quality care, work organisation, job satisfaction, adequate supplies of medical and surgical equipment should be in place. Finally, even the standard guidelines for ANC should be readily available and displayed accordingly.

5.7.2 Nursing Administration

This study shows that the midwives knowledge levels were high whilst the skills levels were low. The policy makers and reproductive health coordinators should do continuous monitoring, evaluation and review of the ANC strategies. The nursing administrators should ensure that regular supervision is conducted to ensure that midwives are providing quality care and they have all the necessary equipment and supplies they need to enable them provide quality care.

5.7.3 Nursing Education

Although the study showed that 65 (73%) of the midwives were knowledgeable on first antenatal care and 24 (27%) were not, there is need to give knowledge and skills updates to midwives in order to keep abreast with current trends. For instance, most respondents in this study were not knowledgeable about important parameters such ultrasound and gravidex. There is also need for nursing and midwifery training schools put emphasis on the diagnostic tests as well observations during the training.

5.7.4 Nursing Research

The scope of this work covered selected midwives working in antenatal care in Livingstone urban district. There is need to conduct future research using a bigger sample size to enable generalization of findings to the rest of the country. The current found out that midwives had inadequate clinical antenatal skills, there is need therefore to determine factors leading to low skills levels on ANC among the midwives. This will help to implore information on skills levels on the midwives on ANC and address the high numbers of maternal deaths.

5.9 Conclusion and Recommendations

5.9.1 Conclusion

The findings of the study revealed that the respondents' knowledge levels on first antenatal care was high 65 (73%) compared to the observational skills 55 (61.8%). The midwives' antenatal skills were low. This could mean that the quality of ANC services offered is compromised which in turn increases chances of more maternal deaths. The supervision of midwives was found to be poor resulting into compromised quality of care rendered by midwives. There is need therefore to regularly update the skills of midwives on antenatal care and to reinforce regular supervision in order to improve the quality of care.

5.9.2 Recommendations

Based on the findings of this study the following recommendations were made:

The Livingstone District Health Office through the Nursing Officers Unit should reinforce regular supervision of midwives in the antenatal clinics to ensure quality care is being provided.

There is need for Livingstone District Health Officer to introduce clinical mentorship of the midwives in the antenatal clinics in Livingstone district to ensure that midwives are mentored on antenatal procedures more especially the newly qualified midwives.

Livingstone District Health office should introduce regular knowledge and skills update for midwives on antenatal care and on MNCH in order to improve their knowledge and skills

There is need for both the District Health Office and Livingstone Central Hospital to conduct Maternal Death Surveillance Response (MDSR) regularly to strengthen health systems to respond to needs and priorities on maternal deaths.

5.10 Limitations and Strength of The Study

5.10.1 Limitations

Every study no matter how well it is conducted has limitations. The limitations of the current study include:

1. Sample size was too small to enable generalization of findings to other settings.

2. Use of self-report could yield non-reliable data in that the respondents may not be truthful.
3. Likelihood of bias due to use of non-participant observations methods.

5.10.2 Strength of the Study

5.10.2.1 Utilization and Dissemination of Findings

The results of the study were presented to the Department of Nursing Sciences, School of Nursing, University of Zambia (UNZA). Then, the results were later presented at the postgraduate seminar week on 1st May to 5th May, 2017 held at UNZA Directorate Research and Graduate Studies. The results will also be presented to numerous stakeholders involved in the provision of maternal health services at various fora such as clinical symposiums workshops and conferences.

Livingstone Central Hospital and Livingstone District Health Office which was the study site will be given a copy of the study results report. The results will be published in African Journal of Midwifery. In addition, four copies of the bound research report will be printed and submitted to the following:

1. School of Nursing Sciences
2. UNZA Medical Library and Main Library
3. Ministry of Health
4. Researcher

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APPENDICES

Appendix III: INFORMATION SHEET

Topic: Knowledge and Skills Levels of Midwives on Antenatal Care in Livingstone District

My name is Linda Muleya Libingi; a student pursuing a Master of Science in Nursing Degree at the University of Zambia. I am kindly requesting for your participation in the research study mentioned above, because it is important to assess knowledge and skills levels of midwives on antenatal care in Livingstone district. I will initially explain the purpose of the study, the risks or benefits and what is expected of you. Your participation will entirely be voluntary and you will be requested to sign the consent form if you are agreeable. However, should you decline to participate you won't have to sign the consent form.

