

**KNOWLEDGE OF POSTPARTUM WOMEN ON PUERPERAL SEPSIS AND
ASSOCIATED FACTORS IN CHOMA DISTRICT, ZAMBIA**

BY

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**A dissertation submitted to the University of Zambia in partial fulfilment of the
requirements of the degree of Master of Science in midwifery, women and child health**

The University of Zambia

Lusaka

2020

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ABSTRACT

Puerperal sepsis is the infection of the genital tract following child birth or abortion. It is a major cause of maternal morbidity and mortality and is usually within the first 42 days after child birth/pregnancy termination. Studies have shown that puerperal sepsis is the second cause of maternal morbidity and mortality during puerperium in the resource poor countries. This study aimed at assessing knowledge of postpartum women on puerperal sepsis and associated factors in Choma district, Zambia.

A descriptive cross sectional study design was used to elicit information on knowledge of postpartum women on puerperal sepsis and associated factors. A sample of 246 postpartum women attending postnatal clinics at 6 days and 6 weeks at Macha Mission Hospital and five selected delivering health centres in Choma district were selected to participate in the study using simple random sampling method. Macha Mission Hospital and five (5) health centres within Choma district were purposively selected because they offer postnatal care services and are big centres (Zonal centres). A pretested interview schedule was used to collect data from the respondents. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 22 programme. Chi-square was used to test for statistically significant association between knowledge of postpartum women on puerperal sepsis and associated factors. A 95% confidence interval and a P- value of 0.05 were set to check the specificity of the tests. Binary logistic regression was used to check for combined impact of independent variables on knowledge of postpartum women on puerperal sepsis and associated factors.

Findings of the study indicated that 60% of postpartum women had low knowledge on puerperal sepsis and associated factors in Choma district. Statistically significant associations were shown between knowledge of postpartum women on puerperal sepsis and distance to health facility (OR 1.893, 95% CI = [1.071, 3.347]; P= 0.020) and hygiene lessons (OR 2.879, 95% CI = [1.581, 5.243]; P= 0.001). However, there was no statistically significant association between the dependent variable and the other independent variables.

The current study revealed that most postpartum women had low knowledge on puerperal sepsis in Choma district. Distance to health facility and hygiene lessons were significantly associated with Knowledge of postpartum women on puerperal sepsis. Therefore, there is need to improve puerperal sepsis awareness among postpartum women in Choma district.

Key words: *Knowledge, postpartum women, puerperal sepsis, puerperium*

DEDICATION

This study is dedicated to all my beloved ones for their understanding, support, prayer and encouragement throughout the course of my studies, particularly; Mr Hachobe, Charles., my dear husband, our lovely children, Hachobe Chileleko, Hachobe Lukondo, Hachobe Rejoice, Hachobe Favour and all those who helped in one way or another.

ACKNOWLEDGEMENTS

It is with honour and pride to place on record my sincere thanks and deep sense of gratitude to the Almighty God who guided me, saw me through hard times, and gave me the strength to conduct the research:

I would like also to thank the following individuals who supported me in many different ways throughout this project:

The participants who made this study a success by providing me with all the necessary information I needed.

My supervisors; Professor Margaret Maimbolwa and Dr. Catherine Mubita Ngoma who tirelessly and patiently guided me throughout the research process.

The entire faculty at the School of Nursing Sciences for the support during this course.

The government of the Republic of Zambia through the Ministry of Health, for granting me Leave days during my studies.

The Provincial Health Office (PHO), Choma District Health Office (CDHO), Macha Mission Hospital, and the District Commissioner (DC) for allowing me to conduct this study from their facilities.

My husband Mr. Charles Hachobe and children Chileleko, Lukondo, Rejoice and Favour, for their continued support, understanding and encouragement throughout my period of study.

Lastly but not the least I wish to express my deep and sincere appreciation to my friends in the Master of Science Midwifery class, 2015 intake for the words of encouragement and psychological support offered to me throughout the project.

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ABBREVIATIONS

ANC	Antenatal care
CARMMA	Campaign for Accelerated Reduction of Maternal Mortality in Africa
CS	Caesarean section
CSO	Central Statistics Office
EmONC	Emergence obstetric and new born care
GRZ	Government of the Republic of Zambia
HCP	Health care provider
Ibid	Same as above
IEC	Information Education Communication
IPC	Infection prevention and control
MNCH	Maternal, neonatal and child health
MOH	Ministry of Health
PNC	Postnatal care
SMGS	Saving mothers giving life
SMI	Safe motherhood Initiative
SPHMIS	Southern Province Health Management Information System
SPSS	Statistical package for the Social Sciences
UNICEF	United Nations Children's Fund
WHO	World Health Organisation
ZCAHRD	Zambia Centre for Applied Health Research and Development
ZDHS	Zambia Demographic Health Survey

CHAPTER ONE

INTRODUCTION

1.1 Background information

Historically, puerperal sepsis has been a common pregnancy-related condition, which could eventually lead to obstetric shock or even death (Momoh et al., 2010; Chepchirchir, 2012). It is a preventable disease which occurs within six weeks of giving birth (WHO, 1999). According to World Health Organization (WHO, 2009), puerperal sepsis is defined as infection of the genital tract occurring at any time between the rupture of membranes or labour and the 42nd day postpartum in which two or more of the following are present: pelvic pains, fever, abnormal vaginal discharge (example presence of pus), abnormal smell or foul odour of discharge, delay in the rate of reduction of the size of the uterus (less than 2 centimetres per day during the first 8 days). The requisites for this infection must include an open or absorbing surface through which the infection passes (Barbara et al., 2010). The first recorded epidemic of puerperal sepsis occurred at the Hotel-Dieude Paris in 1646 (Momoh et al., 2010). In 2012, a study by Miller revealed that there were significant gaps in knowledge of the infective organisms that cause puerperal sepsis in resource-poor settings and the antibiotic management needed to treat it. Nouri and colleagues (2012) identified the major causative microorganisms to be poly microbial with group A-beta-haemolytic streptococcus like the staphylococcal aureus and Escherichia coli often being the cause of severe cases of puerperal sepsis.

Globally, according to the World Health Organization (WHO), puerperal sepsis is the sixth-leading cause of deaths among new mothers and it contributes 15% of total maternal deaths among the mothers of the reproductive age (Iftikhar, 2009). The global incidence of puerperal sepsis is 4.4 per 100 live births (Abouzahr, 2003). The proportion of maternal deaths due to puerperal sepsis are 9.7%, 11.6% and 7.7% in Africa, Asia and Latin America and the Caribbean respectively (WHO, 2009). On the other hand puerperal sepsis contributes only 2.2% of maternal mortality in developed countries. The Odds ratios are 2.71, 1.91 and 2.06 in Africa, Asia and Latin America and the Caribbean respectively comparing to the developed world (Hussein et al., 2010). World Health Organisation (WHO) report revealed that there are 358,000 maternal deaths yearly occurring due to child birth problems and out of these up to 15% are associated with puerperal sepsis (WHO et al., 2010).

It is found as one of the leading cause of maternal deaths in the intensive care unit in the United States of America (Dillen et al., 2010). Aseptic precautions, advances in investigation tools and the use of antibiotics have played a major role in reducing the incidence of puerperal sepsis worldwide (Chisembele, 2004). Although sepsis is an important public health problem contributing to maternal morbidity and mortality, information on the global magnitude of the problem is limited (Chisembele, 2004).

In Africa, the incidence of puerperal sepsis in different countries are 1.7, 0.22, 1.14 and 0.07 per 100 live births in Nigeria, Niger, Uganda and South Africa respectively (Ahmed et al., 2008). In Nigeria, puerperal sepsis is the 3rd leading cause of maternal mortality and contributes 12% of maternal mortality (Mairiga et al., 2009). Puerperal sepsis causes deaths continuously in developing countries mainly because of inadequate access to skilled care during and after child birth (Hussein et al., 2012).

In addition to trauma sustained during the birth process or caesarean procedure, physiologic changes during pregnancy contribute to the development of puerperal sepsis (Knight et al., 2014). Community factors which increase a woman's risk of developing puerperal sepsis and of dying from it, include: delivery by untrained traditional birth attendant; traditional practices such as insertion of foreign objects and substances into the vagina (Abouzahr et al., 1998), lack of transportation and resources; distance from the woman's home to the facility; the inadequacy of health facilities which are often ill-staffed and ill-equipped (Bauer et al., 2013), cultural factors which delay care seeking behaviour, the lack of knowledge about signs and symptoms of puerperal sepsis and of its risk factors; and the lack of postnatal care (Knight et al., 2014). Findings by Khaskheli and colleagues (2013), revealed that some countries now have high number of utilization of health facilities but cases of postpartum infections are still being recorded.

In Zambia, information on puerperal sepsis is limited due to socio-cultural behaviour related to health care seeking pattern of the pregnant women (Maimbolwa, 2003). However, literatures from scant sources established that the predisposing factors for puerperal sepsis includes; anaemia in pregnancy, prolonged labour, frequent vaginal examination, premature rupture of membranes and use of unsterilized/unwashed instruments during delivery (Momoh et al., 2010). Puerperal sepsis is an important morbid condition because of its consequences on both foetal and maternal outcomes (Chisembele, 2004). Morbidities associated with puerperal sepsis includes; fever greater

than 38.0°C (100.4°F), chills, vaginal discharge, septicaemia, peritonitis or abscess formation leading to surgery, endo-toxic shock, pelvic abscess, and finally mortality among others (Sham Shad et al., 2010).

The postpartum period is particularly important for women, as during this period they may develop serious, life-threatening complications (Alkema et al., 2016). A postnatal care visit is an ideal time to educate a new mother on how to care for herself and her new born. Therefore, Zambia's safe motherhood guidelines recommend that women receive at least four postnatal check-ups, the first within six hours of delivery, the second on the second day following delivery, the third on the sixth day following delivery, and the last within six weeks after delivery (MOH, 2011). Though Zambia has made significant achievements in Maternal, New-born and Child Health (MNCH) in the initiation of a national programme of Emergency Obstetric and Neonatal Care (EmONC), strengthening of family planning through emphasis on long term permanent methods of family planning and increased financial commitment towards maternal health through the creation of a separate budget line for reproductive health commodities, there is still much room for improvement. It is estimated that approximately 398/100,000 live births women die every year in Zambia from the complications of childbirth and up to 13% of these are due to puerperal sepsis (CSO, 2014).

Despite the fact that puerperal sepsis has been indicated as one of the leading causes of maternal mortality in low and middle income countries, it is surprising how little attention has been paid to puerperal sepsis and infection control during childbirth (Chepchirchir, 2012). Hence the reason why the researcher sought to assess the knowledge of postpartum women on puerperal sepsis and associated factor in Choma district.

1.2 Statement of the problem

Zambia is one of the countries in sub-Saharan Africa that still experience high maternal mortality with puerperal sepsis accounting for approximately 13% of maternal deaths (WHO, 1999; Kalikiti, 2013). Maternal mortality is a sensitive index to know the quality of obstetric care (Mukherjee et al., 2010). For instance, in 2018, maternal mortality ratio in Zambia was estimated to be 252 /100,000 live births (CSO, 2018). In 2017, puerperal sepsis accounted for 9.5 % of maternal deaths in Choma district (MHMIS, 2017). Such infections can be prevented effectively by careful attention to clean delivery (WHO, 1999).

Choma district is expected to ensure health for all postpartum women in line with the MOH mission adopted from Campaign for Accelerated Reduction of Maternal Mortality in Africa (CARMMA, 2012) which says ‘No woman should die whilst giving life’. However, this is not so in Choma district. The number of postpartum women suffering and even dying from puerperal sepsis is increasing. This is a gap that has been identified in Choma district (SPHMIS, 2015). Statistics on the trend of Puerperal sepsis from the Southern Province Medical office HIA2 (2015) highlight that puerperal sepsis is the second leading delivery complication outcome leading to maternal morbidity and mortality in the district (Table 1). The trend seem to be fluctuating with a possibility of increasing if no interventions will be put in place.

Table 1: Puerperal sepsis trends in Choma district between 2011 and 2015

Year	Total no. of deliveries	No. of women who had puerperal sepsis as a complication of delivery.	Percentage (%)
2011	5040	35	0.694
2012	4638	27	0.582
2013	6245	69	1.104
2014	9595	66	0.687
2015	9248	55	0.594

(Southern Province Medical office, 2015).

The interventions the district has put in place to overcome this challenge include scaling up antenatal / postnatal care services by conducting outreach programs for those more than five kilometres away from the health facilities and offering health education and promotion on personal and environmental hygiene to prevent infections such as puerperal sepsis.

Ministry of Health has put up a number of strategies in order to overcome this challenge in Choma district. These were, ensuring that every birth occurred within the assistance of skilled health personnel, access to Emergency Obstetric and Neonatal Care (EmONC) as well as

access to family planning services and effective referral system (MDGs, 2015). Among others, groups such as UNICEF; Saving Mothers Giving Life (SMGL) were put in place and work to increase the availability of drugs and equipment, train and mentor health professionals, promote better transportation to health facilities, improve data collection and help mobilize communities to increase demand for hospital births (ZCAHRD, 2012).

Sustainable development plan (SDP) indicates that, every country should reduce maternal mortality ratio to $< 70/100,000$ by the year 2030 (SDG, 2015). Thus to achieve this plan and speed up maternal mortality reduction, it is better to identify causes and contributors to maternal mortality.

Despite the long term efforts and the amount of work published on the topic as well as policies and initiatives being adopted in an to reduce puerperal sepsis, the risk of dying during pregnancy or child birth remains significant for women in developing countries. Women are still dying in health facilities due to pregnancy outcome complications such as puerperal sepsis. Much attention has been focused on prenatal care for preventing maternal mortality, though over half of all maternal deaths occur in the postpartum period (Mukherji et al., 2002). Therefore, this study is based on the indicated gaps and lack of a single study conducted in Choma district on assessing knowledge of postpartum women on puerperal sepsis and associated factors, which contribute to maternal morbidity and mortality which makes the study important.

1.3 Theoretical frame work

The study was guided by Becker's Health Belief Model (1970 and 1980) which was developed by Irwin M. Rosenstock in 1966 (Burke, 2011). The framework is an intrapersonal theory that is found within the individual and it includes concepts of knowledge and beliefs. The Health Belief Model assumes that behaviour change occurs with the existence of following three components at the same time:

1. Individual perceptions
2. Modifying factors
3. Likelihood of action

Health belief model suggests that belief is a personal threat, this together with the belief in the effectiveness of the proposed behaviour will predict the likelihood of that behaviour (Burke, 2011). In other words, it focuses on the assessment of health behaviour of individuals' perception of health and attitudes towards disease and may be seen through negative actions.

Individual perception

Perceived susceptibility: It is the individual's opinion about how likely the behaviours they partake in are going to lead to a negative health outcome (Burke, 2011). In the present study, it is the probability of the postnatal mother to contract puerperal sepsis due to the events during puerperium.

Perceived seriousness: It addresses as how serious the disease that a person is susceptible to, can be (Burke, 2011). In the present study it is the knowledge on complications of puerperal sepsis which could include death among others.

Modifying factors

This refers to the outside factors that influence to affect the person and how threatened a person feels by continuing the same behaviours that put him at risk (Burke, 2011). It includes the perceived threat, environmental factors and cues to action.

Perceived threat: It is the factor which could be perceived by a person to develop into a specific disease (Burke, 2011). In the present study, the perceived threat of postnatal mothers to puerperal sepsis was assessed by the semi- structured questionnaire.

Environmental factors: These indicate the associated factors that can add threat of a disease (Burke, 2011). In the present study it includes the following:

- Knowledge on puerperal sepsis which has factors such as ability to define puerperal sepsis, signs and symptoms of puerperal sepsis, importance of attending postnatal clinic, reasons for attending postnatal clinic, knowledge on factors that predispose to puerperal sepsis, measures to be taken to prevent puerperal sepsis and care of vaginal/perineal tears following childbirth.
- Demographic variables like age, education level, occupation, marital status, residence and parity that predispose to the disease.

- It is presumed that these socio-demographic can influence maternal health positively or negatively in the community. Women who are economically stable can afford to seek reproductive health care services provided by well trained personnel. Education level determines the knowledge of hygiene among women, and helps them to make informed decisions regarding their reproductive health.
- Health facility factors: explain various aspects that determine the prevention of infection at the health facility level. These include distance to nearest health facility, hygiene lessons on puerperal sepsis at antenatal and postnatal clinics and hygienic practices by birth attendants.
- Individual factors: From the individual level, Puerperal sepsis control can be influenced by adequate nutrition during pregnancy, sanitary towels used after delivery, source of water, availability of water supply, frequency of bathing after delivery, place of treatment for puerperal sepsis, reasons for seeking treatment at the place of choice, antenatal care attendance, reasons for attending antenatal clinics, diagnosed of disease before during and after delivery and specification of diagnosed disease.
- Traditional / cultural factors: This explain various cultural practices that mothers may engage in which may predispose them to puerperal sepsis.

Cues to action: They are anything that triggers a decision to change the behaviour (Burke, 2011). In this study, cues to action are the information source regarding puerperal sepsis. It is the information education communication on puerperal sepsis given to the postnatal mothers by the health care providers.

Likelihood of action: It is the weighing out of perceived benefits and perceived barriers by the person to determine the change of behaviour (Burke, 2011). In this study, the postnatal mothers are likely to adapt to positive action towards prevention of puerperal sepsis once they learn the consequences of the disease outcome which include morbidity and mortality.

Perceived benefits: It is the person's assessment of the positive consequences of adopting a positive behaviour (Burke, 2011). In this study, the researcher believes that if the postnatal mothers have good knowledge and good practices on puerperal sepsis, it will help them in the prevention of puerperal sepsis.

Perceived barriers: It is the person's assessment that facilitates or discourages the adoption of a promoted behaviour (Burke, 2011). In this study, it indicates the poor knowledge and poor practice of postnatal mothers regarding prevention of puerperal sepsis as outlined in figure 1.

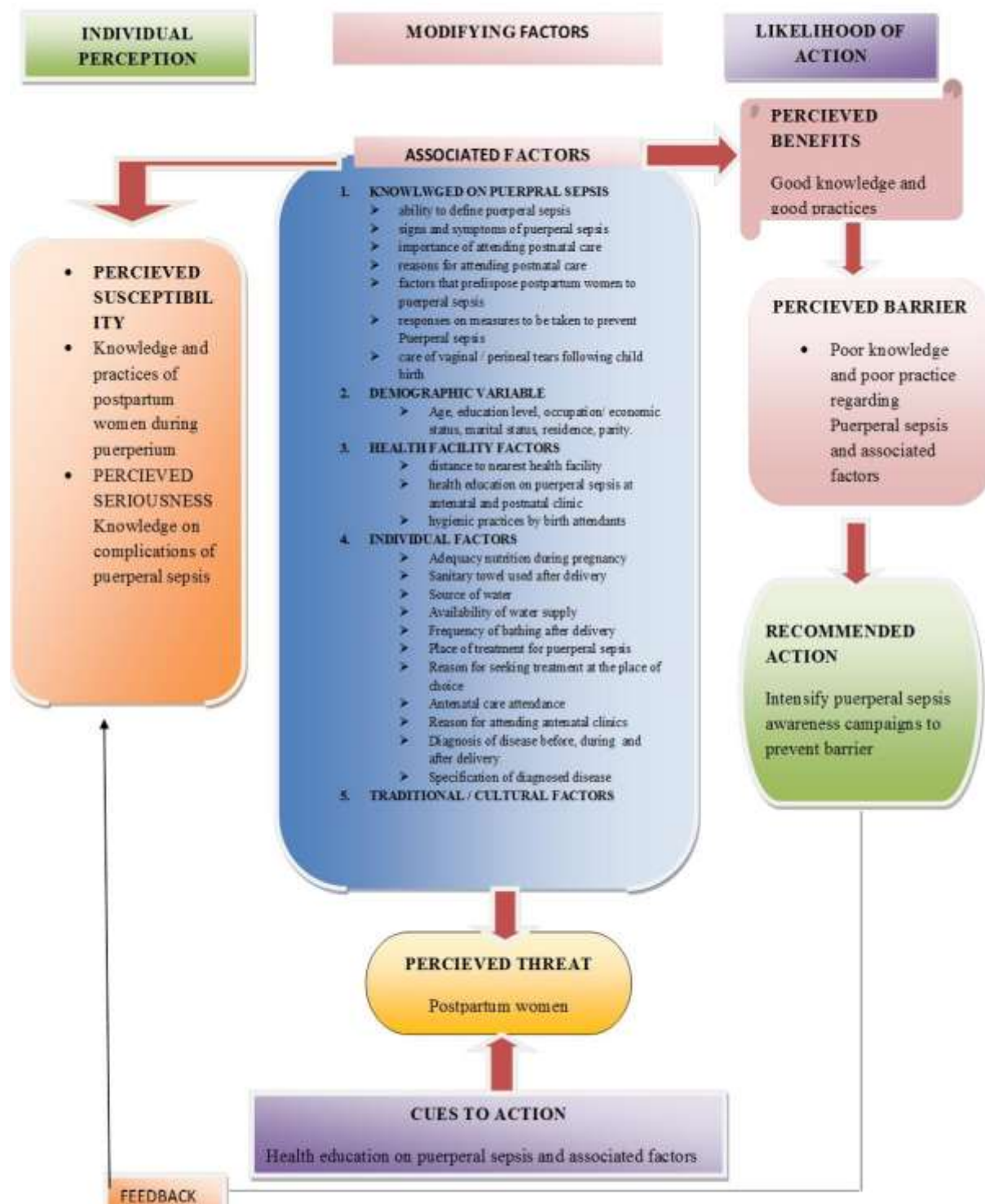


Fig 1. Schematic representation of conceptual framework

1.4 Factors predisposing postpartum women to puerperal sepsis

1. Nutritional intake

Inadequate nutrition can predispose to puerperal sepsis as the body will lack adequate nutritive food or supplements, especially those rich in proteins and vitamins during pregnancy. The availability of proper food boosts the body immune system to fight infections when they occur.