Purpose of the study

The study will provide information on knowledge and skills among midwives concerning antenatal care services that will be utilised to create awareness of the factors that facilitate or contribute to the disparities in the ANC programs. This is to help Livingstone District Health Office, Livingstone Central Hospital and Policy makers to devise measures in promoting clinical practice through integration of theory into practice among midwives.

Procedure

The study will involve signing of the consent form and completing the questionnaire. Once it is completed, the questionnaire should be returned to the researcher.

Risks and discomforts

There is no risk involved in this research though part of your time will be spent answering some questions.

Benefits

There will be no direct benefit to you by participating in this study, but the information which will be obtained will help the policy makers and Livingstone District Office and Livingstone Central Hospital to strengthen the knowledge and skills levels of midwives on antenatal care hence improving the competencies. The information obtained will be used to improve the Knowledge and skills levels of midwives on antenatal care services.

Cost, reimbursement and compensation

Your participation in this study is voluntary. You will receive no money for your participation. However, if you feel like withdrawing at any time, you are free to do so and this will not affect your work as a midwife.

Confidentiality/anonymity

The data we collect do not contain any personal information about you. The discussion and information collected in this study will be kept strictly confidential. No one will link the data you provided to the identifying information you supplied (e.g., address, email).

Appendix IV: INFORMED CONSENT FORM

The purpose of this study has been explained to me and I understand the purpose, the benefits, risks and discomforts and confidentiality of the study, I further understand that taking part in the study is purely voluntary, if I accept to take part in this, I can withdraw at any time without having to give an explanation.

I, _____ _____ (Names)

Agree to take part in this study.

Signed _____Date: _____
(Participant)

Participants' signature or thumb print

Signed: _____Date: _____
(Witness)

Signed: _____Date: _____
(Researcher)

Appendix V: INSTRUMENTS FOR DATA COLLECTION TOOL

UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE

DEPARTMENT OF NURSING SCIENCES

SELF ADMINISTERED QUESTIONNAIRE

TITLE: KNOWLEDGE AND SKILLS LEVELS OF MIDWIVES ON ANTENATAL CARE IN LIVINGSTONE DISTRICT

DATE: ……

SERIAL NO: …….

Place of Interview…….

INSTRUCTION TO THE RESPONDENTS

1. Do not **WRITE** your name on the questionnaire, **ONLY** serial no. are required exclusively for comparison
2. Put (X) on all appropriate responses to the question
3. Attempt all the questions in all the five (5) sections
4. All information provided will be kept confidential

For Official Use

SECTION A: Demographic Data

Put (x) in the blanks and place the correct responses.

1. Gender:
    1. Female ( )
    2. Male ( )

2. Age at last birthday: …….

3. Qualification:
    1. Advanced Nurse Practitioner ( )
    2. Bsc in Nursing ( )
    3. Registered Midwife ( )
    4. Enrolled Midwife ( )
    5. Certified Midwife ( )

4. Where are you working from?
    1. Hospital ( )
    2. Health Center ( )

5. Have you ever worked in antenatal clinic?
    1. Yes ( )
    2. No ( )

6. If yes? For how long? .....

7. Are you currently working in antenatal clinic?

    1. Yes ( ) 2. No ( )

SECTION B : Knowledge on Antenatal Care

8. Antenatal care (ANC) refers to systematic assessment and anticipatory guidance of pregnant woman

1. True ( )
2. False ( )

9. The objectives of ANC are: **Tick possible answers**
    1. Promote the health and well being of the pregnant woman and the fetus throughout pregnancy by early and continuing risk assessment ( )
    2. Health promotion activities ( )
    3. Medical and psychosocial interventions ( )
    4. Follow up including a variety of routine regular examinations ( )