2. Duration of labour

Labour that lasts more than 18 hours is termed **as** prolonged labour and leads to several vaginal examinations, which directly results in puerperal sepsis.

3. Cultural practices

Some mothers observe traditional practices that could predispose them to puerperal sepsis such as douching in traditional herbs.

4. Hygienic practices by mothers

Non-adherence to hygienic practices by mothers during the process of labour and following child birth can leading to puerperal sepsis.

5. Lack of antenatal care attendance

Pregnant women who do not attend antenatal clinics and have poor health are likely to be predisposed to puerperal sepsis as they are not closely monitored and detection of deviation from normal will not be done early in time for treatment.

6. Lack of hygiene lessons

Mothers who lack hygiene lessons and its consequences are at a high risk of contracting puerperal sepsis regardless of their parity status because puerperal sepsis is principally the consequence of poor hygiene.

1.5 Justification

Findings of this study will be the knowledge-base for the policy makers in addressing this unrecognized health burden in a holistic approach, thus achieving the sustainable development goal (SDG) target three (3) considering integration of reproductive health into national strategies and programs by the year of 2030. The findings will also add to the body of knowledge in midwifery practice and will also serve as a reference for future research in Midwifery practice in Zambia.

1.6 Objectives

1.6.1 General Objective

The general objective of the study was to assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district.

1.6.2 Specific Objectives

1.6.2.1 To determine knowledge on puerperal sepsis among postpartum women in Choma district.

1.6.2.2 To establish factors predisposing postpartum women to puerperal sepsis in Choma district.

1.7 Hypothesis

1.7.1 Null hypothesis

There is no association between Knowledge of postpartum women on puerperal sepsis and the independent variables.

1.8 Conceptual definitions

1.8.1 Knowledge: Knowledge is information and understanding about a subject which a person has, or which all people have (Collins dictionary, 2012).

1.8.2 Postpartum: Period following childbirth (Longman dictionary, 2016).

1.8.3 Puerperal Sepsis: Puerperal sepsis is defined as infection of the genital tract occurring at any time between the rupture of membranes or labour and the 42nd day postpartum in which two or more of the following are present: Pelvic pains, fever (that is oral temperature 38.5 degrees Celsius or higher on any occasion), abnormal vaginal discharge (example presence of pus), delay in the rate of reduction of the size of the uterus (WHO, 2009).

1.8.4 Postnatal Mother: This is a mother within six weeks following child birth (Oxford dictionary, 2014).

1.9 Operational definitions

1.9.1 Knowledge: In this study knowledge refers to the correct responses of the postnatal mothers on puerperal sepsis elicited through structured questionnaire.

1.9.2 Postpartum: This is the period following childbirth in which women can acquire serious illness if not properly taken care of.

1.9.3 Puerperal sepsis: This is serious form of infection contracted by women during or soon after child birth, miscarriage or unsafe abortion normally characterized by two or more of the following symptoms; pelvic pain, fever, abnormal vaginal discharge, abnormal foul/smell discharge form birth canal, and delay in the return to normal size of the uterus.

1.9.4 Postnatal mothers: The mothers who delivered through caesarean section or vaginal route.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on literature review on Knowledge of postpartum women on puerperal sepsis and associated factors. The sources of literature consulted in this research included published textbooks, past research studies from relevant masters and PhD theses, and various health based reports such as the demographic health surveys and World Health Organization because of the authenticity of the data bases enlisted. The search strategy was not limited to Zambia and Africa only, instead it was broadened globally. The literature review helped in refining the study and formed the basis for comparison during the interpretation of findings. The review is organized according to the study variables.

2.2 Knowledge of postpartum women on factors predisposing to puerperal sepsis

Knowledge is the information and skills gained through education or experience (Hornby, 2010). Knowledge of postpartum women on factors predisposing to puerperal sepsis encompasses information and skills gained through education or expertise. In this study, it refers to the range of information and understanding gained by postpartum women regarding puerperal sepsis.

Sultana et al. (2018) conducted research on Knowledge and practice regarding prevention of puerperal sepsis among postpartum women attending a private hospital in Bangladesh. A descriptive cross - sectional study design was used. The findings reported that most of the study participants had poor level of knowledge regarding prevention of puerperal sepsis. However, the study participants had satisfactory practice level about prevention of puerperal sepsis. The study recommended that there is need for awareness creation on Puerperal Sepsis.

Indra (2015) conducted a study in Puducherry in the Kingdom of Saudi Arabia to assess the knowledge and practice on prevention of Puerperal Sepsis among Postnatal Mothers in Selected Hospitals. The study revealed that puerperal sepsis is an important public health problem which is a leading cause of preventable maternal death especially in developing countries, due to the lack of knowledge on the preventive methods. The study showed that the knowledge is lacking even though adequate practices are existing.

Similarly, in Africa, a descriptive, cross-sectional study was conducted by Chepchirchir et al. (2017) on associated factors with puerperal sepsis among reproductive age women in Nandi

County, Kenya on 215 women who were diagnosed with puerperal sepsis. The study revealed that there was a lack of knowledge on the aetiology of infection in the area under investigation. The study concluded that Education and knowledge plays an important role in the prevention of puerperal sepsis.

Another cross-sectional study conducted by Jahaya and Bukar (2013) on Knowledge of symptoms and signs of puerperal sepsis in a community in north-eastern Nigeria revealed that of the 400 respondents interviewed, a total of 53% of respondents were not aware of the causes of puerperal sepsis. The knowledge of the causes of puerperal sepsis is poor. The study therefore recommended that there is need to put more emphasis on the causes of puerperal sepsis during antenatal health talks as this could help reduce morbidity and mortality associated with puerperal sepsis.

Masoud and Saber conducted a study in Egypt from October 2015 to March 2016 to assess knowledge and practice of postnatal mothers toward prevention of puerperal sepsis, and evaluate the effectiveness of self-care guideline on postnatal mothers. The results revealed that the great majority of the studied women had poor score of knowledge related to the definition, causes, symptoms, preventive measures and high risk group in pre-test (96.0%).

2.3 Factors predisposing postpartum women to puerperal sepsis

2.3.1 Socio – demographic factors

2.3.1.1 Age

According to a study by Taskin et al. (2016) conducted in Dhaka city during April and December 2011 in two tertiary level government health care facilities/ hospitals to identify the socio demographic and economic risk factors of puerperal sepsis. The findings revealed that the mean maternal age of the respondents was 27 years. Out of 140 respondents, 25% showed that the proportion of mothers less than 25 years was more among the cases (71.4%) compare to controls (32.4%). Puerperal sepsis was significantly associated with <25 years age group compared to > 25 years. This was similar to the study conducted in Egypt which shows that 71.4% of cases were <25 years old comparing 32.4% among the controls (El-Mahally et al., 2004).

Similar findings have been found in another study from Nigeria which identified that the maternal age below 24 years is associated with puerperal sepsis with an OR 1.32 (Carter and

Barbara, 1994). A study from Hyderabad also identified that 67.2% of the mothers who developed puerperal sepsis were below 30 years of age (Abbassi et al., 2009).

In this regard, we can say, women who get pregnant at an early age are inexperienced mothers and may land in the hands of traditional birth attendants who never practice aseptic measures like handwashing and antiseptic materials to provide clean delivery service, clean cord cutting, perineal hygiene and antibiotic cover after delivery. For example, a study in Kenya by Ziraba et al. (2009)'s Statistics showed that nearly a quarter of Kenyan women start childbearing by age 20 and this proportion is double for women living in urban informal settlements. Therefore, from the studies above, we could say age could be a factor that may contribute to puerperal sepsis. This is the reason why the researcher had to venture into conducting this research in order to see if age is one of the factors.

A research conducted in 2003 by Kenya Demographic Health Survey (KDHS), showed that the proportion of births attended to by skilled personnel in Kenya was reported to be only 42%. Such unskilled deliveries are conducted outside health facilities due to lack of education regarding health care, antenatal visits and delivery in well-equipped and well-staffed medical facilities (KDHS, 2003). This behaviour is common among young mothers who are unfamiliar with the process of labour, its length and complications (khaskeli et al., 2013).

Another study conducted by Ahmed et al. (2013), on microbial profile in women with puerperal sepsis in Gadarif state, East Sudan, revealed that the highest rate of infection was observed among young females aged 21-25 years (35.5%), followed by 26-30 years (25%). It was reasonable to expect such findings that occurred in old women due to increase in several pregnancy complications including puerperal sepsis. It was speculated that women at this age were likely to be primigravida, with untested pelvises who resorted to hospitals when labor became obstructed and infected.

According to Sheeba et al. (2017), during the study period, there were 14,550 admissions in Obstetrics and Gynaecology Department, out of which, 366 were due to puerperal sepsis, giving an incidence of 2.5%. Of these, 33 (9%) women fulfilling the inclusion and exclusion criteria for severe puerperal sepsis were finally enrolled into the study. Young women aged less than 20 years constituted 9% of these patients and 12% of the patients were primiparas. Preponderance of women was seen between 20-30 years. Majority (94%) of the patients were unbooked, having delivered at home or in other peripheral hospitals.

A study in Kenya by Chepchirchir et al. (2017), indicated that, most of the mothers, who developed puerperal sepsis, were within the age of 20-29 years and of lower parity (primipara)

(57.2% and 56.2%, respectively). Perhaps, this may have resulted from the fact that the young inexperienced mothers tend to seek services of the traditional birth attendants. They mostly deliver outside health facilities due to the lack of knowledge on the benefits of health care services, antenatal care, and delivery in adequately equipped medical facilities. They also have poor pregnancy spacing tendency. Upon the birth of the closely spaced second child, these mothers are overwhelmed with duties, hence forgetting about their health. This finding is in line with those obtained in Pakistan by Khaskheli et al. (2013), concluding that this group of women suffer from the infectious morbidities caused by poverty, illiteracy, and malnutrition. Young mothers are unfamiliar with the process of labour, its length, and complications. Mostly, primigravida mothers take a long course of labour and trials in various hands before reaching to the health facility.

Similarly, in another study conducted by Shamshad et al. (2010) in Pakistan, 70% and 77% of the women suffering from puerperal sepsis were < 30 years old and para $\leq$ 2, respectively.

Study conducted in India by Shamshad et al. (2010) on puerperal sepsis still a major threat for parturient showed that Puerperal sepsis was common among young patients of 15–25 years age (66.3%) low socioeconomic status (65.20%), and uneducated patients (78.2%).

Study conducted in Sudan showed that those mothers who developed puerperal sepsis had the mean age of 25.4 years. This shows that most of the patients were in adult age group.

A study conducted in Gynaecology and Obstetrics Department Lique University of Medical college showed that, majority of the women admitted with puerperal sepsis were above thirty years of age 84 (65.11%), age below 20 years 28 (21.70%) women and age between 21 to 30 years of age group were 17 (13.17%). This result showed that age of the women between 21 to 30 years were more significant than below 20 years of age 28 (21.70%). Similarly the result of puerperal sepsis depend on the women parity showed that, prim parous women were 20 (15.50%) more significant than grand multiparous having parity 5 and above in 101 (78.29%).

2.3.1.2 Education level

Education enables access to information and helps empower women and their spouses to make appropriate decisions during pregnancy. Educational level of a woman is found to be a powerful influence when it comes to women health; it is observed that women who went up to secondary school level delay their time to fall pregnant, they mostly too have few children, having access to health information and private doctors and these reduce their risk of dying due to maternal related causes compared to their counterparts with low level of education.

A study conducted by Alida (2011) in Ghana found out that, 61.4% of the deceased had up to primary and middle school education as compared to 8% of those with tertiary education. It is also presumed that women with higher education may have some awareness about the effect of illness and treatment; and they may have higher demand for contraceptives, prenatal care and a higher likelihood to have a partner with high education.

A study in Tanzania found that low level of spouse's education was a risk factor for maternal mortality (Mpembeni et al., 2007). Both Okonofau et al. (1992) and Chowdhury et al. (2007) found that increases in education reduce the risk of dying due to maternal infections.

According to a study conducted in Kenya by Chepchirchir (2017) on associated factors with puerperal sepsis, education and knowledge play an important role in the prevention of puerperal sepsis. Young mothers and women of lower parity status need to be informed of puerperal sepsis and its preventive strategies. The women need to be encouraged to utilize antenatal care services through which they can receive counseling on their hygiene and nutrition. The integration of hygiene education and puerperal sepsis awareness into antenatal care services should be performed as a strategy to prevent and control the infection. The education of the mother improves the mother's socio-status, enhances their capability to make autonomous decisions and has been found to be a facilitator for improved health care access and a factor that enhances women's ability to deliver from a health facility.

These findings are consistent with Belagavi et al. (2015), who studied the knowledge regarding puerperal sepsis and its prevention among postnatal mothers in selected hospitals of Bhavnagar and reported that the majority of post-natal mothers were from the age group 23-27 years, more than half of them (60%) had primary education and living in rural area.

In a study conducted by Taskin et al. (2016), it was revealed that among the cases, 62.9% had below secondary level education while 67.6% of controls had above secondary level education. This study revealed that there was an association between development of puerperal sepsis and lack of education of the respondents. 62.9% of cases had below secondary level education while 67.6% of controls had more than secondary level education. Similar findings have been revealed in a study where it was found that 96% women were uneducated and only the rest had below primary level of education who developed puerperal sepsis (Naheed and Akbar, 2002). Another study from Karachi found that almost two thirds of the women having puerperal sepsis did not have any formal education, 21.4% had 1-5 years of formal schooling, 9.5% had 6-10 years of formal schooling and only 7.6% had more than 11 years of schooling (Ali et al., 2006).

2.3.1.3 Parity

According to a Study done in Pakistan by Shamshad (2010), the mothers who developed puerperal sepsis were mostly young (66.3%) and of lower parity (63%). The reason is young inexperienced mothers land up in the hands of traditional birth attendants and mostly deliver outside health facility due to lack of education regarding health care, antenatal visits and delivery in well-equipped well-staffed medical facility. They are unfamiliar with the process of labour, its length and complications. It is mostly primi parous mothers who take a long course of labour and trials in various hands before reaching health facility. Another study also support that age and parity tend to be younger, 70% less than 30 years age and 77% having parity of two (2) or less. There is strong association of prolonged labour with puerperal sepsis which occurs in younger mothers of lower parity.

A cross-sectional survey study by Ozumba and Nwongu (2008) in Nigeria, revealed that, the most common risk factors for maternal death were prim-gravidity (19%), and unbooked status (19%). This was confirmed by a study conducted by Kalu and Hika in 2004 in Adama hospital in Ethiopia, where they found a positive relationship between maternal death and parity, especially in the presence of pathogenic factors. Women who had at least four live births experienced twice the risk of maternal death as compared to their counter parts of parity one (1) to three (3). This is expected since increased exposure to childbearing would invariably increase the risk of haemorrhage, obstructed labour and infections and these factors elevate the risk of maternal death. Short and long birth intervals are known to adversely affect infant and child mortality, and short birth intervals in particular can impede maternal nutrition repletion in low-income settings. The effect of the length of time between pregnancies and their outcomes on subsequent maternal and child morbidity and mortality warrant accurate and full understanding. There is limited consensus on the optimal length of a birth interval associated with lower risk of child death. The observed effects of birth spacing themselves can be decomposed and attributed to several key underlying behaviours and conditions, i.e., breastfeeding, sexual abstinence, contraceptive practice, maternal nutrition, physical exertion, and infections. Collectively these impact foetal growth, safe delivery and subsequent maternal and child mortality risk (Ahmed et al., 2012).

In the same study, Ahmed et al. (2012) found that contraceptive use is efficient for the primary prevention of maternal mortality in developing countries by about 44%. The use of contraceptives reduces unwanted pregnancies, lower rates of abortion, decreases the rate of baby dumping and reduces the risk of premature deaths. Those are some of the benefits and roles of family planning in improving maternal health (MOH, 2009).

2.3.1.4 Economic status (Occupation)

The study by Taskin et al. (2016) in Dhaka city to identify the socio demographic and economic risk factors of puerperal sepsis revealed that no significant association between the occupation of the respondents and development of puerperal sepsis was established. Unemployed respondents mostly comprised of housewives in both cases (74.3%) and controls (84.8%). Only few respondents were employed (25.7% of cases and 15.2% of controls). Unemployment was not likely to increase the chances of developing puerperal sepsis.

Poverty has also been associated with adverse maternal outcomes, not directly, but as a contributor to maternal ability to access and utilize care where complications occur (Fillipi et al., 2006; Harding et al., 2008). This is irrespective of socio - cultural and demographic aspects of women, with the poor women using fewer services than the rich (Kone-Pefoyo and Rivard, 2006).

In a study conducted by Shamshad (2010) in Bangladesh, the findings revealed that the women of Bangladesh are not only disadvantaged by economic and social condition but also having limited access to adequate health care services. The study also identified that around 77% population of Bangladesh live in the rural areas and out of which 60% are living under the poverty level and poor people cannot afford the proper or standard health care services, thus the women of this economic strata deliver their babies in the unhygienic condition (Shamshad, 2010).

Studies conducted in Pakistan reported high rate of 67.2% of sepsis in low socio-economic group. Low economic social set up is associated with illiteracy, poor hygiene, ill health, poor antenatal care, prolonged labour, delayed referrals and pre-labour rupture of membranes all setting encourages the development of puerperal sepsis (Sham Shad et al., 2010).

The study by Taskin (2016) shows that 85.7% of cases came from poor economic status compare to 16.2% of the controls. Poor economic condition was found significantly associated with development of puerperal sepsis. Total family income represents the socio economic status of the respondents. The study also found that puerperal sepsis was significantly higher among the mothers of lower socio-economic status.

Less than 15,000 taka monthly family income is counted as low socio economic status in our study. The study also identified that 97.1% cases were from lower socio-economic status compared to 46.7% of the controls were from the same economic group. Similar findings have been identified in several studies. For example, a study from Pakistan found that 67.2% patients with puerperal sepsis came from the low socio-economic status (Abbassi et al., 2009).

This is similar to a study conducted in Zambia which revealed that low socio-economic status is a risk factor for developing puerperal sepsis (Chisembele, 2004). Another study from Alexandria also found that low socio-economic status is a predisposing factor for puerperal sepsis (El-Mahally et al., 2004). The reason of getting higher chance of puerperal sepsis among the poor class people are chronic ill health and malnutrition which is common among low socio-economic profile females (Chatterjee, 1990).

Chepchirchir et al. (2017) conducted a descriptive cross sectional study aimed to determine the incidence and management of puerperal sepsis among the women of reproductive age (15-49 years) attending to two hospitals in Nandi County, Kenya. The results revealed that 64% of the participants were of low socioeconomic status (unemployed). In this study, the majority of the women (64%) had a low socioeconomic status. The probability of sepsis incidence is higher in the poor females delivering in unhygienic conditions. This might have compromised their health-seeking behaviour. Most of these women (50.2%) had attained only primary school education rendering them jobless. Poor socioeconomic status hinders the women from acquiring adequate food during antenatal period. In this regard, several studies have reported high rate of sepsis (65.2%) in the low socioeconomic group. Poor social setting is associated with illiteracy, poor hygiene, ill health, poor antenatal care, prolonged labour, delayed referrals, and pre-labour rupture of membranes all of which set the scene for the occurrence of sepsis.

Taskin et al. (2016) conducted research on Socio-demographic factors and puerperal Sepsis: experiences from two tertiary level hospitals in Bangladesh. Findings evidenced that exposure to lower socio economic status of mothers predispose them to developing puerperal sepsis. This might be due to that mothers in low socio economic status cannot afford for their health expense, poor nutrition and low immunity in resisting themselves.

2.3.1.5 Place of residence

In a study by Chepchirchir (2017) conducted in Kenya, it was reported that 38.1% of the participants delivered in the health facilities. The same study revealed that 73.8% of the respondents gave birth at home. In addition, the study found an association of puerperal sepsis with nosocomial infections and increasing antibiotics resistance which posed a significant challenge to the overburdened health care systems. It was reported that mothers and their newborns are discharged from the hospital six hours after delivery, but the symptoms of puerperal sepsis take up to 42 days to manifest. Therefore Hospital delivery by itself cannot

reduce the probability of getting the infection if there are no proper antiseptic techniques in the respective health care facility. The new mother may acquire the infection before leaving the healthcare facility, and thereafter developing the disease. According to the study findings, puerperal sepsis was more prevalent among the hospital deliveries (38.1%), compared to that in the home deliveries (33.5%). These results are inconsistent with those of a study carried out by Sham shad et al. (2010) in Pakistan. In the mentioned study, puerperal sepsis prevalence was higher in the home deliveries (37.9%), compared to that in the hospital deliveries (26.1%). Maternal Sepsis is often undiagnosed or misdiagnosed because infection begins after hospital discharge without proper follow-up of cases (Van Dillen et al., 2010).

The study by Taskin et al. (2016) revealed that a large proportion of puerperal sepsis cases were from the urban areas (68.6%) compare to the rural areas (31.4%). However, no significant association between the occurrence of puerperal sepsis and the area of leaving was found. Among the cases 65.7% were from the joint families while 52.4% of controls were from nuclear family. But it did not differ significantly between the groups.

2.3.2 Health facility factors

2.3.2.1 Infection prevention measures by health care providers

Jain et al. (2012) conducted a study in India on infection control practices among doctors and nurses in a tertiary care hospital to assess the knowledge and practice of 400 healthcare personnel. The finding were that inadequate infection prevention practices by health care professionals contributed to puerperal sepsis among postpartum women.

In a study done in Tanzania to determine factors influencing puerperal sepsis where a sample size of 3,262 women were selected, only 27% (877) reported that the birth attendant inserted his or her hands into the vagina, and 25% (830) reported that the attendant washed his or her hands before doing so. Of those 830 women, 98% reported that the attendant had used soap and water while 1.5% were attended by birth assistants who washed their hands developed puerperal sepsis, compared to two (8.0%) of the 25 women who reported that the birth attendant did not wash their hands before inserting them into the vagina (Winani et al., 2005)

A study conducted by Khaskheli et al., (2013) in Pakistan to determine risk factors and complications of puerperal sepsis at a tertiary healthcare centre revealed that during this period there were 3316 obstetrical admission and out of these 129 (3.89%) women had puerperal

sepsis. Most of these women 84 (65.11%) were aged 31 years and above, multiparous 101 (78.29%), and unbooked 98 (75.96%) cases. Common risk factors found were absent membranes in 108 (83.72%) of the women, delivered or undelivered and mismanaged, referred cases 95 (73.64%), were being delivered in this hospital 34 (26.35%). Morbidities seen were septicaemia in 35 (27.13%) cases, and disseminated intra vascular coagulation in 23(17.82%) cases, while 11 (8.52%) of the women died. The research further concluded that risk factors were anaemia; suboptimal personal hygiene as well as improper sterilization which resulted in severe health hazards such as septicaemia, disseminated intravascular coagulation as well as death were common risk factors for puerperal sepsis among postpartum women.

A study done in Nairobi to assess maternal mortality in the informal settlement, found out that puerperal sepsis was more rampant in slum areas of Nairobi (Makumi, 2004). According to Gordon et al. (2013), such areas lack adequate attention in terms of research and service delivery.

2.3.2.2 Distance to health facility

Sulamane et al. (2018) conducted a 10 year retrospective cohort study of women managed for puerperal sepsis from January, 2008 to December, 2017 at Usmanu Danfodiyo University Teaching Hospital, Sokoto. In their study, they alluded to the fact that, hospital based studies are not reliable sources of data for developing countries, because many women do not have access to health facilities, for many reasons. Some of the reasons include geographical distance, financial constraints, and cultural beliefs. Thus the population of patients that deliver in hospital may not be representative of the general obstetric population (Dole and Stein, 2003).

A research conducted in Kenya about the maternal resident during child birth with puerperal sepsis showed that 32 (28%) of the women resident were <10 km distance from the health facility, remaining 112 (72%) were living more than 10 km distance (Acosta et al., 2013).

Kimani et al. (2014) conducted research on Influence of Distance to Health Facilities on the Use of Skilled Attendants at Birth in Kenya. The findings revealed that women who resided 5 km or less from the nearest health facility were more likely to use skilled care at delivery than women resident at greater distances, although the pattern of choice of health facility level for delivery differed at this distance. Outreach maternity services are urgently required in counties with remote communities in order to improve access to skilled attendants during deliveries in these areas.

Awoyemi et al. (2011) conducted research on the Effect of Distance on Utilization of Health Care Services in Rural Kogi State, Nigeria. The result reveals that household size, distance and total cost of seeking health care affect the utilization of government and private hospitals while total cost of seeking health care and the quality of access route affect the use of traditional care. The policy implication arising from this study suggests that distance to improved health facilities and the total cost of seeking health care need to be reduced to enhance accessibility to improved health services by various socio-economic groups in the area.

2.3.2.3 Hygiene lessons

A study conducted by Sultana et al. (2018) on Knowledge and practice regarding prevention of puerperal sepsis among postpartum women attending a private hospital in Bangladesh in which a descriptive cross - sectional study design was used recommended that there is need for awareness creation on Puerperal Sepsis. Community health workers and Health care staff should be holding frequent educational camps. There is a need to enlighten the community on the need for ANC attendance, skilled attendant at delivery and hospital delivery under aseptic conditions and also maintaining high hygiene after delivery. Hygiene lessons are important in the prevention of puerperal sepsis as this infection is as a result of poor hygiene.

Findings by Chepchirchir et al. (2015) in a descriptive cross sectional study aimed to determine the incidence and management of puerperal sepsis among the women of reproductive age (i.e., 15-49 years) attending to two hospitals in Nandi County, Kenya underscored the necessity of supplying funds by the Ministry of Health to raise the individuals' awareness on puerperal sepsis and provide them with hygiene education in the investigated area. The study also recommended that integration of hygiene education and puerperal sepsis awareness into antenatal care services should be performed as a strategy to prevent and control the infection.

2.3.3 OBSTETRIC FACTORS

2.3.3.1 Place of delivery

Unlike the study by Hussain et al. (2012) which reported that CS was an important risk factor for puerperal sepsis among women, a study done by Ahmed et al. (2013) on puerperal sepsis in a rural Hospital in Sudan where 170 women were prospectively studied from January, 2011 through January 2012, revealed that, the rate of sepsis increased with home deliveries, in addition to younger age group. This is in line with Chisembele (2004)'s findings in which she alluded to the

fact that most of births take place at home, where delivery is carried out without aseptic measures. Besides, women cannot adopt good health seeking behaviours even when they know that they have life threatening conditions (Chisembele, 2004). Other risk factors for puerperal sepsis include; a home birth in unhygienic conditions, low socioeconomic status, anaemia, primi parity, prolonged rupture of membranes, multiple vaginal examinations, prolonged labour and obstetrical manoeuvres (Dare et al., 1998). An underlying infection such as HIV/AIDS may contribute to a woman's susceptibility to puerperal sepsis (McIntyre, 2003).

According to a study done by Bako et al. (2012) in Maiduguri University Teaching Hospital in Nigeria, on risk factors and microbial Isolates of puerperal sepsis it was found that the major risk factors for developing puerperal sepsis were un-booked status, home delivery, perineal trauma, caesarean section (C/S) and maternal age less than 24 years. The most common microorganisms isolated were *Staphylococcus aureus* and *Escherichia coli* (Chepchirchir, 2012).

A bivalent study conducted by Winani et al. (2005) revealed that there was no significant difference in the incidence of puerperal sepsis between the three places of delivery: medical facilities (1.8%), home (2.3%), and other places (4.5%).

2.3.3.2 Mode of delivery

A study by Hussain et al. (2012) in South Africa reported that caesarean section was an important factor for puerperal sepsis among women and was a cause of 8.3% (274) of deaths (2002–04) (Ahmed et al., 2013). It was found out that Caesarean section (CS) was the most important risk factor for postpartum infection (Hussein et al., 2012).

A study by Johnson and Buchman (2012) was done to determine the incidence of puerperal sepsis after caesarean section (CS) in a group of South African women at Chris Hani Baragwanath Academic Hospital.

It was revealed that caesarean section was an important factor for puerperal sepsis among postpartum women. In this study, a total of 272 women were followed up. Four (1.5%) were readmitted with puerperal sepsis, and 30 (11.0%) had possible mild wound infection.

Another study by Demisse et al. (2019) conducted in Ethiopia on determinants of puerperal sepsis among postpartum women also indicated that mode of delivery is significantly associated with puerperal sepsis. That is mothers who delivered by caesarean section were 3.9 times more likely to develop puerperal sepsis when compared to those delivered by spontaneous vaginal delivery.

2.3.3.3 Prolonged labour

Ahmed et al. (2013) conducted a study on puerperal sepsis in a rural Hospital in Sudan and found that prolonged labour contributed to puerperal sepsis among postpartum women. This is evident especially among the young mothers who are unfamiliar with the process of labour, its length and complications (Khaskheli et al., 2013). Most prim gravida mothers are found to take a long course of labour and trials in various hands before reaching health facility (Ahmed et al., 2013). Another study showed that there is strong association of prolonged labour with puerperal sepsis which occurs in younger mothers of lower parity (Sham Shad et al., 2010).

A bivalent study noted that Women who experienced labour for more than three hours had significantly more cases of puerperal sepsis than women who experienced labour lasting under three hours (Winani et al., 2005).

Another study done in India also showed that Puerperal sepsis was 1.7% of all obstetrical admissions and 34.4% of postnatal complications. It was seen common among young patients prolong labour, 58.6% (Sham Shad et al., 2010).

A study by Chepchirchir (2012) on occurrence and management of puerperal sepsis amongst women of reproductive age (15-49) attending two hospitals in Nandi County, Kenya revealed that most of the women with puerperal sepsis (34.8%) had their labour lasting between 6 and 12 hours; 28.4% had their labour lasting between 12 and 24 hours; and 8.4% of the women had their labour lasting between 24 and 36 hours.

2.3.4 INDIVIDUAL FACTORS

2.3.4.1 Unhygienic practices by mothers

A study conducted by Hussain (2012) as quoted by Chepchirchir (2012) in a study on occurrence and management of puerperal sepsis in Kenya revealed that the contributing factors to puerperal sepsis among others include childbirth in unhygienic environment.

In another study conducted in Pakistan, it was revealed that high rate of 67.2% of puerperal sepsis was common in postpartum women with poor hygiene (Sham Shad et al., 2010). This study highlights the fact that delivery in unhygienic conditions would predispose postpartum women to puerperal sepsis. Several factors were significantly associated with the incidence of infection in a bivariate analysis. It was also found out that bathed or shaved before delivery had

significantly fewer cases of puerperal sepsis than women who did not bathe or shave before delivery (Winani et al., 2005).

Marwah et al. (2016) conducted a retrospective study in Safdarjung Hospital, New Delhi, India, from January 2016 to June 2016 in Department of Obstetrics and Gynaecology. During the study period, a total of 33 cases met the inclusion criteria. The study further revealed that maternal mortality due to puerperal sepsis is very high; Lack of safe and hygienic practices for conducting delivery and abortion are important contributory factors.

2.3.4.2 Availability of Nutritious food throughout pregnancy period

Nutrition plays an important role in the health of the mother and her offspring and understanding this relation could help in designing interventions that could improve birth outcomes and further, the long-term quality of life of children (Abu-Saad & Fraser, 2010).

A study by Araya (2013) on "Knowledge and Practice of Reproductive Health among Mothers and their Impact on Fetal Birth Outcomes: A Case of Eritrea" revealed that majority of participants in this study (97%) understood the need for balanced diet during pregnancy. It is optimistic that the majority of the participants consider nutrition to be an important concept during pregnancy. However, future studies should look at this at a deeper level as to the practicality of this awareness.

Chepchirchir et al (2017) conducted a descriptive cross sectional study aimed to determine the incidence and management of puerperal sepsis among the women of reproductive age (15-49 years) attending to two hospitals in Nandi County, Kenya.

The results of the study, among other findings indicated that the food availability showed a significant relationship with duration of labour. The mothers with adequate food were five times more likely to experience a short labour compared to those with food shortage. In the same study, findings revealed that poor socioeconomic status hinders the women from acquiring adequate food during antenatal period. In this regard, several studies have reported high rate of sepsis (65.2%) in the low socioeconomic group. Poor social setting is associated with illiteracy, poor hygiene, ill health, poor antenatal care, prolonged labour, delayed referrals, and pre-labour rupture of membranes all of which set the scene for the occurrence of sepsis.

It has been found that there are higher chances of puerperal sepsis in poor females who are suffering from malnutrition. These women are unable to afford the cost of health facility. To

most women, poverty combines with cultural constraints that construct a social barrier around them which health services cannot penetrate (Sham Shad et al., 2010).

In a study by Chepchirchir et al. (2017) on associated factors with Puerperal Sepsis among Reproductive Age Women in Nandi County, Kenya, findings revealed a strong association between the food availability and duration of labour. Those with adequate food experienced shorter labour, compared to those with food shortage. Regarding this, it could be stated that nutrition can determine the duration of labour. This finding is in line with that obtained by Singata et al. (Utoo, 2012), concluding that poor nutritional balance may be associated with longer and more painful labours.

According to Momoh et al. (Desai et al., 2013), puerperal sepsis can be prevented through the consumption of adequate nutritive food or supplements, especially those rich in proteins and vitamins during pregnancy. The availability of proper food boosts the body immune system to fight infections when they occur (Rink, 2013). This will help reduce the puerperal sepsis resulting from prolonged labour.

2.3.4.3 Antenatal care (ANC) attendance

The antenatal period is the best time to provide women with the necessary health related information or even interventions if needed which promote their health and survival along with their infants (UNICEF, 2008). Antenatal care is defined as the care that a woman receives during childbearing that helps ensure healthy outcomes for women and their infants (WHO and UNICEF, 2003).

The United Nations Children's Fund (UNICEF), United Nations Population Fund (UNFPA), and the WHO (UNICEF, 2008) recommend a minimum of four prenatal visits to provide basic services including infection screening, nutritional supplement provision and monitoring for pregnancy and related complications. Although the quality of the antenatal care is not stated, the UNICEF report (2008) further states that approximately 50% of women worldwide receive four antenatal visits, compared with only 42% in the sub-Saharan Africa.

Chepchirchir et al (2017) conducted a descriptive cross sectional study aimed to determine the incidence and management of puerperal sepsis among the women of reproductive age (15-49 years) attending to two hospitals in Nandi County, Kenya. According to the results of the study, antenatal care attendance was significantly associated with puerperal sepsis.

Another study conducted by Utoo et al. (2012) in south Nigeria on maternal morbidity after child birth in health care facilities, reported that puerperal sepsis was more prevalent among the unbooked mothers (8.7%) than the booked ones (1.9%).

Demisse et al. (2019) in Ethiopia conducted research whose finding revealed that ANC attendance is significantly associated with puerperal sepsis. Those mothers who had ANC follow up one to two times be 4.2 times more likely to develop puerperal sepsis when compared to those who had three to four times. This was supported by a study from Pakistan.

Sulaiman et al. (2018) conducted a 10 year retrospective cohort study of women managed for puerperal sepsis from January, 2008 to December, 2017 at Usmanu Danfodiyo University teaching hospital, Sokoto to determine the incidence of puerperal sepsis, organisms and sensitivity in pattern as well as morbidity and mortality associated with puerperal sepsis. Findings revealed that 84.9% of the women had no antenatal care.

2.3.4.4 Ill - health during pregnancy (Anaemia, HIV infection etc.)

An underlying infection such as HIV/AIDS may contribute to a woman's susceptibility to puerperal sepsis (McIntyre, 2003). According to data from the Global Burden of Disease Study, in 2015, a review of 44 studies found that HIV positive status was associated with increased risk of intrauterine infection, puerperal sepsis, antepartum haemorrhage, uterine rupture and prolonged labour.

Sultana et al. (2018) also conducted a study on knowledge and practice regarding prevention of puerperal sepsis among postpartum women in Bangladesh.

A descriptive cross sectional study was used. The study revealed that ill health in pregnancy would predispose to puerperal sepsis.

Sulaiman et al. (2018) conducted a 10 year retrospective cohort study of women managed for puerperal sepsis from January, 2008 to December, 2017 at Usmanu Danfodiyo University teaching hospital, Sokoto to determine the incidence of puerperal sepsis, organisms and sensitivity in pattern as well as morbidity and mortality associated with puerperal sepsis. Findings revealed that 6.8% of respondents had anaemia during pregnancy and that this would predispose them to puerperal sepsis.

Dare et al. (1998) and McIntyre (2003) also alluded to the fact that an underlying infection such as anaemia and HIV/AIDS may contribute to a woman's susceptibility to puerperal sepsis. In another study conducted in Pakistan, it was revealed that high rate of 67.2% of puerperal sepsis was common in postpartum women with ill health (Sham Shad et al., 2010).

According to a study from Nigeria, 80% of mothers who died in relation to pregnancy belonged to the lower socio-economic class (Obi et al., 2001). Women especially of reproductive age group 15-49, are physically, mentally and socially more vulnerable to infections such as puerperal sepsis. These women are more vulnerable to Respiratory Tract Infections (RTIs) which increases the risk of one developing Puerperal sepsis (Singh et al., 2011). It has been found that there are higher chances of puerperal sepsis in poor females who are suffering from chronic ill health and malnutrition delivering in unhygienic conditions. These women are unable to afford the cost of health facility. To most women, poverty combines with cultural constraints that construct a social barrier around them which health services cannot penetrate (Sham Shad et al., 2010).

Chisembele (2004) conducted a study on the global incidence of puerperal sepsis in Geneva which revealed that chronic illnesses, such as anaemia could predispose to puerperal sepsis.

2.3.5 CULTURAL PRACTICES

Sahar (2013) conducted a study in Egypt on Postpartum Traditional Beliefs and Practices among Women in Makkah Al Mukkaramah. A descriptive study was carried out at Heraa General Hospital. The results of the study revealed that about one half of the women (51.7%) had positive beliefs while 18.3% and 30.0% of them respectively had neutral and negative beliefs. Moreover, slightly less than one half of women (46.7%) performed right practices while 25.8% and 27.5% respectively performed neutral and wrong practices.

Mellissa (2017) conducted a study on Traditional beliefs and practices in pregnancy, childbirth and postpartum period in Asia. The findings revealed that in the postpartum period, confinement was common because postpartum women were perceived to be weak, fragile and vulnerable to illness. Other prevalent beliefs and practices across Asian countries included massage, the state of pollution after childbirth, the use of traditional healers and traditional medicine and herbs, beliefs relating to hot/cold imbalance, behavioral taboos, magic, and superstition. The study further concluded that many Asian women continue to practice a wide

range of traditional beliefs and practices during pregnancy, childbirth, and the postpartum period.