10. When is the timing of the first antenatal visit?
    1. Amenorrhoea of one month ( )
    2. Amenorrhoea of two months ( )
    3. Amenorrhoea of three months ( )
    4. I have no opinion ( )

11. Recommended number of ANC visits
    1. At least two visits but further visits can be arranged in of case of any of risk identified ( )
    2. At least three visits but further visits can be arranged in of case any of risk identified ( )
    3. At least four visits but further visits can be arranged in of case any of risk identified ( )
    4. Any number of visits ( )

12. What are the routine interventions during ANC? **Tick possible answers**
    1. History taking ( )
    2. Physical Examination ( )
    3. Laboratory investigations ( )
    4. Assessment for referral ( )

13. Frequency of health education
    1. During every visit ( )
    2. Only once ( )
    3. When I feel like ( )
    4. I do not know ( )

14. What are the important information, education and information to the pregnant women? **Tick possible answers**
    1. Danger signs in pregnancy ( )
    2. Birth preparedness ( )
    3. Care of the newborn ( )
    4. Health facility delivery ( )

15. Advice given to the mothers during and after pregnancy. **Tick possible answers**
    1. Balance diet ( )
    2. Tetanus Toxoid ( )
    3. Personal Hygiene ( )
    4. Breast feeding ( )
    5. Vaccination of the children ( )
    6. Family planning ( )

16. Which ones are the danger signs in pregnancy? **Tick possible answers**
    1. Abdominal pain ( )
    2. Vaginal bleeding ( )
    3. Fever ( )
    4. Headache ( )
    5. Swelling of the hands, feet and legs ( )
    6. Blurred vision ( )
    7. Fits ( )

17. Which ones are the advices given to pregnant mothers on the supplements to be taken during pregnancy? **Tick possible answers**
    1. Iron ( )
    2. Calcium ( )
    3. Folic acid ( )
    4. Iodised salt ( )
    5. Fortified sugar ( )

18. Which investigations are done during the first antenatal visit?

Haemoglobin levels estimation? **Tick possible answers**

1. RPR ( )
2. Urinalysis ( )
3. Blood group ( )
4. HIV testing ( )
5. Gravidex ( )
6. Ultrasound ( )

19. What medications are given during antenatal period? **Tick possible answers**

1. IPT Fansidar starting after second trimester (three doses) ( )
2. Folic acid tablets ( )
3. Ferrous Sulphate tablets ( )
4. Deworming tablet (anti helminthics) ( )
5. HIV positive pregnant women Highly Active Antiretroviral Treatment (HAART) ( )
6. Septrin tablets for prophylaxis for HIV positive pregnant women ( )

20. At what gestation age should the routine ultrasound done in the first trimester of pregnant woman?

1. 8- 10 weeks ( )
2. 10-12 weeks ( )
3. 11-14 weeks ( )

21. What are the purposes of routine ultrasound done in the first trimester of pregnant woman?

Tick possible answers

1. Establish that the pregnancy is viable and intrauterine (not ectopic) ( )
2. Establish gestational age( )
3. Establish fetal number (and chorionicity or amionicity in multiple pregnancies) ( )
4. Establish detection of gross fetal abnormalities such as anencephaly (absence of the cranial vault) ( ).

SECTION C : Open-Ended Questions.

Please fill in the blanks.

22. Have you received any supervision in the last 6 months?

1. Yes ( )
2. No ( )

23. What was the nature of supervision?

1. Clinical ( )
2. Administrative ( )

Explain your answer?

……

……

……

24. Did you have any in service training in reproductive health?

1. Yes ( )
2. No ( )

If answer is yes? What type of in service training did you attend?

Mention at least three (3)

.....

If the answer is no? Why?

.....

25 Did you have any in service training in reproductive health?

1. Yes ( )
2. No ( )

If answer is yes? What type of in service training did you attend?

Mention at least three (3)

.....

26. If the answer is no? Why?

.....