Andrews and Boyle (2012) in a study conducted in Philadelphia posit that in some cultures a lot of importance is placed on the postpartum period; whilst western medicine considers pregnancy and childbirth as the most dangerous and precarious period, however for cultures that regard the postpartum period highly, these groups have formed ways and means that creates a balance during this delicate period for the newly delivered mother and baby. Some of these practices are considered as raising support for the newly delivered mother, many of these forms of support is usually from family, friends, relatives and even neighbors.

In Vietnam, the women also made use of herbal steam bath one or two months after delivery; this was believed to aid recovery. Vietnamese women in postnatal phase paid special attention to the hygiene of the genital area; these parts were washed daily to prevent infection (Lundberg and Thu, 2011).

A study by Chepchirchir (2012) on occurrence and management of puerperal sepsis in Kenya also revealed that socio-cultural practices among others were a factor predisposing postpartum women to puerperal sepsis.

Mothupi (2012) in Kenya conducted a cross sectional study which aimed to determine the pattern of use of herbal medicine in an urban setting. Results revealed that herbal medicine is used by 12% of pregnant women with access to healthcare in an urban context in Kenya, and often occurs without the knowledge of healthcare practitioners.

In Zambia, Maimbolwa *et al.* (2003) studied the cultural childbirth practices and beliefs amongst the women who escorted pregnant women to the health facility during labour (mbusas). The mbusas were advisors to the women regarding appropriate traditional practices and childbirth. They encouraged pregnant women to use herbs as they believed that these helped to precipitate labour and widened the birth canal.

Complications occurring during labour were attributed to witchcraft or were seen as punishment for misdeeds committed by the pregnant woman.

2.4 Conclusion

Literature review revealed that there was lack of knowledge on puerperal sepsis among postpartum women. Some of the patient factors predisposing to the development of puerperal infection include home birth in unhygienic conditions, prolonged labour with or without rupture of membranes, obstetric manoeuvres among others. Such infections can be prevented effectively by careful attention to clean delivery. If postpartum women have no knowledge of

these predisposing factors, they would continue with the practices that would put them at risk of developing puerperal sepsis. Establishing the level of knowledge of postpartum women on puerperal sepsis and associated factors will help in formulating better interventions that can be used to improve puerperal sepsis awareness strategies and hence prevent the disease, as opposed to relying merely on identifying the risk factors. It was against this background that the researcher investigated knowledge of postpartum women on puerperal sepsis and associated factors in Choma district and identified gaps so that appropriate strategies could be implemented.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter focuses on research design, research settings, study population, sampling method, sample size, data collection instrument, pilot study, validity and reliability of the data collection tool that was used and ethical considerations.

3.2 Study design

The study used a descriptive cross sectional study design to meet the research objectives. The study did not involve manipulation of the environment but recording of information as obtained from the participants (Hennekens and Buring, 1987). The design allowed the researcher to generate data regarding Knowledge of postpartum women on puerperal sepsis and associated factors in Choma district to provide a picture of the burden of puerperal sepsis in Choma district.

3.3 Study setting

This study was conducted at Macha Mission Hospital and other five selected Health centres namely; (Mbabala, Railway surgery, Shampande, Batoka and Sikalongo) that offer postnatal care services in Choma district. Macha Mission Hospital is a second level hospital based in Southern Province with a bed capacity of 208. The hospital serves as a referral centre for Choma district and neighbouring districts like Kalomo and Namwala. There are four major clinical services/ departments namely: internal medicine, surgery, paediatrics, Maternal and child health, obstetrics and gynaecology. The hospital also offer comprehensive HIV programs that encompasses voluntary counselling 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 Centre for Disease Control (CDC), Catholic Relief Services (CRS) and Churches Health Association of Zambia (CHAZ). The five selected health centres also offer the clinical services outlined above. The researcher had chosen this setting because they were offering the services such as antenatal, intranatal and postnatal care services of which the researcher was interested in for the purpose of the study.

Besides, it was a cost effective measure as the researcher came from the same area hence the measure was aimed at lowering the cost of carrying out the study.

3.4 Study population

The study population comprised of postpartum women attending postnatal care at Macha Mission Hospital and at the five selected health centres that offer postnatal care services in Choma district.

3.5 Target population

The target population included postpartum women attending postnatal care clinics at Macha Mission Hospital and at the five selected health centres at the time of the study.

3.6 Accessible population

The accessible population included postpartum women receiving postnatal care services at Macha Mission Hospital and the five selected health centres in Choma district at the time of the study and were willing to participate in the study.

3.7 Selection of respondents / study setting

3.7.1 Selection of the Hospital/Clinics

Macha Mission Hospital and five (5) health centres (Mbabala, Shampande, Railway Surgery, Batoka and Sikalongo health centres respectively) within Choma district were selected using Purposive sampling , a non-probability sampling method because they offer postnatal care services in Choma district and the researcher had interest in them for the purpose of the study.

3.7.2 Selection of Respondents

Study respondents were selected by simple random sampling from the daily appointments made for all postnatal mothers at Macha Hospital and in the five health facilities (Mbabala, Shampande, Railway Surgery, Batoka and Sikalongo health centres respectively. Macha Mission Hospital had a larger proportion of 121 respondents because of the larger catchment area while the other clinics were given 25 respondents each.

3.7.2.1 Inclusion criteria

The inclusion criteria as set by the researcher included the following:

- (a) Postpartum women within the child bearing age attending postnatal clinics at 6 days and 6 weeks willing to participate in the study
- (b) Postpartum women within the child bearing age attending postnatal clinics at 6 days and 6 weeks who had consented to be included in the study.

3.7.2.2 Exclusion criteria

- (c) All postpartum women who had critical medical, surgical or obstetric complications were excluded from the study.

3.8 Sampling method

A simple random sampling method was used for this study from the daily appointments made for all postnatal mothers in the health facilities to obtain a numbered list of all the units (Sampling frame) from the accessible population. This was done to ensure that all the postnatal mothers had adequate representation in the study and selected health centres would have the opportunity of providing information that would help to identify Knowledge of postpartum women on puerperal sepsis and associated factors. Then the selection of the specific sample was done within the health facilities randomly for equal opportunity of respondents in the study. The 246 selected postnatal mothers were drawn from Macha Mission Hospital (Zambia) and five (5) health centres from Choma district and were included in the sample upon obtaining informed consent. The proportion was according to the total number of postnatal mothers using the prevalence formula as outlined in 3.8.1.

3.8.1 Sample size

The sample size was calculated using the prevalence formula as follows:

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

Where $P = 0.2$ is the prevalence of puerperal sepsis in Southern province (i.e. 192 /1868 for the year 2015)

$$1 - P = 1 - 0.2 = 0.8$$

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

$d = \pm 5\% = \pm 0.05$ is the precision.

Therefore

$$\begin{aligned} n &= \frac{1.96^2 \times 0.2 \times (0.8)}{0.05^2} \\ &= 246 \text{ Respondents.} \end{aligned}$$

The study was conducted in a period of one month and a total of 246 respondents were interviewed, 12 from the health facilities per day. 25 from Sikalongo, Shampande and Mbabala health centres respectively, 37 from Batoka health centre, 13 from Railway Surgery and 121 from Macha Mission Hospital. These sample sizes were in proportion to facility populations for the year 2015 (SPHMIS, 2015). This was a finite population size (Less than 1000).

3.9 Data collection tool

A semi- structured interview schedule was used to collect data from the respondents.

3.9.1 Semi - structured interview schedule

The semi structured interview schedule had both open-ended and closed-ended questions and was adapted from similar studies conducted by Chepchirchir (2012) and Sultana et al. (2018) The semi structured interview schedule was divided into four sections arranged sequentially and in a simple, concise, brief sentence or statements for easy understanding according to objectives. The same tool was used on all the respondents to validate consistence in data collection.

3.10 Study variables

3.10.1 Dependent variable

Knowledge of postpartum women on puerperal sepsis.

3.10.2 Independent variables

1. Socio-demographic characteristics of the postpartum women: Age, parity, economic status, education level, residence and marital status.
2. Health facility factors: Distance to health facility, hygiene lessons, and hygienic practices by birth attendants.
3. Obstetric factors: Place of delivery, mode of delivery, prolonged labour, antenatal care attendance.
4. Individual factors: Adequate nutrition during pregnancy, Ill health such as Anaemia, HIV infection during pregnancy/puerperium, Health seeking behaviour, Unhygienic practices by mothers.
5. Cultural practices: those practices that predispose postpartum women to puerperal sepsis.

Table 2 (a): Variables, Indicators and Cut off points for Dependent Variable

VARIABLES	INDICATORS	CUT-OFF POINTS	QUESTION NUMBER
Dependent variable: Knowledge on puerperal sepsis	Low	Scores of 0 – 10 on knowledge questions	30 - 36
	High	Scores of 11 – 20 on Knowledge questions	

Table 2 (b): Variables, Indicators and Cut off points for Social Demographic Variables

VARIABLES	INDICATORS	CUT-OFF POINTS	QUESTION NUMBER
<u>Socio - Demographic Variables</u>			
Age	20 – 35 years	172 (70%)	1
	36 – 49 years	18 (7%)	
Parity	High	Having more than 5 children	6
	Low	Having less than 5 children	
Level of education	High	Attained Tertiary education	2
	Medium	Attained Secondary education	
	Low	Attained Primary education	
Economic Status (Occupation)	High	Employed, affords three meals In a day	3
	Medium	Employment, affords two meals In a day	
	Low	Unemployed, only affords two Meals per day	
Marital Status	Married	Response have been converted to %	4
	Unmarried	Response have been converted to %	
Residence	Rural	Responses converted to %	5
	Urban	Responses converted to %	

Table 2 (c): Variables, Indicators and Cut off points for Health Facility Factors

VARIABLES	INDICATORS	CUT-OFF POINTS	QUESTION NUMBER
<u>Health Facility Factors:</u>			
Distance to health facility	Within reach	0 – 5 KM	7
	Not within reach	>5KM	
Hygiene Lessons	Yes	Had hygiene lessons	8
	No	Did not have hygiene lessons	
Infection Prevention Practices by health care providers	Good	Washed hands, put on gloves, cleaned the woman`s vulva	9
	Poor	Did not wash hand, put on gloves, did not clean woman`s vulva	

Table 2 (d): Variables, Indicators and Cut off points for Obstetric Factors

VARIABLES	INDICATORS	CUT-OFF POINTS	QUESTION NUMBER
<u>Obstetric Factors</u>			
Place of delivery	Home		10
	Health facility		
Assistant during delivery	Skilled	Health Professional	14
	Unskilled	Non health professional	
Mode of delivery	Spontaneous		11
	Caesarean section		
	Instrumental		
Duration of Labour	Normal	Within 18 hours from start of labour	12
	Prolonged	More than 18 hours from start of labour	
Antenatal care Attendance	Yes	Attended	23
	No	Did not attend not even one	

Table 2 (e): Variables, Indicators and Cut off points for Individual Factors

VARIABLES	INDICATIONS	CUT-OFF POINTS	QUESTION NUMBER
Nutritional intakes	Adequate	Had two main meals in a day	16
	Inadequate	Had one or less meals in a day	
Ill health i.e. Anaemia, HIV, infection during Pregnancy/puerperium	Yes	Had anaemia, HIV or any other infection during pregnancy/following delivery	25, 26
	No	Did not have any infection	
Health seeking behaviour	Good	Seek treatment from a health facility	22
	poor	Seek treatment from a herbalist/traditional healer	
Hygienic practices By mothers	Good hygiene	Used clean sanitary material i.e. materials pads, Cotton wool	17- 20
	Poor hygiene	Used unclean sanitary material i.e. old pieces of cloth, old pieces of blanket	

Table 2 (f): Variables, Indicators and Cut off points for Culture Practice

VARIABLES	INDICATORS	CUT-OFF POINTS	QUESTION NUMBER
Cultural practice	Observe	Mothers observe traditional practices that could predispose to puerperal sepsis.	27-29
	Does not observe	Mothers do not observe Traditional practices that could Predispose to puerperal sepsis	

3.11 Validity

Construct and content validity was measured by checking items in the data collection tool against the objectives of the study and the concepts in the conceptual framework, to establish if all elements investigated were measured. An extensive review was conducted before designing the research instrument for quantitative data. Face validity was achieved by ensuring that the tool was carefully evaluated by a panel of experts including the researcher's supervisor, and the faculty in the school of nursing sciences. External validity was sustained by ensuring that the required number of respondents were interviewed. Internal validity was achieved by testing the data collecting tool through a pilot study that was conducted at Mapanza Rural Health centre in order to examine accuracy of the questions and elicit the information that was sought. The health centre offered similar health services as for the study sites. The pilot study helped the researcher to check the validity of the instrument. Validity was ensured by accurate and careful phrasing of each question to avoid ambiguity and leading respondents to a particular answer.

3.12 Reliability

Reliability focused on two aspects, which were stability and equivalence. The same interview schedule and method of collecting data was used on all the respondents during the actual study. Pretesting of the instrument was done through a pilot study to check whether the instrument was able to bring out consistent information about knowledge of postpartum women on puerperal sepsis and associated factors. Adjustments to the data collection tool were made as need arose. The research respondents were informed of the purpose of interviews and the need to respond truthfully. Reliability was achieved by standardizing the data collection instrument.

3.13 Data collection techniques

This study was face to face interviews using a semi-structured interview schedule. Each study respondent was interviewed in a private place for 25 to 30 minutes. All interviews were conducted between 08:00 and 16:00 hours. 12 respondents were interviewed each day from the study sites. Each interviewer on average conducted two (2) interviews per day to leave time for sorting out and checking for completeness of questionnaires before respondents left the health facility. Self-introduction was made by the researcher and research assistants to each respondent before starting each interview to create rapport and make respondents relax.

The purpose of the study was truthfully explained to each respondent. Interviewers were expected to follow instructions on interview schedule to standardize the interview technique. Questions were expected to be asked the way they were written, without influencing the answers. Questions not understood were merely repeated without paraphrasing them or indicating the direction of the answer. The researcher and her assistants endeavored to ensure respondents' comfort at all times by considering their priorities, or where not possible, explaining to them. Patience was exercised and respondents were given adequate time to think through the question and respond. Respondents were politely asked to repeat answers not understood by the interviewers. All responses were recorded right away to avoid missing any of them. At the end of each interview, respondents were given time to ask questions and were answered accordingly. Respondents were thanked at the end of each interview. The interviews were conducted from 06th November, 2017 to 15th December, 2017. Furthermore, corrections were made where necessary to make questions clear and provide information that was sought. The physical and psychological environment where data was collected were made comfortable by ensuring that there was privacy, confidentiality and general physical comfort

3.14 Pilot study

The researcher carried out the pilot study at Mapanza Health Centre in Choma district to check if the research instrument would meet the objectives of the study. The pilot study sample comprised of 10% of the total sample which was 25 respondents.

The pilot study was useful in identifying areas that needed to be revised in the data collection tool. Adjustments to the data collection tool were made and included the following:

- Question number one (1) Options of 19 years and below, 20 to 35 years, 36 years and above were included.
- Question number eight (8) was deleted as it had no bearing on the topic under review. Instead, the question was changed to how old is your second youngest child?
- Question number eleven (11) instead of reading Are you aware of puerperal sepsis? it was changed to have you ever suffered from puerperal sepsis?
- Question number thirteen (13) options 0 to 30 minutes and 31 minutes and above were included.
- Question number twenty six (26) what is puerperal sepsis? Was included on the knowledge questions

3.15 Ethical considerations

Ethical approval was sought from the University of Zambia Biomedical Research Ethics Committee (UNZABREC). The researcher sought written permission to conduct the study from National Health Research Authority–Ministry of Health (MOH), Southern Province Medical office, Choma District Medical Office, Choma District Commissioner, and Macha Mission Hospital respectively.

The purpose of the study was explained and written consent was obtained from respondents 18 years and above while assent was obtained from clients below 18 years before the study. Those that did not consent to participate in the study were reassured that they would not suffer any consequences as a result of not participating. Those who consented were asked to sign the consent form, which was explained to them fully. The respondents were not remunerated in any way.

Questionnaires and discussions were administered in privacy that was offered by the researcher. The respondents were assured of anonymity by using serial numbers on the questionnaires instead of writing their names.

After data collection, the questionnaires were kept under lock and key for security and confidentiality. No one, apart from the principal Investigator was allowed to access the collected data. Respondents were not subjected to any physical harm as the study did not involve invasive procedures. At completion of the study, all links between individuals and specific data was destroyed so that any future work with the research data is anonymous.

3.15.1 Beneficence

The patient's decisions were respected and the efforts were made to ensure their wellbeing throughout the data collection.

3.15.2 Maleficence

Patients were not subjected to any harm as the research did not involve any invasive procedures. They were protected from psychological harm by letting them answer the questions in a natural setting which provided privacy with no public interference.

3.16 Data analysis plan

After data was collected, the questionnaires were checked for completeness, consistence, legibility and accuracy. Categorization of the open-ended questions, which involved reading through all responses and grouping answers that belonged together was done. This enabled the researcher to report percentage of respondents giving answers that fell in each category.

Codes were assigned to each category, entered and analyzed using Statistical Package for Social Sciences (SPSS) software version 22. Confidence interval was set at 95%. A 5% level of significance was set, only p values of 0.05 or less were considered statistically significant. Chi-square test and Binary logistic regression model were used to test for association between the dependent variable and independent variables.

3.17 Data presentation

Research findings were presented according to the sections of the questionnaire. Some data were grouped together to give an overall picture. Data were presented using frequency tables and cross-tabulations to communicate research findings.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 Introduction

The chapter presents the study findings on Knowledge of postpartum women on puerperal sepsis and associated factors at Macha Mission hospital and the five selected health centres. The study findings were based on responses from 246 postpartum women who participated in the study. The general objective of the study was to assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. The findings are presented according to the study objectives as reflected in chapter one and are as follows: (i) To assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. (ii) To establish factors predisposing postpartum women to puerperal sepsis in Choma district.

4.2 Section A: Socio - demographic factors (n=246)

Table 3 below shows the demographic characteristics of the respondents. The frequency tabulation on age shows that 56.9% of the respondents were aged below 25 years, 32.9% were aged between 25 and 34 years, 9.8% were aged between 35 and 44 years while 0.4% of the respondents were aged between 45 and 54 years. In terms of education levels, 50% of the respondents had attained primary education, followed by 46.7% who had attained secondary education. Respondents who had attained tertiary education constituted 1.6% while those who had not attained any level of education also constituted 1.6%. The frequency tabulation on occupation shows that the majority (63%) of the respondents were housewives, 17.5% were self-employed, 2.8% were formally employed while 16.7% reported occupations categorized as 'other'. Most respondents (79.7%) were married while 20.3% were unmarried. In terms of residence, the majority (74.4%) of the respondents resided in rural areas whereas 25.6% resided in urban areas. The frequency tabulation on parity shows that 34.6% of the respondents had a parity of more than three, followed by 28% of the respondents who had a parity of one. 20.7% of the respondents had a parity of two while 16.7% had a parity of three.