27 Is the work organization and environment having adequacy job place for antenatal services ?

1. Yes ( )
2. No ( )

28 Are you satisfied with organization of antenatal program?

1. Yes ( )
2. No ( )

Thank You for your participation and time…

SECTION D: OBSERVATIONALCHECK LIST FOR SKILLS ON ANTENATAL

History taking				
No	**Activity**	**Observed**	**Not Observed**	**Remarks**
1	Social history			
2	Obstetric history			
3	Menstrual			
4	Medical History			
5	Surgical History			
6	Family History			
Physical Examination				
7	Head to toe			
8	Body Weight Measurement			
9	Blood Pressure Measurement			
10	Urinalysis			
11	Gravidex			
12	HIV testing			
Abdominal Examination				
13	Inspection			
14	Palpation – Pelvic, Fundal, lateral			
15	Presentation			
16	Auscultation			

Calculation of EDD				
17	Naegele ,s rule			
18	Obstetrical wheel (EDD) calculation circle			
Collection of specimens				
19	Hb			
20	RPR			
21	blood group			
No	**Activity**	**Observed**	**Not Observed**	**Remarks**
Giving information, education and communication				
No	**Activity**	**Observed**	**Not Observed**	**Remarks**
22	Danger signs in pregnancy			
23	Birth preparedness			
24	Nutrition			
25	HIV/AIDS			
26	Health facility delivery			
Administration of medications				
27	Folic acid Tablets			
28	Ferrous Sulphate			
29	Deworming tablets			
30	IPT Fansidar starting after second trimester (three doses)			

31	HIV positive pregnant women Highly Active Antiretroviral Treatment (HAART)			
32	Septrin tablets for prophylaxis for HIV positive pregnant women			
Documentation				
33	Antenatal Card			
34	Tetanus Toxoid Card			
35	Birth preparedness Card			
36	Standard guidelines (protocols, written guidelines)			

E: CHECKLIST FOR THE HEALTH FACILITY FOR EQUIPMENT AND SUPPLIES

No	Item	Available and functional	Not available	Remarks
37	Thermometer			
38	Weighing Scale			
39	Blood pressure machine			
40	Stethoscope			
41	Examination couch			
42	Fetoscope			
43	Doppler Machine			
44	Specimen containers for blood collection			
45	Containers for urinalysis			
46	Examination Gloves			
47	Surgical gloves			
48	Syringes			
49	Needles			
50	Cotton wool			
51	Reagents for urinalysis			
52	Reagents for gravidex			
53	Reagents for HIV testing			

Thank You for your participation and time…

MARKING KEY FOR THE KNOWLEDGE LEVELS

QUESTION NO	QUESTION	CORRECT ANSWER	MAXIMUM SCORE
8	**Antenatal care (ANC) refers to systematic assessment and anticipatory guidance of pregnant woman**	**True**	**1**
9	**The objectives of ANC are: tick possible answers**	**1. Promote the health and well being of the pregnant woman and the fetus throughout pregnancy by early and continuing risk assessment** **2. Health promotion activities** **3. Medical and psychosocial interventions** **4. Follow up including a variety of routine regular examinations**	**2** **1** **1**

			1
10	**When is the timing of the first antenatal visit?**	**Amenorrhoea of one month**	**1**
11	**Recommended number of ANC visits**	**At least four visits but further visits can be arranged in of case any of risk identified**	**2**
12	**What are the routine interventions during ANC? Tick the possible answers.**	**1. History taking** **2. Physical Examination** **3. Laboratory investigations** **4. Assessment for referral**	**2** **2** **2** **2**
13	**Frequency of health education**	**During every visit**	**2**
14	**What are the important information, education and information to the pregnant women?**	**1. Danger signs in pregnancy.** **2. Birth preparedness** **3. Care of the newborn** **4. Health facility delivery**	**2** **2** **2**

			2
15	**Advice given to the mothers during and after pregnancy**	**1. Balance diet** **2. Tetanus Toxoid** **3. Personal Hygiene** **4. Breast feeding** **5. Vaccination of the children** **6. Family planning**	**2** **2** **2** **2** **2** **2**
16	**22. Which ones are the danger signs in pregnancy? Tick the appropriate answers**	**1. Abdominal pain** **2. Vaginal bleeding** **3. Fever** **4. Headache** **5. Swelling of the hands, feet and legs** **6. Blurred vision.** **7. Fits**	**2** **2** **2** **2** **2** **2** **2**
17	**Which ones are the advices given to pregnant mothers on the supplements to be taken during pregnancy? Tick appropriate answers**	1. **Iron** 2. **Calcium** 3. **Folic acid** 4. **Iodised salt.** 5. **Fortified sugar**	**1** **1** **1** **1**

			1
18	**Which investigations are done during the first antenatal visit? Tick the appropriate answer**	**1. Haemoglobin levels estimation** **2. RPR** **3. Urinalysis** **4. Blood group** **5. HIV testing** **6. Gravidex** **7. Ultrasound**	**1** **1** **1** **1** **1** **1** **1**
19	**What medications are given during antenatal period?**	**1. IPT Fansidar starting after second trimester (three doses)** **2. Folic acid tablets** **3. Ferrous Sulphate tablets** **4. Deworming tablet (anti helminthics)** **5. HIV positive pregnant women Highly Active Antiretroviral Treatment (HAART)** **6. Septrin tablets for prophylaxis for HIV positive pregnant women**	**2** **2** **2** **2** **2** **2**

20	**At what gestation age should the routine ultrasound done in the first trimester of pregnant woman?**	**11-14 weeks**	**2**
21	**What are the purposes of routine ultrasound done in the first trimester of pregnant woman?**	**1. Establish that the pregnancy is viable and intrauterine (not ectopic)** **2. Establish gestational age** **3. Establish fetal number (and chorionicity or amionicity in multiple pregnancies)** **4. Establish detection of gross fetal abnormalities such as anencephaly (absence of the cranial vault).**	**2** **2** **2** **2**

MARKING KEY FOR SUPERVISION AND IN- SERVICE TRAINING

QUESTION NO	QUESTION	CORRECT ANSWER	MAXIMUM SCORE
22	Have you received any supervision in the last 6 months?	Yes	1
23	What was the nature of supervision?	1. Clinical 2. Administrative	2 1
	Explain your answer? New knowledge and skills on antenatal care at least three (3)	1. Mentioned three (3) 2. Mentioned two (2) 3. Mentioned one (1)	3 2 1
24	Did you have any in service training in reproductive health?	Yes	1
25	If answer is yes? What type of in service training did you attend? Pertaining to antenatal care services. Mention at least three (3)	1. Mentioned three (3) 2. Mentioned two (2) 3. Mentioned one (1)	3 2 1

27	**Is the work organization and environment having adequacy? Job place for antenatal services?**	**Yes**	**1**
28	**Are you satisfied with organization of antenatal program?**	**Yes**	**1**

MARKING KEY FOR OBSERVATIONS OF SKILLS

QUESTION NO	QUESTION	OBSERVED ACTIVITY	MAXIMUM SCORE
1-6	**History Taking** 1. **Social History** 2. **Obstetric History** 3. **Menstrual History** 4. **Medical History** 5. **Surgical History** 6. **Family History**	**Observed six (6)** **Observed five (5)** **Observed four (4)** **Observed three (3)** **Observed two (2)** **Observed one (1)**	**6** **5** **4** **3** **2** **1**
7-12	**Physical Examination** **1. Head to toe** **2. Body weight Measurement** **3. Blood Pressure Measurement Urinalysis** **4. Gravidex** **5. HIV testing**	**1. Observed five (5)** **2. Observed four (4)** **3. Observed three (3)** **4. Observed two (2)** **5. Observed one (1)**	**5** **4** **3** **2** **1**
13-16	**Abdominal Examination** **1. Inspection** **2. Palpation – Pelvic, Fundal, lateral** **3. Presentation** **4. Auscultation**	**1. Observed four (4)** **2. Observed three (3)** **3. Observed two (2)** **4. Observed one (1)**	**4** **3** **2** **1**