Table 3: Demographic characteristics of the respondents (n=246)

Variable		Frequency	Percent
Age	Below 25	140	56.9
	25-34	81	32.9
	35-44	24	9.8
	45-54	1	.4
	Total	246	100.0
Level of Education	None	4	1.6
	Primary	123	50.0
	Secondary	115	46.7
	Tertiary	4	1.6
	Total	246	100.0
Occupation	Unemployed (Housewife)	155	63.0
	Self-employed	43	17.5
	Formally employed	7	2.8
	Others	41	16.7
	Total	246	100.0
Marital Status	Married	196	79.7
	Unmarried	50	20.3
	Total	246	100.0
Residence	Rural	183	74.4
	Urban	63	25.6
	Total	246	100.0
Parity	One	69	28.0
	Two	51	20.7
	Three	41	16.7
	More than three	85	34.6
	Total	246	100.0

4.3 Section B: Knowledge of postpartum women on puerperal sepsis and associated factors

Table 4 (a): Knowledge of postpartum women on puerperal sepsis and associated factors (n=246)

Variable	Responses	Frequency	Percent
What is puerperal sepsis?	Unable to define	147	59.8
	Able to define	99	40.2
	Total	246	100.0
Signs and symptoms of puerperal sepsis	Abnormal vaginal discharge	159	64.6
	Pelvic pain	25	10.2
	Fever	54	22
	Delay in reduction in size of uterus	6	2.4
	Backache and painful feet	2	0.8
	Total	246	100
Is it important to attend postnatal clinic following delivery?	Yes	238	96.7
	No	5	2
	Not sure	3	1.2
	Total	246	100
If "Yes" to question 27, explain why?	For immunization	66	27.7
	For immunization and growth monitoring of baby	44	18.5
	For health education	17	7.1
	For screening for disease in both mother and baby	111	46.6
	Total	238	100
What do you think are some of the factors that predispose postpartum women to puerperal sepsis	Delivery in unhygienic environment	68	27.6
	Use of unclean sanitary towels	54	22
	Insertion of herbs in the vagina following delivery	12	4.9
	Poor personal hygiene	54	22
	Anaemia	1	0.4
	Malnutrition	4	1.6
	Others	37	15
	Not collected	16	6.5
	Total	246	100

Table 4 (b): Knowledge of postpartum women on puerperal sepsis and associated factors (n=246)

Variable	Response	Frequency	Percent
What do you think should be done to prevent puerperal sepsis?	Good personal hygiene and nutrition	103	41.9
	Inserting herbs into vagina	13	5.3
	Attending antenatal and postnatal clinics for health education and seeking medical care	63	25.6
	Delivering from health facility	27	11
	Taking medicines after delivery	1	0.4
	Not sure	15	6.1
	Not collected	24	9.8
	Total	246	100
How do you take care of vagina/perineal tears following child birth?	Don't know	3	1.2
	Use spirit to clean	2	0.8
	Bathing with cold or warm water	159	64.6
	bathing using salt water	64	26
	Bathing using soap	2	0.8
	Bathing using traditional herbs	1	0.4
	Not collected	15	6.1
	Total	246	100

Table 4 shows responses on knowledge of postpartum women on factors predisposing to puerperal sepsis. Majority of the respondents 147 (60%) were unable to define puerperal sepsis while 99 (40%) were able to define it. Regarding the signs and symptoms of puerperal sepsis, abnormal vaginal discharge was mentioned by most respondents 159 (64.6%), followed by fever which was mentioned by 54 (22%) of the respondents. Pelvic pain was mentioned by 25 (10.2%) of the respondents while delay in reduction in size of uterus and backache and painful feet were mentioned by 6 (2.4%) and 2 (0.8%) of the respondents respectively.

In terms of importance of postnatal clinic attendance, the majority 238 (96.7%) responded in the affirmative while 5 (2%) responded in the negative and 3 (1.2%) were not sure.

On the reasons for attending postnatal care for respondents who said attendance was important, Table 4 shows that screening for disease in both mother and baby was given as the reason by 111 (46.6%) of the respondents, followed by immunization which was given as a reason by 66 (27.7%) of the respondents. Immunization and growth monitoring of the baby was given by 44 (18.5%) of the respondents while health education was cited by 17 (7.1%) of the respondents.

In terms of the knowledge on factors that predispose postpartum women to puerperal sepsis, 16 (6.5%) of the respondents did not give a response. Out of the 230 respondents, 68 (29.6%) mentioned delivery in unhygienic environments as a factor, while 54 (23.5%) mentioned the use of unclean sanitary towels and another 54 (23.5%) mentioned poor personal hygiene. Insertion of herbs in the vagina following delivery was mentioned by 12 (5.2%) of the respondents while malnutrition was mentioned by 4 (1.7%), Anaemia was mentioned by 1 (0.4%) and 37 (16.1%) of the respondents gave factors categorized as 'other'.

On the measures that should be undertaken to prevent puerperal sepsis, Table 4 shows that 24 (9.8%) of the respondents did not give a response. Out of the 222 responses given, 103 (46.4%) of the respondents mentioned good personal hygiene and nutrition, followed by 63 (28.4%) of the respondents who mentioned attendance of antenatal and postnatal clinics for health education and seeking medical care. Delivering from the health facility was mentioned by 27 (12.2%) of the respondents, inserting herbs in the vagina was mentioned by 13 (5.9%), taking medication after delivery was mentioned by 1 (0.5%) while 15 (6.8%) of the respondents were not sure.

Table 4 shows responses given as ways of caring for vaginal/perineal tears following child birth and 15 (6.1%) did not give a response. Of the 231 responses, 159 (68.8%) of the respondents mentioned bathing with cold or warm water, 64 (27.7%) mentioned bathing using salt water, 2 (0.9%) mentioned use of spirit to clean, another 2 (0.9%) mentioned bathing using soap, 1 (0.4%) mentioned bathing using traditional herbs while 3 (1.3%) did not know.

4.4 Factors predisposing postpartum women to puerperal sepsis

4.4.1 Section C: Health facility factors

Table 5: Health facility factors predisposing to puerperal sepsis (n=246)

VARIABLE	RESPONSES	FREQUENCY	PERCENTAGE
Distance to nearest health facility.	More than 5 kilometers	103	42
	Less or equal to 5 kilometers	143	58
	Total	246	100
Health education on Puerperal sepsis at antenatal and Postnatal clinics	Yes	163	66.7
	No	83	33.7
	Total	246	100
Hygienic practices by birth attendants	Washed hands before assisting	6	2.4
	Used gloves	73	29.7
	Cleaned my private part	11	4.5
	Washed hands before assisting, used gloves and cleaned my private part	109	44.3
	Washed hands before assisting and used gloves	47	19.1
	Total	246	100

Table 5 shows responses on health facility factors predisposing postpartum women to puerperal sepsis. In terms of distance to the nearest health facility, most respondents 143 (58%) reported distances of 0 – 5 km while 103 (42%) reported distances of more than 5km.

In terms of health education, most respondents 163 (66.7%) had received health education on puerperal sepsis at antenatal and postnatal clinic while 83 (33.7%) did not receive health education.

In terms of hygienic practices by birth attendants, majority 109 (44.3%) of the respondents reported that the attendants washed hands before assisting, used gloves and cleaned the respondents' private parts, followed by 73 (29.7%) of the respondents who reported that the attendants used gloves and 37 (15%) who reported that the respondents washed hands before assisting and used gloves. Respondents who reported that the assistants only cleaned their private parts were 11 (4.5%) while those who reported that the assistants washed hands and used clothes were 10 (4.1%) and those who reported that the assistants only washed hands before assisting were 6 (2.4%).

4.4.2 Section D: Obstetric factors predisposing postpartum women to puerperal sepsis

Table 6: Obstetric factors predisposing postpartum women to puerperal sepsis (n=246)

Variable		Frequency	Percent
Place of delivery	Home	30	12.2
	Health facility	216	87.8
	Total	246	100
Mode of delivery for last child	Spontaneous vaginal delivery	222	90.2
	Caesarean delivery	19	7.7
	Instrument/assisted delivery	5	2
	Total	246	100
Duration of labour	Normal (within 18 hours)	214	87.0
	Prolonged (more than 18 hours)	32	13.0
	Total	246	100.0
Duration to deliver after membrane rupture	Within 24 hours	245	99.6
	More than 24 hours	1	0.4
	Total	246	100
Assistance during delivery	Yes	244	99.2
	No	2	0.8
	Total	246	100
Source of assistance during labour	Unskilled attendants	28	11.5
	Skilled attendants	216	88.5
	Total	244	100.0

Table 6 shows responses on obstetric factors predisposing postpartum women to puerperal sepsis. On places of delivery, majority (87.8%) of the respondents had delivered their children from health facilities while 12.2% had delivered from home.

On the mode of delivery for respondent' last child, majority 222 (90.2%) had spontaneous vaginal deliveries while 19 (7.7%) had caesarean deliveries and 5 (2%) had instrumental /assisted deliveries.

In terms of duration of delivery, most respondents 214 (87%) had normal labour while 32 (13%) had prolonged labour.

In terms of duration taken for the respondents to deliver following rupture of membranes, the frequency tabulation above shows that the majority 245 (99.6%) of the respondents reported that their delivery lasted within 24 hours while 1 (0.4%) reported that their delivery lasted more than 24 hours after the rupture of the membranes.

In terms of assistance during delivery, most respondents 244 (99.2%) received assistance while 1(0.8%) did not receive assistance during delivery.

In terms of the sources of assistance during delivery, majority 218 (89%) of the respondents were assisted by skilled attendants while 28 (11%) were assisted by unskilled attendants.

4.4.3 Section E: Individual factors predisposing postpartum women to puerperal sepsis

Table 7(a): Individual factors predisposing postpartum women to puerperal sepsis (n=246)

Variable	Responses	Frequency	Percentage
Adequacy of Nutrition during pregnancy	Yes	234	95.1
	No	12	4.9
	Total	246	100
Sanitary towel used after delivery.	Maternity pads	36	14.6
	Cotton wool	64	26
	Pieces of cloth	125	50.8
	Maternity pads, cotton wool and pieces of cloth	20	8.1
	Blankets and clothes	1	0.4
	Total	246	100
Source of water.	Tap water	64	26
	Ground water	151	61.4
	Surface water	31	12.6
	Total	246	100
Availability of water supply.	Regular	204	82.9
	Irregular	42	17.1
	Total	246	100
Frequency of bathing after delivery.	Twice a day	48	19.5
	Three or more times a day	198	80.5
	Total	246	100
Place of treatment PS	Health facility	242	98.4
	Non-health facility	1	0.4
	Not sure	3	12
	Total	246	100
Reason for seeking treatment.	So that they can examine, diagnose and treat me	174	70.7
	This is where I deliver from	25	10.2
	This is where we find doctors and if they fail we can go for prayers.	47	19.1
	Total	246	100
Antenatal care attendance.	Yes	244	99.2
	No	2	0.8
	Total	246	100

Table 7(b): Individual factors predisposing postpartum women to puerperal sepsis (n=246)

Variable	Responses	Frequency	Percentage
Reasons for attending ANC	To check if the baby and mother are well	89	36.5
	To see if baby is ok	155	63.5
	Total	246	100
Diagnosed with disease before, during and after delivery up to 6 weeks	Yes	23	9.3
	No	223	90.7
	Total	246	100
Specifications of diagnosed disease	Hypertension, malaria and anaemia	5	21.7
	Fungal infection, HIV/AIDs, Syphilis	9	39.1
	Oedema, varicose veins, leg pains, headache, stomach pains and abscess on vulva	9	39.1
	Total	23	100

Table 7 shows responses individual factors predisposing postpartum women to puerperal sepsis. On adequacy of nutritious food throughout respondent's last pregnancy, majority 234 (95.1%) of the respondents reported adequate nutrition while 12 (4.9%) reported inadequate nutrition.

In terms of the types of sanitary towels used after delivery, majority 125 (50.8%) of the respondents reported using pieces of cloth, 64 (26%) reported using cotton wool, 36 (14.6%) reported using maternity pads, 20 (8.1%) reported using a combination of maternity pads, cotton wool and pieces of cloth while 1 (0.4%) reported using blankets and clothes.

On sources of water, majority of the respondents 151 (61.4%) had ground water as their water source while 64 (26%) had tap water and 31 (12.6%) had surface water as their source.

Responses on the availability of their water supplies shows that most respondents 204 (82.9%) reported having regular water supply while 42 (17.1%) reported irregular supply.

In terms of frequency of bathing after delivery, majority of the respondents 198 (80.5%) reported bathing three or more times a day while 48 (19.5%) reported bathing twice a day after delivery.

In terms of where to seek treatment for puerperal sepsis, majority of the respondents 242 (98.4%) would seek treatment from health facilities if they suspected they had puerperal sepsis while 1 (0.4%) said they would seek treatment from non-health facilities and 3 (1.2%) were not sure.

In terms of respondents' reasons for seeking treatment at their place of choice, majority of the respondents 174 (70.7%) said they would go to that place so that they could be examined, diagnosed and treated while 47 (19.1%) said they would go there because that is where they find doctors and if they failed they could go for prayers and 25 (10.2%) said they would go there because that is where they deliver their children from.

In terms of antenatal care attendance, most respondents 244 (99.2%) attended antenatal care while 2 (0.8%) did not attend.

In terms of reasons for attending antenatal care, most respondents 155 (63.5%) would attend to see if the baby was ok while 89 (36.5%) would attend to check if both the baby and the mother were well.

In terms of whether they were diagnosed with any disease before, during and after delivery up to six weeks, most respondents 223 (90.7%) responded in the negative while 23 (9.3%) responded in the affirmative.

In terms of the diseases that respondents were diagnosed with before, during and after delivery, 9 (39.1%) of the respondents mentioned Fungal infection, HIV/AIDS and Syphilis, another 9 (39.1%) mentioned Oedema, varicose veins, leg pains, headache, stomach pains and abscess on vulva while 5 (21.7%) mentioned hypertension, malaria and anaemia.

4.4.4 Section F: Traditional /cultural practices predisposing postpartum women to puerperal sepsis

Table 8: Traditional / Cultural practices predisposing Postpartum women to Puerperal Sepsis (n=246)

Variable		Frequency	Percent
Have you heard of women using traditional medicine soon after delivery?	Yes	112	45.5
	No	134	54.5
	Total	246	100
If "Yes" to above question, how do they use the medicine?	Don't know	13	11.6
	Bathing/insertion of herbs into vagina	78	69.6
	Drinking and bathing herbs	20	17.9
	Tattoo sacral area and thighs	1	0.9
	Total	112	100
How often do you bath after delivery?	Twice a day	48	19.5
	Three or more times a day	198	80.5
	Total	246	100
What traditional or cultural beliefs do you know that can predispose delivered mothers to puerperal sepsis?	Don't know	106	43.1
	Inserting/applying herbs in the vagina	73	29.7
	Drinking traditional herbs	36	14.6
	Bathing in herbs	20	8.1
	Poor personal hygiene	11	4.5
	Total	246	100

Table 8 shows responses on the traditional/ cultural practices of the respondents. On whether respondents had heard of women using traditional medicine after delivery, 134 (54.5%) of the respondents answered in the negative while 112 (45.5%) answered in the affirmative.

In terms of how traditional medicines are used after delivery, majority of the respondents, 78 (69.6%) mentioned bathing/insertion of herbs into the vagina, 20 (17.9%) mentioned drinking and bathing in herbs, 1 (0.9%) mentioned the tattooing of sacral areas and thighs while 13 (11.6%) did not know.

In terms of knowledge on traditional / cultural practices that can predispose delivered mothers to puerperal sepsis, 106 (43.1%) of the respondents did not know any practice, 73 (29.7%) mentioned the inserting/applying of herbs in the vagina, 36 (14.6%) mentioned drinking herbs, and 20 (8.1%) mentioned bathing in herbs while 11 (4.5%) mentioned poor personal hygiene.

4.5 Cross tabulations on relationships among dependent and independent variables.

Table 9: Relationship between knowledge on puerperal sepsis and demographic variables (n= 246)

Variable		Knowledge on puerperal sepsis			Chi - square value	p – value
		Low	High	Total		
Age	Below 25	60 (42.9%)	80 (57.1%)	140 (100.0%)	1.486	0.476
	25-34	36 (44.4%)	45 (55.6%)	81 (100.0%)		
	35 and above	14 (56.0%)	11 (44.0%)	25 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Level of Education	Low	61 (48.0%)	66 (52.0%)	127 (100.0%)	1.168	0.280
	High	49 (41.2%)	70 (58.8%)	119 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Economic Status	Low	88 (44.9%)	108 (55.1%)	196 (100.0%)	0.013	0.909
	Medium to high	22 (44.0%)	28 (56.0%)	50 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Marital Status	Married	87 (44.4%)	109 (55.6%)	196 (100.0%)	0.042	0.838
	Unmarried	23 (46.0%)	27 (54.0%)	50 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Parity	Low	69 (42.9%)	92 (57.1%)	16 (1100.0%)	0.651	0.420
	High	41 (48.2%)	44 (51.8%)	85 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		

The Cross tabulation in Table 9 shows the relationship between knowledge on puerperal sepsis and demographic variables. No significant relationship was observed between knowledge on puerperal sepsis and age, level of education, economic status, marital status and parity of respondents as the p-values were greater than 0.05 in all cases. The researcher therefore, failed to reject the null hypotheses and concluded that there was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and all other demographic variables.

Table 10: Relationship between knowledge on puerperal sepsis and health facility factors (n=246)

Variable		Knowledge on puerperal sepsis			Chi - square value	p - value
		Low	High	Total		
Distance to health facility	Not within	55 (53.4%)	48 (46.6%)	103 (100.0%)	5.404	0.020
	Within reach	55 (38.5%)	88 (61.5%)	143 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Hygiene Lessons	Did not have health lessons	49 (59.0%)	34 (41.0%)	83 (100.0%)	10.392	0.001
	Had health lessons	61 (37.4%)	102 (62.6%)	163 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Infection prevention Practices	poor	39 (43.3%)	51 (56.7%)	90 (100.0%)	0.110	0.741
	Good	71 (45.5%)	85 (54.5%)	156 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		

The Cross tabulation in Table 10 shows the relationship between knowledge on puerperal sepsis and health facility factors. Statistically significant relationships were observed between knowledge on puerperal sepsis, distance to health facility and hygiene lessons.

A higher proportion 88 (61.5%) of respondents within reach of the health facility had high knowledge on puerperal sepsis as compared to those who were not within reach 48 (46.6%). The researcher therefore rejected the null hypothesis and concluded that there is a relationship between knowledge on puerperal sepsis and respondents' distance from the health facilities. Similarly, a higher proportion 102 (62.6%) of respondents who had received lessons on hygiene

had high knowledge on puerperal sepsis as compared to those who had not received lessons 34 (41.0%).

Table 11: Relationship between knowledge on puerperal sepsis and obstetric factors (n=246)

Variable		Knowledge on puerperal sepsis			Chi - square value	P - value
		Low	High	Total		
Place of Delivery	Home	15 (50.0%)	15 (50.0%)	30 (100.0%)	0.386	0.534
	Health facility	95 (44.0%)	121 (56.0%)	216 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Assistant during delivery	Unskilled attendants	13 (46.4%)	15 (53.6%)	28 (100.0%)	0.030	0.863
	Skilled attendants	97 (44.7%)	120 (55.3%)	217 (100.0%)		
	Total	110 (44.9%)	135 (55.1%)	245 (100.0%)		
Mode of delivery	Spontaneous vaginal delivery	97 (43.7%)	125 (56.3%)	222 (100.0%)	0.961	0.327
	Caesarean / assisted delivery	13 (54.2%)	11 (45.8%)	24 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Duration of labour for last delivery	Normal (within 18 hours)	95 (44.4%)	119 (55.6%)	214 (100.0%)	0.069	0.792
Antenatal care attendance	Prolonged (more than 18 hours)	15 (46.9%)	17 (53.1%)	32 (100.0%)		
Antenatal care	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
attendance	Yes	109 (44.7%)	135 (55.3%)	244 (100.0%)		*0.880
	No	1 (50.0%)	1 (50.0%)	2 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		

*Result obtained using the Fisher's Exact Test as the Chi-square test assumption was violated

From the Cross tabulation in Table 11, no significant relationship was observed between knowledge on puerperal sepsis and place of delivery, type of assistant during delivery, mode

of delivery, duration of labour and antenatal care attendance as the p-values were greater than 0.05 in all cases.

The researcher therefore failed to reject the null hypotheses and concluded that there was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and place of delivery, assistant during delivery, mode of delivery, duration of labour and antenatal care attendance.

Table 12: Relationship between knowledge on puerperal sepsis and individual factors (n=246)

Variable		Knowledge on puerperal sepsis			Chi - square value	p - value
		Low	High	Total		
Nutrition intakes	Inadequate	7 (58.3%)	5 (41.7%)	12 (100.0%)	0.946	0.331
	Adequate	103 (44.0%)	131 (56.0%)	234 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Ill health	Yes	8 (34.8%)	15 (65.2%)	23 (100.0%)	1.013	0.314
	No	102 (45.7%)	121 (54.3%)	223 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Hygienic practices by mothers	Poor hygiene	67 (45.9%)	79 (54.1%)	146 (100.0%)	0.201	0.654
	Good hygiene	43 (43.0%)	57 (57.0%)	100 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		
Health seeking behaviour	Health facility	106 (43.8%)	136 (56.2%)	242 (100.0%)		*0.039
	Non-health facility	4 (100.0%)	0 (0.0%)	4 (100.0%)		
	Total	110 (44.7%)	136(55.3%)	246 (100.0%)		

*Result obtained using the Fisher's Exact Test as the Chi-square assumption was violated

From the Cross tabulation in Table 12, a statistically significant relationship was observed between knowledge on puerperal sepsis and respondents' health seeking behaviours.