17-18	**Calculation of Expected Date of Delivery (EDD)** **1. Naegele's, rule** **2. Obstetrical wheel (EDD) calculation circle**	**1. Observed two (2)** **2. Observed one (1)**	**2** **1**
19-21	**Collection of specimens** 1. **HB** 2. **RPR** 3. **HIV testing**	**1. Observed three (3)** **2. Observed two (2)** **3. Observed one (1)**	**3** **2** **1**
22-26	**Giving Information, Education and Communication (IEC)** **1. Danger signs in pregnancy** **2. Birth preparedness Nutrition** **3. HIV/AIDS** **4. Health facility delivery**	**1. Observed four (4)** **2. Observed three (3)** **3. Observed two (2)** **4. Observed one (1)**	**4** **3** **2** **1**
27-32	**Administration of medications**	**1. Observed six (6)** **2. Observed five**	**6**

	1. **Folic acid tablets** 2. **Ferrous Sulphate tablets** 3. **Deworming tablets** 4. **IPT Fansidar starting after second trimester (three doses)** 5. **HIV positive pregnant women Highly Active Antiretroviral Treatment (HAART)** 6. **Septrin tablets for prophylaxis for HIV positive pregnant women**	**(5)** **3. Observed four (4)** **4. Observed three (3)** **5. Observed two (2)** **6. Observed one (1)**	**5** **4** **3** **2** **1**
33-36	**Documentation** 1. **Antenatal Card** 2. **Tetanus Toxoid Card** 3. **Birth preparedness Card** 4. **Standard guidelines (protocols, written guidelines)**	**1. Observed three (3)** **2. Observed two (2)** **3. Observed one (1)**	**3** **2** **1**

MARKING KEY OBSERVATIONS HEALTH FACILITY - EQUIPMENT/ SUPPLIES

QUESTION NO	QUESTION	OBSERVED	MAXIMUM SCORE
37	**Thermometers**	1. **Available** 2. **Not available**	**1** **0**
38	**Weighing Scale**	1. **Available and functional** 2. **Available and not functional** 3. **Not available**	**2** **1** **0**
39	**Blood pressure machine**	**1. Available and functional** **2. Available and not functional** **3. Not available**	**2** **1** **0**
40	**Stethoscope**	1. **Available and functional** 2. **Available and not functional** 3. **Not available**	**2** **1** **0**
41	**Examination couch**	1. **Available and functional** 2. **Available and not functional** 3. **Not available**	**2** **1** **0**

42	**Fetoscope**	1. **Available and functional** 2. **Available and not functional** 3. **Not available**	**2** **1** **0**
43	**Doppler Machine**	**1. Available and functional** **2. Available and not functional** **3. Not available**	**2** **1** **0**
44	**Specimen bottles for blood collection**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
45	**Containers for urinalysis**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
46	**Examination Gloves**	1. **Available and adequate** 2. **Available and adequate** 3. **Not available**	**2** **1** **0**
47	**Surgical gloves**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
48	**Syringes**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1**

			0
49	**Needles**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
50	**Cotton wool**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
51	**Reagents for urinalysis**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
52	**Reagents for gravidex**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**
53	**Reagents for HIV testing**	1. **Available and adequate** 2. **Available and not adequate** 3. **Not available**	**2** **1** **0**

QUESTIONAIRES SCORES

- **Knowledge Levels**

High - scores 66 to 88 (scores above 75%)

Low – score below 66 (score below 75%)

- **Skills Levels**

Skillful – scores 24 to 33 (scores below 75%)

Not Skillful – scores below 33 (score below 75%)

- **Availability of necessary equipment, instruments and supplies**

Adequate – scores 23 to 31 (scores above 75%)

Not adequate – score below 23 (score below 75%)

- **In service training**

Adequate - attended two (2) or three (3) or more (scores above 75%)

Inadequate - attended one (1) (scores below 75%)