A higher proportion 136 (56.2%) of respondents who would seek health services from health facilities had high knowledge on puerperal sepsis as compared to those who would seek health services from Non-health facilities 0 (0.0%). The researcher therefore rejected the null hypothesis and concluded that there is a relationship between knowledge on puerperal sepsis and respondents' health seeking behaviours.

No significant relationship was observed between knowledge on puerperal sepsis and nutrition intakes, ill health and hygienic practices by mothers as the p-values were greater than 0.05 in all cases. The researcher therefore failed to reject the null hypotheses and concluded that there

was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and nutrition intakes, ill health and hygienic practices.

Table 13: Relationship between knowledge on puerperal sepsis and cultural factors (n=246)

Variable		Knowledge on puerperal sepsis			Chi - square value	p - value
		Low	High	Total		
Cultural Practices	Observes	78 (44.1%)	99 (55.9%)	177 (100.0%)	0.107	0.774
	Does not observe	32 (46.4%)	37 (53.6%)	69 (100.0%)		
	Total	110 (44.7%)	136 (55.3%)	246 (100.0%)		

From the Cross tabulation in Table 13 on the relationship between knowledge and cultural factors, the researcher failed to reject the null hypothesis as the p-value was greater than 0.05. The researcher therefore concluded that there was no sufficient evidence to prove that there is a relationship between respondents' knowledge on puerperal sepsis and their observance of cultural practices.

4.6 Binary logistic regression model summary results

Table 14: Binary logistic regression analysis to test the impact of the independent variables against the dependent variable

Predictor Variable	Knowledge on puerperal sepsis		OR (95% C.I)	P-value
	Low	High		
	No (%)	No (%)		
Distance to health facility				
Not within reach	55 (53.4%)	48 (46.6%)	1.00(Ref)	
Within reach	55 (38.5%)	88 (61.5%)	1.939 (1.131 - 3.325)	0.020
Health seeking behaviour				
Health facility	106 (43.8%)	136 (56.2%)	0.323 (0.082 - 1.266)	0.105
Non health facility	4 (100%)	0 (0%)	1.00 (Ref)	
Hygiene Lessons				
Did not have health lessons	49 (59.0%)	34 (41.0%)	1.00 (Ref)	
Had health lessons	61 (37.4%)	102 (62.6%)	2.491 (1.420 - 4.371)	0.001

Table 14: Show results of binary logistic regression, a test which was done to check on the combined impact of distance to health facility, health seeking behaviour and reception of hygiene lessons on knowledge of postpartum women on puerperal sepsis. It was observed that, reduction in distance from more than 5km to 0- 5km from the health facility impacted significantly on the outcome variable. The logistic regression model was statistically significant, $X^2(3) = 20.487$, $p < .005$. The model explained 10.7% (Nagelkerke R^2) of the variance in knowledge of puerperal sepsis and correctly classified 61.0% of cases. After adjusting for confounding variables, the said reduction raised the odds of having high knowledge on puerperal sepsis by 93.9%. This means respondents who stayed within 0 – 5Km from the health facilities were 93.9% more likely to have high knowledge on puerperal sepsis as compared to those who stayed more than 5km away.

Similarly, reception of hygiene lessons contributed significantly to the model outcome. After adjusting for confounding variables, reception of hygiene lessons increased the likelihood of having high knowledge of puerperal sepsis by 149.1%.

Changes in health seeking behaviours did not contribute significantly to the model outcome.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

The chapter discussed the results of the study on Knowledge of postpartum women on puerperal sepsis and associated factors in Choma district, Zambia. Additionally, it also presented the recommendations, limitations and conclusion. The study aimed at assessing Knowledge of postpartum women on puerperal sepsis and associated factors in Choma district, Zambia. The study revealed that the majority of postpartum women had low level of knowledge on puerperal sepsis and associated factors in Choma district. This is in line with the study conducted in Saudi Arabia which had results that showed lack of knowledge on puerperal sepsis among postnatal mothers (Indra, 2015). However, there are no studies conducted in Choma district on the same. The findings have been discussed in relation to the objectives as follows: (i) To assess the existing level of knowledge of postpartum women on puerperal sepsis and associated factors. (ii) To establish factors predisposing postpartum women to puerperal sepsis in Choma district.

5.2 SOCIO- DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

(N=246)

Socio-demographic characteristics in this study included age, education level, occupation, marital status, residence and parity.

The findings in Table 3 showed that on age, majority 56.9% of the respondents were aged below 25 years while the minority 0.4% of the respondents were aged between 45 and 54 years. These findings are consistent with Belagavi, et al. (2015), who studied the knowledge regarding puerperal sepsis and its prevention among postnatal mothers in selected hospitals of Bhavnagar and reported that the majority of post-natal mothers were from the age group 23-27 years. The foregoing present study finding concerning the knowledge and practice of postnatal mothers on prevention is in the agreement with Lalitha (2016), who assessed the knowledge and practice of postnatal mothers on prevention of selected puerperal infections in a selected maternity hospital and proved that majority of the mothers were in the age group of 20-25 years.

The current study results suggest that most of the mothers are youths. This can be explained on the basis of population findings which show that Zambia has a high proportion of women aged between 20-24 years (CSO, 2015). These young mothers need support and IEC on how

to take good care of themselves before during and after delivery in order to prevent infections such as puerperal sepsis.

In terms of education level, this study finding revealed that 123 (50%) of the respondents had attained primary education, followed by 46.7% who had attained secondary education and respondents who had attained tertiary education and those who had not attained any level of education constituted 1.6% respectively. This present study finding is consistent with Belagavi, et al (2015), who studied the knowledge regarding puerperal sepsis and its prevention among postnatal mothers in selected hospitals of Bhavnagar and reported that more than half of the postnatal mothers (60%) had primary education. The current study findings is in the agreement with Lalitha (2016), who assessed the knowledge and practice of postnatal mothers on prevention of selected puerperal infections in a selected maternity hospital and proved that majority of the mothers had educational status of primary and secondary education. Education enables access to information and helps empower women and their spouses to make appropriate decisions during pregnancy. The education level of a woman is found to be a powerful influence when it comes to women's health. It is observed that women who went up to secondary level delay their time to fall pregnant, they mostly too have few children, have access to health information and these reduce their risk of dying due to maternal related causes compared to their counterparts with low level of education. This level of education may render mothers jobless. Therefore, they may lack the adequate resources to afford the cost of health facility.

In terms of occupation, findings of the current study shows that the majority (63%) of the respondents were housewives and the minority 2.8% of the respondents were formally employed (Table 3). This finding is consistent with Belagavi, et al (2015), who studied the knowledge regarding puerperal sepsis and its prevention among postnatal mothers in selected hospitals of Bhavnagar and reported that the majority of post-natal mothers were house wives. This is also consistent with the findings by Lalitha (2016), who assessed the knowledge and practice of postnatal mothers on prevention of selected puerperal infections in a selected maternity hospital and proved that majority of the mothers were housewives. This high unemployment level may translate to poverty levels in Zambia which are at 54.4% (CSO, 2015). Another possible explanation is that poverty continues to be a significant problem in Zambia despite its economy stabilizing and attaining single-digit inflation in 2000-2010. Jesuit Centre for Theological Reflection basic needs basket for September 2010 shows that a family

of six in Lusaka the capital city of Zambia needs approximately K867, 000 every month for food only and 80% of Zambians cannot meet the basic rights such as food, housing, clean water, education and medical care because they are living in inhuman conditions that are below the basic poverty datum line (Kelly, 2011). This is likely to affect the mothers' nutritional status, hygiene and access to health care facilities were they would receive IEC on Puerperal sepsis.

Findings in Table 3 of the current study shows that most 196 (79.7%) of the respondents were married whilst 50 (20.3%) were unmarried. These findings are similar to CSO (2015) which reports that 60% women are married, 28% never married and 9% were divorced/separated. Those married were likely to receive social support before, during and after childbirth and this would help them identify risk factors for puerperal sepsis and seek health care in case of any. This calls for community sensitization in communities where gender roles are unequal to promote male involvement in reproductive health issues.

In terms of residence, the current study findings shows that the majority 183 (74.4%) of the respondents resided in rural communities, whilst 63 (25.6%) resided in the urban communities (Table 3). These findings are consistent with Belagavi, et al (2015), who studied the knowledge regarding puerperal sepsis and its prevention among postnatal mothers in selected hospitals of Bhavnagar and reported that the majority of post-natal mothers were living in rural areas. These findings however are contrary to Lalitha (2016), who assessed the knowledge and practice of postnatal mothers on prevention of selected puerperal infections in a selected maternity hospital and proved that majority of the mothers were from urban residential. In the current study, mostly those in the rural could be of low social economic status, uneducated and could have poor health seeking behaviour due to traditional /cultural practice (Maimbolwa, 2003). This would deny them the opportunity to get IEC on puerperal sepsis from appropriate health personnel.

Parity is the number of children a woman may have had prior to the current pregnancy. Findings in this study revealed that 85 (34.6%) of the respondents had a parity of more than three, followed by 69 (28%) of the respondents who had a parity of one. The current findings are not consistent with those of Shamshad et al., (2010) who carried out a study on puerperal sepsis; still a major threat for parturient where majority (63%) of respondents were of low parity. This can be attributed to the fact that multiparas have experience with childbirth and could have at one time or another been exposed to IEC on importance of health facility delivery where there are skilled health care providers who could help in times of complications.

5.3 Knowledge of postpartum women on factors predisposing to puerperal sepsis (n=246)

Knowledge of postpartum women on puerperal sepsis encompasses information and skills gained through education or expertise. In this study, it refers to the range of information and understanding gained by postpartum women regarding puerperal sepsis.

In relation to knowledge of puerperal sepsis, the results of the present study showed that 147 (60%) of the respondents were not able to define the concept of puerperal sepsis in their own understanding while 99 (40%) defined it correctly (Table 4). This is similar to a study conducted by Masoud and Saber (2015) in Egypt in which they assessed knowledge and practices of postnatal mothers towards prevention of puerperal sepsis. The results revealed that the great majority of the respondents had poor score of knowledge related to the definition, causes, symptoms, preventive measures and high risk group in pre-test (96.0%) respectively. This implies that communities need to be educated on puerperal sepsis.

Pertaining to the signs and symptoms of puerperal sepsis, in this study, abnormal vaginal discharge was mentioned by most respondents 159 (64.6%), followed by fever which was mentioned by 22% of the respondents. Pelvic pain was mentioned by 10.2% of the respondents while delay in reduction in size of uterus and backache and painful feet were mentioned by 2.4% and 0.8% of the respondents respectively (Table 4). This is consistent with the study findings by Jahaya and Bukar (2013) on Knowledge of symptoms and signs of puerperal sepsis in Nigeria which revealed that a reassuring number of respondents, 265 (66.3%), knew that fever with abnormal vaginal discharge; 252 (63%) fever with foul smelling lochia; 346 (86.4%) fever occurring with lower abdominal pain and 182 (45.5%) knew that fever occurring with prolonged flow of lochia, are all indicators of puerperal sepsis. However, pertaining to the current study findings, despite the fact that majority 159 (64.6%) of the respondents were able to mention abnormal vaginal discharge as a sign of puerperal sepsis, knowledge of the other signs and symptoms by other respondents seems to be low as compared to those in the study by Jahaya and Bukar (2013). This implies that there is need to sensitize and educate the women on puerperal sepsis so as to improve on their knowledge.

The current study findings on whether it is important to attend postnatal clinic following delivery showed that the majority 238 (96.7%) of respondents were in the affirmative (Table 4). Pertaining to reasons for attending postnatal care for respondents who said attendance was important, screening for disease in both mother and baby was given as the reason by majority 111 (46.6%) of the respondents (Table 4).

Despite these findings, the responses given by other respondents were indicating that mothers do not really understand reasons for postnatal care attendance. Others think it is children's clinic and so when they attend, they are actually bringing children for immunization and growth monitoring and not themselves. Health care providers should intensify education and sensitization of women on importance of postnatal care attendance so that women can be knowledgeable on this as maternal health is a priority component of health service delivery.

In relation to factors that predispose postpartum women to puerperal sepsis, current study findings showed that 64 (29.6%) mentioned delivery in unhygienic environments as a factor, while 54 (23.5%) mentioned the use of unclean sanitary towels and another 54 (23.5%) mentioned poor personal hygiene (Table 4). This is contrary to the findings by Jahaya and Bukar (2013) in Nigeria which revealed that a total of 53% of respondents were not aware of the factors predisposing to puerperal sepsis; 10% believed it is caused by evil spirits. The knowledge of the predisposing factors of puerperal sepsis is poor since no respondent mentioned all of them at once. This means they know some but have no ideas on the others. Therefore, there is need to put more emphasis on the predisposing factors of puerperal sepsis during antenatal health talks as this could help reduce morbidity and mortality associated with puerperal sepsis.

On the measures that should be undertaken to prevent puerperal sepsis, the current study findings revealed that out of the 222 responses given, 46.4% of the respondents mentioned good personal hygiene and nutrition, followed by 28.4% of the respondents who mentioned attendance of antenatal and postnatal clinics for health education and seeking medical care. Delivering from the health facility was mentioned by 12.2% of the respondents, inserting herbs in the vagina was mentioned by 5.9%, taking medication after delivery was mentioned by 0.5% while 6.8% of the respondents were not sure (Table 4). This is consistent with the findings by Indra (2015) in a study conducted in Puducherry in the Kingdom of Saudi Arabia which alluded to the fact that puerperal sepsis is an important public health problem which is a leading cause of preventable maternal death especially in developing countries, due to the lack of knowledge on the preventive methods. The study showed that the knowledge is lacking even though adequate practices are existing. There is still need to educate our communities on puerperal sepsis in order to raise awareness.

Pertaining to care of vaginal/perineal tears, the current study findings showed that 68.8% of the respondents mentioned bathing with cold or warm water, 27.7% mentioned bathing using

salt water, 0.9% mentioned use of spirit to clean, another 0.9% mentioned bathing using soap, 0.4% mentioned bathing using traditional herbs while 1.3% did not know (Table 4). From the responses given, there is still need to educate delivered mothers on care of vaginal / perineum tears as some responses such as use of spirit to clean and insertion of herbs could lead to more harm than help.

5.4 Factors predisposing postpartum women to puerperal sepsis

5.4.1 Health facility factors

Health facility factors in this study included distance to health facility, hygiene lessons and infection prevention practices by health care providers.

In terms of distances to the nearest health facilities, the study findings showed that most respondents 143 (58%) reported distances of 0 – 5 km while 103 (42%) reported distances of more than 5km (Table 5). This is contrary to a study by Sulamine et al. (2018) conducted at Usmanu Danfodiyo University Teaching Hospital, Sokoto in which they alluded to the fact that, hospital based studies are not reliable sources of data for developing countries, because many women do not have access to health facilities, for many reasons. Some of the reasons include geographical distance, financial constraints, and cultural beliefs. Distance to health facility if more than 5km can lead to postpartum women failure to seek health care which may deny them opportunities to receive health lessons which would increase their knowledge on postpartum care. The WHO (2009) report states that it is not only important that health care services be available for women during pregnancy and childbirth but also those should be provided in a way that are culturally appropriate for the community and, at the same time, need to be responsive to the needs of those women.

The study results on hygiene lessons revealed that most respondents (66.3%) had received health education on puerperal sepsis at antenatal and postnatal clinic while 33.7% had not received health education (Table 5). This is contrary to the study findings by Chepchirchir (2012) in Kenya whose findings showed that most postnatal mothers did not receive health education. Educating the mothers on personal hygiene and increasing their awareness about puerperal sepsis could be effective in the eradication of this menace. The integration of hygiene education and puerperal sepsis awareness into antenatal care services should be performed as a strategy to prevent and control the infection.

In relation to infection prevention practices by health care providers, findings in this study revealed that majority of the respondents 109 (44.3%) stated that the birth attendants washed hands, used gloves and cleaned their private parts during delivery. 73 (29.7%) respondents mentioned that the birth attendants used gloves during delivery, 47 (19.1%) mentioned that the birth attendants washed hands before assisting and used gloves, 11 (4.5%) mentioned that the birth attendants cleaned the respondents private parts, and 6 (2.4%) mentioned that the assistant washed hands before assisting during delivery (Table 5). This is similar to the study findings by Winani et al., (2005) in Tanzania in a study to determine factors influencing puerperal sepsis where a sample size of 3,262 women were selected, only respondents 27% (877) reported that the birth attendant inserted his or her hands into the vagina, and 25% (830) reported that the attendant washed his or her hands before doing so. Of those 830 women, 98% reported that the attendant had used soap and water while 1.5% were attended by birth assistants who washed their hands developed puerperal sepsis, compared to two (8.0%) of the 25 women who reported that the birth attendant did not wash their hands before inserting them into the vagina. This shows that even health care providers are not consistent with their hand washing practices and yet hand washing is the most practical procedure for preventing cross contamination (person to person).

5.4.2 Obstetric factors

Place of delivery, assistant during delivery, mode of delivery, duration of labour and antenatal care attendance.

In terms of place of deliver, the results of the current study showed that majority 216 (87.8%) of the respondents delivered at the health facility and 30 (12.2%) at home (Table 6). The current study findings are contrary to Chisembele (2004)'s findings in which she alluded to the fact that most of births take place at home, where delivery is carried out without aseptic measures. This study findings revealed that majority of respondents deliver at health facilities and yet the puerperal sepsis situation in Choma district is not stable. This could be attributed to poor knowledge on personal hygiene exhibited by the mothers in their homes ending up infecting themselves. These women are of low socio-economic status and most of them live in the rural and so cannot afford clean sanitary towels, soap and sometimes clean and safe water (Tables 3, 4, 5). On the other hand, the facility deliveries are more than the home deliveries. This is attributed to the measures government has put in place to reduce maternal morbidity and mortality (CSO, 2015).

In terms of mode of delivery, findings of the current study revealed that most 222 (90.2%) of the respondents mode of delivery of their last child was spontaneous vaginal delivery, 19 (7.7%) delivered by caesarean section and 5 (2%) had instrumental deliveries (Table 6). This is similar to the study finding by Ahmed (2015) in Sudan which showed that mothers developed puerperal infection due to obstetric factors, and the high prevalent rate of infection was among women who delivered vaginally (97.6%) compared to those who delivered by caesarean section (2.5%). This finding is however not consistent with the study findings by Johnson and Buchman (2012) in which they conducted a study to determine the incidence of puerperal sepsis after caesarean section (CS) in a group of South African women at Chris Hani Baragwanath Academic Hospital. Their study revealed that caesarean section was an important factor for puerperal sepsis among postpartum women. This could be attributed to poor hygienic practices by mothers.

Regarding assessment of duration of labour as an obstetric risk factor, it was found that majority (87%) of the respondents had the duration of labour within 18 hours which is considered to be normal while (13%) were in labour for more than 18 hours, which is considered as prolonged labour (table 6). This finding is similar to a study conducted by Chepchirchir (2012) on occurrence and management of puerperal sepsis amongst women of reproductive age (15-49) attending two hospitals in Nandi county, Kenya which revealed that most respondents (34.8%) had their labour lasting between 6 and 12 hours; 28.4% had their labor lasting between 12 and 24 hours; and 8.4% of the women had their labour lasting between 24 and 36 hours. This is evident especially among the young mothers who are unfamiliar with the process of labour, its length and complications (Khaskheli et al., 2013). This is attributed to the fact that in prolonged labour and mode of delivery if caesarean section, infection prevention is compromised since invasive procedures are performed.

In terms of Antenatal care (ANC) attendance, the finding of the current study revealed that majority 244 (99.2%) of the respondents attended antenatal care while 2 (0.8%) respondents did not attend antenatal care (Table 6). This finding is contrary to that of Utoo et al. (2012), reporting that puerperal sepsis was more prevalent among the unbooked mothers (8.7%) than the booked ones (1.9%). This is attributed to the stigma that exist against women who get pregnant before marriage. There is need to encourage women to come for antenatal care (ANC) for monitoring their health and that of their baby in utero. The health care providers should take this opportunity to sensitize the women and community at large on puerperal sepsis and

also for IEC on health issues. In terms of reasons for attending antenatal care, the current study finding showed that 155 (63.5%) of the respondents would attend to see if the baby was ok while 89 (36.5%) respondents would attend to check if both the baby and the mother were well (Table 6). This finding shows that most women do not understand the reason for attending ANC. Therefore, health care providers should endeavor educate communities on reasons for attending ANC.

This study findings showed that most respondents 244 (99.2%) received assistance during delivery while 0.8% did not receive assistance during delivery (Table 6). In terms of the sources of assistance during delivery, the current study showed that the majority 216 (88.5%) of the respondents were assisted by skilled attendants while 28 (11.5%) were assisted by unskilled attendants (Table 6). This is consistent with the study by Araya (2013) on knowledge and practice of reproductive health among mothers which revealed that 85.1% respondents were assisted by a professional. This is attributed to the fact that, the ministry of health (MoH) in Zambia, in collaboration with the non-governmental agencies, has launched maternity waiting homes for women who live in remote areas so that they can stay close to health facilities before giving birth where eventually, they could deliver with the assistance of skilled professionals or get a referral service if needed (Wild, Barclay, Kelly, & Martins, 2012).

Delivery by unskilled attendants should be discouraged as much as possible. Therefore health care providers should educate communities on the importance of having skilled attendants during delivery so that in case of any complications, the mothers could be helped appropriately. This is in line with the world health statistics report which shows that skilled birth attendance is important (World Health Organization, 2010). Naturally, birth assisted by a skilled attendant reduces the risk of mortality associated with pregnancy and childbirth (World Health Organization, 2008a). The care provided by skilled health personnel is extremely important especially when complications occur.

5.4.3 Individual factors

The study considered nutritional intake, Ill health, health seeking behaviour and unhygienic practices by mothers as individual factors.

In terms of adequacy of nutritious food throughout their last pregnancy, 234 (95.1%) of the respondents reported adequate nutrition while 12 (4.9%) reported inadequate nutrition (Table 7). This is consistent with the study findings by Chepchirchir et al. (2015) in Kenya whose results among other findings indicated that the food availability showed a significant

relationship with duration of labour. The mothers with adequate food were five times more likely to experience a short labour compared to those with food shortage.

The current study findings as regards to ill health or whether they were diagnosed with any disease before, during and after delivery up to six weeks showed that most respondents 223 (90.7%) responded in the negative while 23 (9.3%) responded in the affirmative (Table 7). In terms of specific diseases respondents were diagnosed of before, during and after delivery, the current study findings revealed that 9 (39.1%) of the respondents mentioned Fungal infection, HIV/AIDS and Syphilis, another 9 (39.1%) of respondents mentioned Oedema, varicose veins, leg pains, headache, stomach pains and abscess on vulva while 5 (21.7%) mentioned hypertension, malaria and anaemia (Table 7). This is consistent with the findings by Chepchirchir (2013) in which she alluded to the fact that such infection would predispose to puerperal sepsis. This is because HIV and anaemia lower the immune system hence mothers are predisposed to infection.

In relation to health seeking behaviour, the findings of the present study revealed that majority 245 (98.4%) of the respondents would seek treatment from the health facility if they developed puerperal sepsis while one (0.4%) said she would seek treatment from a non-health facility (Table 7). This is in line with McIntyre (2003) findings which alluded to the fact that an underlying infection such as HIV/AIDS may contribute to a woman's susceptibility to puerperal sepsis.

In relation to unhygienic practices by mothers, findings of the current study revealed that on the types of sanitary towels used after delivery, 125 (50.8%) of the respondents reported using pieces of cloth, 64 (26%) reported using cotton wool, 36 (14.6%) reported using maternity pads, 20 (8.1%) reported using a combination of maternity pads, cotton wool and pieces of cloth while 1 (0.4%) reported using blankets and clothes (Table 7). This is in line with the findings by Shamshad et al. (2010) in Pakistan in which their study alluded to the fact that delivery in unhygienic conditions would predispose postpartum women to puerperal sepsis.

5.4.4 Cultural practices

Cultural practices are very common among women in puerperium. Therefore the study considered these practices to be determined whether they have an effect on the knowledge of postpartum women on puerperal sepsis.

In terms of whether respondents had heard of women using traditional medicine soon after delivery, 134 (54.5%) of the respondents answered in the negative while 112 (45.5%) answered in the affirmative (Table 8). This is in line with a study by Mothupi (2012) in Kenya whose findings revealed that only 12.5% respondents would disclose such information to health care professionals.

The current study findings on how traditional medicines are used after delivery showed that of the respondents who had heard of the use of such medicines, the majority 78 (69.6%) mentioned bathing/insertion of herbs into the vagina, 20 (17.9%) mentioned drinking and bathing in herbs, 1 (0.9%) mentioned the tattooing of sacral areas and thighs while 13 (11.6%) did not know (Table 8). This is also consistent to the findings by Chepchirchir (2012) in a study on occurrence and management of puerperal sepsis in Kenya which revealed that the contributing factors to puerperal sepsis among others included socio-cultural practices among postnatal mothers. 69.6% respondents mentioned bathing/ insertion of herbs into the vagina. Seriously this practice would actually predispose these mothers to puerperal sepsis as mostly mothers sustain tears during delivery which could be infected by these unsterile herbs which they insert in the vagina. Health care providers need to sensitize postpartum women on the dangers of engaging in such practices.

Findings of the current study Showed responses on traditional beliefs that can predispose delivered mothers to puerperal sepsis as shown, 106 (43.1%) of the respondents did not know any belief, 73 (29.7%) mentioned the inserting/applying of herbs in the vagina, 36 (14.6%) mentioned drinking herbs, 20 (8.1%) mentioned bathing in herbs while 11(4.5%) mentioned poor personal hygiene (8). This is similar to the study findings by Sahar (2013) in Egypt in a study on postpartum traditional beliefs and practices which revealed that about one half of the women (51.7%) had positive beliefs while 18.3% and 30.0% of them respectively had neutral and negative beliefs. Moreover, slightly less than one half of women (46.7%) performed right practices while 25.8% and 27.5% respectively performed neutral and wrong practices. In Zambia, Maimbolwa et al. (2003) also discusses these cultural practices done by postpartum women and traditional labour attendants as predisposing factors to postpartum infections.

The findings in the present study revealed that most respondents had no knowledge of traditional practices that predispose mothers to puerperal sepsis. This is a danger to them as they would ignorantly indulge in practices that would predispose them to puerperal sepsis. There is need therefore to intensify sensitization of postpartum women on puerperal sepsis.

5.5 Cross Tabulation between Dependent and Independent Variables

In terms of relationship between knowledge on puerperal sepsis and demographic variables, on age, the current study findings showed that the respondents whose age was below 25 and had low knowledge on puerperal sepsis were 60 (42.9%) and those with high knowledge on puerperal sepsis were 80 (57.1%). Those respondents whose age group was between 25 - 34 years, 45 (55.6%) had high knowledge on puerperal sepsis, while 36 (44.4%) had low knowledge on puerperal sepsis. Those respondents who were 35 years and above 11(44%) had high knowledge on puerperal sepsis while 14(56%) had low knowledge on puerperal sepsis. These findings mean that those with age below 35 had higher knowledge on puerperal sepsis compared to those with age 35 and above. This implies that those respondents above age 35 may be predisposed to puerperal sepsis since they have low level of knowledge on puerperal sepsis compared to those with age below 35. However, no significant relationship was observed between knowledge on puerperal sepsis and age as the *P* value was greater than 0.05. ($X^2 = 1.486$, *P* = 0.476, N=246, 2- tailed). (Table 9)

The current study findings revealed that among the respondents who had low level of education 61 (48%) had low knowledge on puerperal sepsis and 66 (52%) had low level of education but high knowledge on puerperal sepsis, while among the respondents who had medium – high level of education, 49(41.2%) had low knowledge on puerperal sepsis and 70 (58.8%) had high knowledge on puerperal sepsis. These findings may mean that education level was a factor in terms of level of knowledge on puerperal sepsis as those respondents who had medium to high level of education had high knowledge on puerperal sepsis. However, the observed trend was not statistically significant as the Chi-square test yielded a p-value of 0.280 which was more than the threshold of 0.05. Hence, we fail to reject the null hypothesis and conclude that there is no association between level of education and knowledge on puerperal sepsis ($X^2 = 1.168$, *P* value = 0.280, N = 246, 2-tailed) (Table 9).

In terms of economic status, the current study findings revealed that among respondents who had low economic status, 88 (44.9%) had low knowledge on puerperal sepsis and 108 (55.1%) had high knowledge on puerperal sepsis while those with medium - high economic status 22 (44.0%) had low knowledge and 28 (56.0%) had high knowledge on puerperal sepsis. This may mean that economic status is not a factor in terms of knowledge on puerperal sepsis as this study finding had a very small margin in terms of percentage between low economic status and high economic status (Table 9). However, the results showed no statistical association between economic status and knowledge on puerperal sepsis since the *P* - value of 0.909 which was

yielded was greater than 0.05 but the chi-square of 0.013 indicated some relationship. Therefore, we fail to reject the null hypothesis and conclude that there was no sufficient evidence to prove that there is an association between economic status and knowledge on puerperal sepsis ($X^2 = 0.013$, P value = 0.909, $N = 246$, 2-tailed).

In terms of relationship between marital status and knowledge on puerperal sepsis, the current study indicated that of the married respondents, 87(44.4%) had low knowledge on puerperal sepsis and 109 (55.6%) had high knowledge on puerperal sepsis while among the unmarried 23 (46%) had low knowledge on puerperal sepsis and 27 (54%) had high knowledge on puerperal sepsis. Table 9 indicated results showing slightly more than half of the married and unmarried respondents showing high knowledge on puerperal sepsis. This means both the married and unmarried have low level of knowledge on puerperal sepsis. Implying therefore that marriage is not a factor in relation to knowledge on puerperal sepsis. The Chi-square of 0.042 yielded a P - value of 0.838 above the threshold of 0.05 which indicated that the observed association was not statistically significant. Hence, we fail to reject the null hypothesis and conclude that there was no sufficient evidence to prove that there is an association between marital status and knowledge on puerperal sepsis ($X^2 = 0.042$, $P = 0.838$, $N = 246$, 2-tailed).

In terms of relationship between parity and knowledge on puerperal sepsis, the current study revealed that 69 (42.9%) of respondents with low parity had low knowledge on puerperal sepsis and 92 (57.1%) of respondents with low parity had high knowledge on puerperal sepsis, while among respondents who had high parity 41 (48.2%) had low knowledge and 44 (51.8%) had high knowledge on puerperal sepsis (Table 9). This finding basically means that both respondents who had low and high parity had low knowledge on puerperal sepsis. However, the observed correlation in the results had no statistical significant association between parity and knowledge on puerperal sepsis. A Chi-square of 0.651 and a P - value of 0.420 yielded was greater than the threshold of 0.05, indicating insufficient evidence to prove the association. Hence, we failed to reject the null hypothesis and concluded that there was no sufficient evidence to prove that there is an association ($X^2 = 0.651$, $P = 0.420$, $N = 246$, 2-tailed).

In Table 10, the current study findings showed the relationship between knowledge on puerperal sepsis and health facility factors. Statistically significant relationships were observed between knowledge on puerperal sepsis and distance to health facility and hygiene lessons. A higher proportion (61.5%) of respondents within reach of the health facility had high knowledge on puerperal sepsis as compared to those who were not within reach (46.6%). This

is attributed to the fact that those respondents within reach had access to health services which include health lessons on hygiene from health facilities. The researcher therefore rejected the null hypothesis and concluded that there was a relationship between knowledge on puerperal sepsis and respondents' distance from the health facilities ($X^2 = 5.404$, $p = 0.020$, $N = 246$, 2-tailed). Similarly, a higher proportion (62.6%) of respondents who had received lessons on hygiene had high knowledge on puerperal sepsis as compared to those who had not received hygiene lessons (41.0%). The researcher therefore rejected the null hypothesis and concluded that there is a relationship between respondents' knowledge on puerperal sepsis and their reception of hygiene lessons ($X^2 = 10.392$, $p = 0.001$, $N = 246$, 2-tailed).

From the current study findings, no significant relationship was observed between knowledge and infection prevention practices by attendants and therefore, the researcher failed to reject the null hypothesis and concluded that there was no sufficient evidence to prove that there is a relationship between respondents knowledge on puerperal sepsis and the infection prevention practices by attendants ($X^2 = 0.110$, $p = 0.741$, $N = 246$, 2-tailed) (Table 10).

In terms of relationship between knowledge on puerperal sepsis and obstetric factors, the current study findings revealed that respondents who had home deliveries and low knowledge on puerperal sepsis were 15 (50%) and those who had home deliveries and high knowledge were 15 (15%), while those who delivered in health facility and had low knowledge were 95 (44%) and those who had high knowledge on puerperal sepsis were 121 (56%) (Table 11). These results showed that most of those who delivered at health facility had high knowledge on puerperal sepsis compared to 95(44.7%) who had low knowledge on puerperal sepsis. This implies that knowledge is important if women are to utilize health facilities for deliveries. However, the regression results showed no statistical significance between place of delivery and knowledge on puerperal sepsis. The Chi-square of 0.030 yielded a P - value of 0.863 above the threshold of 0.05 which indicated that the observed association was not statistically significant. Hence, we fail to reject the null hypothesis and conclude that there was no sufficient evidence to prove that there is an association between place of delivery and knowledge on puerperal sepsis ($X^2 = 0.030$, $P = 0.863$, $N = 246$, 2-tailed) (Table 11).

In terms of assistant during delivery, the current study findings revealed that respondents whose attendants were unskilled and had low knowledge on puerperal sepsis were 13 (46.4%) and those who had high knowledge on puerperal sepsis were 15(53.6%). Those who had skilled attendants and had low knowledge on puerperal sepsis were 97 (44.7%) while those who had skilled attendants and had high knowledge on puerperal sepsis were 120 (55.3%) (Table 11).

This implies that respondents whether delivered by skilled attendant or not, they had low knowledge on puerperal sepsis. However, the results showed no statistical association between assistant during delivery and knowledge on puerperal sepsis since the P - value of 0.863 which was yielded was greater than 0.05 but the chi-square of 0.030 indicated some relationship. Therefore, we fail to reject the null hypothesis and conclude that there was no sufficient evidence to prove that there is an association between assistant during delivery and knowledge on puerperal sepsis ($X^2 = 0.030$, $P = 0.863$, $N = 246$, 2-tailed).

In terms of mode of delivery, the current study findings revealed that, of the respondents who had spontaneous vaginal delivery, 97 (43.7%) had low knowledge and 125 (56.3%) had high knowledge while of those respondents who had Caesarean section/ assisted delivery 13 (54.2%) had low knowledge and 11(45.8%) had high knowledge. This showed that majority of respondent with spontaneous vaginal delivery had high knowledge on puerperal sepsis while majority respondents with caesarean section/ assisted delivery had low knowledge on puerperal sepsis. However, the results showed no statistical association between mode of delivery and knowledge on puerperal sepsis since the P - value of 0.327 which was yielded was greater than 0.05 and the chi-square value was 0.961. Therefore, we fail to reject the null hypothesis and conclude that there was no sufficient evidence to prove that there is an association between mode of delivery and knowledge on puerperal sepsis ($X^2 = 0.961$, $p = 0.327$, $N = 246$, 2-tailed). This finding is consistent with Buchman (2012) study which revealed that caesarean section was an important factor for puerperal sepsis among postpartum women. This could be attributed to poor hygienic practices by mothers. This may also mean that the women who had cesarean section and had low knowledge on puerperal sepsis could be predisposed to puerperal sepsis as they may not have knowledge on hygiene which is key in puerperal sepsis prevention. In terms of relationship between duration of labour and knowledge on puerperal sepsis, the respondents who had normal delivery and had low knowledge on puerperal sepsis were 95 (44.4%) and those with high knowledge on puerperal sepsis were 119 (55.6%) while respondents who had prolonged labour and had low knowledge on puerperal sepsis were 15 (46.9%) and those with high knowledge on puerperal sepsis were 17 (53.1 %).

This implies that slightly above 50% of the respondents in both normal labour and prolonged labour, respondents had high knowledge on puerperal sepsis. However, there was no statistical significant association observed between duration of labour and knowledge on puerperal sepsis as the p-values were greater than 0.05. Therefore the researcher failed to reject the null hypotheses and concluded that there was no sufficient evidence to prove that there is a

relationship between knowledge on puerperal sepsis and duration of labour ($X^2 = 0.069$, $p = 0.792$, $N = 246$, 2-tailed).

In terms of relationship between antenatal care attendance and knowledge on puerperal sepsis, the current study findings revealed that most respondents had attended ANC. Amongst them 109 (44.7%) had low knowledge on puerperal sepsis while 135 (55.3%) had high knowledge on puerperal sepsis. Basically, these study finding mean that there is low level of knowledge on puerperal sepsis among postpartum women despite attending ANC. This result was from the fisher's exact test which was used as some cells had counts less than five hence the chi-square test could not apply. However, despite this correlation, upon application of the regression model, no significant relationship was observed between knowledge on puerperal sepsis and antenatal care attendance, as the p-value was greater than 0.05. The researcher therefore failed to reject the null hypotheses and concluded that there was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and antenatal care attendance ($P = 0.880$, $N = 246$, 2-tailed) (Table 11).

In terms of relationship between knowledge of puerperal sepsis and individual factors, the current study findings revealed that respondents who had inadequate nutrition and had low knowledge on puerperal sepsis were 7(58.3%) and those with inadequate nutrition and had high knowledge on puerperal sepsis were 5 (41.7%), while respondents who had adequate nutrition and low knowledge on puerperal sepsis were 103 (44.0%) and those respondents who had adequate nutrition and high knowledge were 131 (56.0 %). This shows that nutrition had a bearing on knowledge of puerperal sepsis as most of the respondents (58.3%) who had inadequate nutrition also had low knowledge on puerperal sepsis. No significant relationship was observed between knowledge on puerperal sepsis and nutrition intake as the p-value was greater than 0.05. The researcher therefore failed to reject the null hypothesis and concluded that there was no sufficient evidence to prove that there was a relationship between knowledge on puerperal sepsis and nutrition intake ($X^2 = 0.946$, $P = 0.331$, $N = 246$, 2-tailed) (Table 12). In terms of the relationship between ill health and knowledge on puerperal sepsis, the current study revealed that respondents who asserted to ill health and had low knowledge on puerperal sepsis were 8 (34.8%) and those who asserted and had high knowledge on puerperal sepsis were 15 (65.2%). Those respondents who did not assert to ill health and had low knowledge on puerperal sepsis were 102 (45.7%) and those who had high knowledge were 121 (54.3 %). This finding show that most respondents (65.2%) who asserted to ill health also had high knowledge on puerperal sepsis. This may be attributed to the fact that respondents who asserted

to ill-health could have been seeking health care services for treatment where in turn could receive health lessons on hygiene/ puerperal sepsis. However, no significant relationship was observed between knowledge on puerperal sepsis and ill health as the p-value was 0.314. The researcher therefore failed to reject the null hypothesis and concluded that there was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and ill health ($X^2 = 1.013$, $p = 0.314$, $N = 246$, 2-tailed) (Table 12).

In terms of the relationship between hygienic practices by mothers and knowledge on puerperal sepsis, the current study findings revealed that respondents with poor hygiene and had low knowledge on puerperal sepsis were 67 (45.9%) and those who had low knowledge on puerperal sepsis and had good hygiene were 79 (54.1%), while those respondents with good hygiene and low knowledge on puerperal sepsis were 43 (43%) and those with good hygiene and high knowledge on puerperal sepsis 57 (57%). This finding shows that most respondents who had high knowledge on puerperal sepsis also had good hygiene. This imply that knowledge on puerperal sepsis had a bearing on hygienic practices by mothers. However, no significant relationship was observed between knowledge on puerperal sepsis and hygienic practices by the mothers as the p-value was greater than 0.05. The researcher therefore failed to reject the null hypothesis and concluded that there was no sufficient evidence to prove that there is a relationship between knowledge on puerperal sepsis and hygienic practices by the mothers ($X^2 = 0.201$, $p = 0.654$, $N = 246$, 2-tailed) (Table 12).

According to the current study, a statistically significant relationship was observed between knowledge on puerperal sepsis and respondents' health seeking behaviours. A higher proportion (56.2%) of respondents who would seek health services from health facilities had high knowledge on puerperal sepsis as compared to those who would seek health services from non-health facilities (0.0%). The fisher's exact test was used as some cells had counts less than five hence the chi-square test could not apply. The findings were ($P = 0.039$, $N = 246$, 2-tailed) (Table 12). However, when the binary logistic regression model analysis was used to test the combined impact of the independent variable on the dependent variable, the P -value generated was 0.105. The researcher therefore failed to reject the null hypothesis and concluded that there is no relationship between knowledge on puerperal sepsis and respondents' health seeking behaviours as there was no sufficient evidence to prove that there was a relationship between knowledge on puerperal sepsis and health seeking behaviour.

Pertaining to the relationship between knowledge and cultural factors, the current study findings revealed that of the respondents who observed the cultural practices, 78 (44.1%) had

low knowledge on puerperal sepsis and 99 (55.9%) had high knowledge on puerperal sepsis, while those respondents who did not observe the cultural practices and had low knowledge were 32 (46.4%) and those with high knowledge were 37 (53.6%). This finding basically shows that most respondents (55.9%) who observed cultural practices also had low knowledge on puerperal sepsis.

The researcher therefore failed to reject the null hypothesis as the *P*-value was greater than 0.05. The researcher therefore concluded that there was no sufficient evidence to prove that there was a relationship between respondents' knowledge on puerperal sepsis and their observance of cultural practices ($X^2 = 0.107$, $p = 0.774$, $N = 246$, 2-tailed) (Table 13).

5.6 Binary logistic regression to test the impact of the independent variables against the dependent variable.

Table 14 shows the results of the binary logistic regression model for the predictor variables and knowledge on puerperal sepsis. A reduction in distance from more than 5km to 0 – 5km from the health facility impacted significantly on the outcome variable ($p = 0.028$, Adjusted odds ratio = 1.893, 95% CI = [1.071, 3.347]). After adjusting for confounding variables, the said reduction raised the odds of having high knowledge on puerperal sepsis to 189.3%. This means respondents who stayed within reach of the health facilities were 89.3% more likely to have high knowledge on puerperal sepsis as compared to those who stayed more than 5km away.

Similarly, reception of hygiene lessons contributed significantly to the model outcome ($p = 0.001$, Adjusted odds ratio = 2.879, 95% CI = [1.581, 5.243]). After adjusting for confounding variables, reception of hygiene lessons increased the likelihood of having high knowledge of puerperal sepsis by 187.9%.

Changes in all other variables did not contribute significantly to the model outcome.

5.7 Application of the health belief model to the research findings

The study adapted the theoretical framework developed by using the concepts from Becker's Health Belief Model. The Health belief model was developed by Irwin M. Rosen stock in 1966 and was furthered by Becker and colleagues in the 1970s and 1980s (Burke, 2011). The Health Belief Model is an intrapersonal theory (within the individual, knowledge and beliefs) used in health promotion to design intervention and prevention programs. Health belief model suggests that belief in a personal threat, together with the belief in the effectiveness of the proposed

behaviour will predict the likelihood of that behaviour. In other words, it focuses on the assessment of health behaviour of individuals through examination of perceptions and attitudes that someone may have towards disease and negative outcomes of certain actions.

In the current study, the investigator aimed to assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. The Health Belief Model assumes that behaviour change occurs with the existence of the three components at the same time and these are Individual perceptions, Modifying factors and Likelihood of action. The more positive the individual perception and subjective norms are towards the modifying factors, the more likely the individual is to adapt to positive behaviour. The study indicated that 60% of the respondents had low knowledge on puerperal sepsis (Table 4). This can have an effect on the postpartum women as they are predisposed to puerperal sepsis due to lack of knowledge. Adequacy of information has a positive effect on behaviour intention (figure 1). The findings in this study indicated that a change in knowledge levels of postpartum women on puerperal sepsis and associated factors from low to high was expected to impact significantly on the outcome variable (Knowledge).

Becker's Health Belief Model (1970 and 1980) or frame work was applicable to this study that sought to assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. Several factors were identified to have an influence on knowledge of postpartum women on puerperal sepsis and associated factors. These included; Socio-demographic factors of the patients, Obstetric factors, Health facility factors, Individual factors and Cultural factors as outlined in figure 1. However, two factors which are distance to health facility and health lessons were statistically significant upon running the regression test analysis. The other factors did not show significance on the outcome variable.

5.8 Strengths of this Study

This study facilitated the identification of the relationships between several factors and knowledge of postpartum women on puerperal sepsis. Furthermore, the current study findings revealed that distance to health facility, hygiene lessons and health seeking behaviour were significantly associated with knowledge of postpartum women on puerperal sepsis. The current study findings have added to the body of knowledge which will inform policy towards development of strategies that will improve IEC programs in all Health facilities to increase puerperal sepsis awareness before pregnancy, during pregnancy, labour, delivery and following delivery.

5.9 Limitations of this study

- i. The study was conducted on a limited sample size (n =246) hence the results may be generalized but cautiously to the whole population of this region as they only represented postpartum women in Choma district.
- ii. Causality could not be directly assessed as it required long term assessment and no experiment interventions were applied to the study but observations of exposure and outcome as it utilized a cross section study design.
- iii. There were few if not no studies were conducted in Choma district on knowledge of postpartum women on puerperal sepsis and associated factors. However, a few studies were conducted on the topic in other countries, hence the inadequate literature.

5.10 IMPLICATIONS TO MIDWIFERY

5.10.1 Implications to midwifery practice

The study findings showed that most of the postnatal mothers (60 %) in this study had limited knowledge on puerperal sepsis, the signs and symptoms of puerperal sepsis and what should be done to prevent puerperal sepsis. Health personnel especially midwives need to intensify giving health education on puerperal sepsis antenatally and postnatally so as to relay information to the mothers and increase puerperal sepsis awareness.

5.10.2 Implications to midwifery administration

Since some of the mothers depicted a lack of knowledge on puerperal sepsis, there is need for Nurse Managers to ensure that midwives provide information, education and communication to mothers on puerperal sepsis at the antenatal and postnatal clinics.

This could be done by conducting regular supervision of midwives at the antenatal and postnatal clinics. Nurse Managers should ensure that they have adequate numbers of staff required at these clinics.

5.10.3 Implications to midwifery education

Maternal health is a priority to service delivery in Zambia, therefore, Nurses and midwives should be encouraged to give Information, Education, and Communication on puerperal sepsis to mothers to increase awareness on such conditions which could lead to maternal morbidity and mortality. This will help contribute towards achieving sustainable development goals.

There is need to hold workshops/seminars on midwifery updates so that midwives are updated on issues affecting midwifery practice.

5.10.4 Implications to midwifery research

This study revealed that most (60%) of postpartum women had low knowledge on puerperal sepsis and associated factors. It is therefore, necessary that health care providers take interest in researching on various aspects of knowledge of postpartum women on puerperal sepsis and associated factors and conduct research on a large scale to improve knowledge.

From the literature reviewed, it was found that few researches if not none, have been conducted in the area of Knowledge of postpartum women on puerperal sepsis in Choma district. It is therefore necessary for Nurse researchers to conduct more studies this time to interview Health care providers and community based agents on the challenges they are facing in trying to prevent puerperal sepsis.

5.11 Conclusion and Recommendation

5.11.1 Conclusion

The study sought to assess knowledge of postpartum women on puerperal sepsis and associated factors in Choma district, Zambia. The present study findings revealed that most (60%) of the study participants had low level of knowledge regarding puerperal sepsis and associated factors. The current study findings further revealed that distance to health facility and hygiene lessons contributed significantly to knowledge on puerperal sepsis and associated factors. Therefore, there is need to strengthen strategies aimed at reducing distance covered by postpartum women to nearest health facility to improve access to health care and also integration of hygiene education and puerperal sepsis awareness into antenatal care services as a strategy to prevent and control the infection.

5.11.2 Recommendations.

Based on the findings of this study, the following recommendations have been made:

5.11.2.1 Recommendations to the Ministry of Health

1. The Ministry of Health should intensify and speed up the process of taking health services as close as possible to the families by constructing health centres within reach as distance to the health facility had significantly impacted on knowledge of postpartum women on puerperal sepsis and associated factors.

5.11.2.2 Recommendations to Choma district health office

1. There is need for Choma district health office to regularly supervise the health care professionals to intensify the provision of information, education and communication on hygiene to mothers at the antenatal and postnatal clinics on puerperal sepsis as hygiene lessons in this study had a bearing on knowledge of postpartum women.
2. Choma District Health Office should consider intensifying on outreach activities for communities more than 5km away from health facilities as results of this study revealed that distance to health facilities had significantly impacted on knowledge of postpartum women on puerperal sepsis.
3. Mothers should be encouraged to deliver in health facilities and home deliveries should be discouraged in the district as the findings of this study still recorded home deliveries.

5.11.2.3 Recommendations for further Research

1. The study was conducted on a small scale in Choma district, it may be important in future to conduct another study on a large scale in order to generalize the findings and get a holistic picture of what could be prevailing in Zambia.
2. The nature and extent of the impact of this disease could be different in various settings in Zambia. Therefore, further community based studies are recommended to be conducted on the same issue on a large scale in Zambia.
3. Future studies be extended to health care providers and community based agents so that knowledge of postpartum women on puerperal sepsis and associated factors can be identified from their perspective as well.

5.12 Dissemination and utilization of findings

The findings were disseminated at the UNZA postgraduate Seminar week held from Monday, 23rd July to Friday 25th July, 2018. Bound approved copies of the dissertation will be submitted to the School of Nursing Sciences, UNZA -Medical Library and Main Library. The findings will also be published in recognized Journals such as African Journal of Midwives and Women's Health.

The abstract of this study will be distributed to Ministry of Health, Southern Province Health Office, Choma District Health Office and Macha Mission Hospital. The researcher also intends to disseminate the findings in meetings and seminars that will be taking place in Choma district. The results will also be presented to various stake holders involved in provision of strategies to reduce maternal morbidity and mortality.

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APPENDICES

APPENDIX I: PARTICIPANT INFORMATION SHEET

TITLE: KNOWLEDGE OF POSTPARTUM WOMEN ON PUERPERAL SEPSIS AND ASSOCIATED FACTORS IN CHOMA DISTRICT.

INTRODUCTION

I, **Fuden Moono**, a student pursuing Master of Science in Midwifery Degree program at the University of Zambia is kindly requesting for your participation in the research study mentioned above, because it is important to assess Knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. Before you decide whether or not to participate in this study, I would like to explain to you the purpose of the study, any risks or benefits and what is expected of you. Your participation in this study is entirely voluntary. You are under no obligation to participate; you can choose to participate or not to participate. If you decline to participate, no privileges will be taken away from you. If you agree to participate, you will be asked to sign the consent form in front of someone. Agreement to participate will not result in any immediate benefits.

PURPOSE OF THE STUDY

The study will obtain information on Knowledge of postpartum women on puerperal sepsis and associated factors in Choma district. This is important as the data obtained from this study will assist Choma district Medical office and Ministry of Health to enhance infection control measures in maternity units. This will help to reduce sickness and death among postpartum women that come as a result of infections following delivery / or childbirth.

PROCEDURE

After you have signed the consent form, and have had a chance to ask questions, you will be asked questions concerning factors predisposing postpartum women to puerperal sepsis in Choma district and the responses will be recorded on the interview Schedule.

You will also be given a chance to make suggestions on what you think could be done to prevent puerperal sepsis in Choma district. The interview will take about 25 to 30 minutes to complete.

RISKS AND DISCOMFORTS

No risks or discomforts are involved apart from the use of your time in answering questions and the presence of a witness. Answering questions will take approximately 30 minutes.

BENEFITS

By taking part in this study, you will be able to provide us with information that will help relevant authorities and policy makers to come up with effective strategies and policies on prevention, control and management of puerperal sepsis among postpartum women. No monetary favours will be given in exchange for information obtained.

CONFIDENTIALITY

Your research record and any information you will give will be confidential to the extent permitted by law. You will be identified by a number, and personal information will not be released without your written permission except when requested by law. The Ministry of Health, the University of Zambia, Biomedical Research ethics Committee or the School of Medicine may review your records again. This will be done with confidence.

FOR FURTHER INFORMATION

We will be glad to answer your questions about this study at any time. You may contact us by phone or email

Principle Investigator: Cell no 0977332908 / 0966217181 email moonof.fuden@gmail.com

Supervisor: Cell no 0977800067 email margaretmaimbolwa@unza.zm

The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of Medicine, P.O. Box 50110, Lusaka.

APPENDIX II: TRANSLATED PARTICIPANT INFORMATION SHEET

CIKUMBATIZYO CITAANZI

CIPEPA CIJISI TWAAMBO TWAKUTOLA LUBAZU

Bupanduluzi

Mebo, nde Fuden Moono Hachobe, ndili sicikolo wiiya busilisi busumpukide bwa digilii a cikolo cipati camu Zambia (UNZA), ndilomba kutola lubazu kwanu mulwiiyo lwaambwa atala aawa. Ndilamupandulwida muzeezo mupati wa lwiiyo na buvwuntauzyi, ntenda a bubotu alimwi aceeco ncomweelede bkucita kamutana kutola lubazu, naa mwasala kutola lubazu. Naa mwasala kutola lubazu, kwiina ncomunga mwasweekelwa. Kuti naa mwalyaaba kutola lubazu, inga ndamulomba kuti mulembe cizuminano cinga cilandizumizya kumubuzya mibuzyo. Kutola lubazu lwanu mukuvwuntauzya ooku kwiina bubotu mbomunga mwajana cakufwambaana.

Muzeezo wabuvuntauzyi

Muzeezo mupati wabuvuntauzyi oobu mbwakuyanda kuziba ciletelezya kuciswa bamakaintu bamwi ciindi nobazwaa kutumbuka mucilikiti ca Choma. Twaambo toonse tuyoozwa mukuvuntaunzya ooku tuyoogwasya basikubamba twaambo tujatikizya batumbusyi abamatumbu, kuti bubelesi boonse bukabe kabotu akusika kumbaakani iyanda bantu.

Machililanwa

Mubuvuntauzyi boonse, kuyooba ciindi cakubuzigwa mibuzyo mulomo mpande mwaakumana Kusimba cipepa cacizuminano. Bwiinguzi bwanu buyoolembwa mupepa lyamibuzyo. Kubuziyigwa ooku kuyootola ciindi cifwaafwi tuwvalu-vwalu tuli makumi obile kusikila kucisela cawoola.

Ntenda akutalimvwa kabotu

Ciindi cenu tuyoocibelesya kuvwuwa mibuzyo, mpoona kwiina ntenda iliwo mukuvwuntauzya ooku. Mibuzyo imwi inoliyagaminina pele tuyoosola kuti mutakafwi nsoni.

Bubotu

Kwiina bubotu bwacigaminina buzwa mukuvwuntauzya ooku. Nokuba boobo, twaambo tutikapegwe tuyoogwasya basikubamba makani aanseba kuti bakabambe bweendelezi buti ka gwasye ndinye abamakaintu bamwi kuciindi cakutumbuka na kutulubanya. Kwiina mali

ayoopegwa mubuvwuntauzyi oobu,pele tuyooingula mibuzyo yanu kujatikizya nseba zyabamakaintu ciindi nobatumbuka na kutulubanya.

Maseseke

Twaambo toonse tujatikizya buwvuntauzyi atwaambo toonse tutipegwe kuciindi eeci ntwamaseseke cita kuti mulawo wazumizya kucita oobo.Muyopegwa buyo namba yalo inooli cizyibyo canu.Zyoonse zijatikizya ndiywe kwiina noziyoozibwa akupegwa kumuntu uumbi nshita kuti mwazumizya kwiinda mukulemba. Cibeela ceendelezya zyamaseseke, abweende bubotu bwazyintu, naa cikolo camisamu, alimwi amutabi wa nseba wa mfulumende inga watambula twaambo twanu pele zyoonse ziyoocitwa camaseseke.

Naa mujisi mibuzyo nokuba makatazyo, amulembele kuli:-

1. Fuden Moono, University of Zambia, School of Nursing Sciences, P.O.BOX 50110, Lusaka. Cell phone number 0977332908 / 0966217181 E-mail : moonofuden@gmail.com
2. The Dean, University of Zambia, School of Nursing Sciences, P.O.BOX 50110, Lusaka. Telephone number 0211252453.
3. The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of Medicine, P.O.BOX 50110, Lusaka.

APPENDIX III: INFORMED VOLUNTARY CONSENT FORM

CONSENT FORM

The purpose of this study has been explained to me and I understand the purpose, benefits, risks and discomforts and confidentiality of the study. I further understand that:

If I agree to take part in this study, I can withdraw at any time without giving an explanation and that taking part in this study is purely voluntary.

I (Names)

Agree to take part in the interview schedule.

Signed / thumb print:..... Date:.....

(Participant)

Signed / thumb print:..... Date:.....

(Witness)

FOR FURTHER INFORMATION

We will be glad to answer your questions about this study at any time. You may contact us by phone or email.

Principle Investigator Cell no 0977332908 / 0966217181 email moonof.fuden@gmail.com

Supervisor Cell no 0977800067 email margaretmaimbolwa@unza.zm

The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of Medicine, P.O. Box 50110, Lusaka.

APPENDIX IV: TRANSLATED INFORMED VOLUNTARY CONSENT FORM

IPEPA LYACHIZUMINANO

Buwvuntauzyi boonse bwapandululwa kulindime alimwi ndaswiililisa muzeezo, bubotu, ntenda akutalimvwa kabotu kubikiliza amaseseke ajatikiza buvwuntauzyi. Ndajana alimwi luziyibo lwakuti naa ndazumina kutola lubazu mukuvwuntauzya ooko, inga ndaleka akatikati kakunyina kupa twaambo. Alimwi ndazyiba kuti kutola lubazu mubuvwuntauzyi oobu ncakulyaaba buya.

Mebo nde.....(Mazyina)

Ndazumina kutola lubazu mukuvwuntauzya ooku.

Kusimba.....Buzuba bwamweezi.....

(Sikutola lubazu)

Kusimba.....Buzuba bwamweenzi.....

(Kamboni)

Kusimba.....Buzuba bwamweenzi.....

(Sikuvwuntauzya)

Naa mujisi mibuzyo nokuba makatazyo, amulembele kuli:-

1. Fuden Moono, University of Zambia, School of Nursing Sciences, P.O.BOX 50110, Lusaka. Cell phone number 0977332908 / 0966217181 E-mail: moonofuden@gmail.com
2. The Dean, University of Zambia, School of Nursing Sciences, P.O.BOX 50110, Lusaka. Telephone number 0211252453.
3. The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of Medicine, P.O.BOX 50110, Lusaka.

APPENDIX V: INFORMED CONSENT FORM FOR THE SURROGATE

(if respondent is below 18 years)

INFORMED CONSENT FORM FOR THE SURROGATE

The study has been explained to both me and my daughter/relative and we understand the purpose, the benefits, the risks and discomforts and the confidentiality of the study. I further understand that if I allow my daughter/relative to take part in this study, I am at liberty to withdraw her from the study at any time without having to give an explanation. I also understand that taking part in this study is purely voluntary.

I, (Names of surrogate)

Have allowed my daughter/relative to take part in this study.

Signed: Date : (Surrogate)

(Surrogate's signature or thumb print)

Signed: Date: (Participant)

(Participant's signature or thumb print)

Signed: Date: (Witness)

Signed: Date: (Researcher)

PERSONS TO CONSULT FOR QUESTIONS OR PROBLEMS

1. Fuden Moono Hachobe, University of Zambia, School of Nursing Sciences,

P. O. Box 50110, Lusaka. Cell phone number:

0977332908/0966217181. E-mail: moonofuden@gmail.com.

2. The Dean, University of Zambia, School of Nursing Sciences, P. O. Box 50110, Lusaka.

Telephone number 0211252453.

3. The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of Medicine, P.O.BOX 50110, Lusaka.

**APPENDIX VI: TRANSLATED INFORMED CONSENT FORM FOR THE
SURROGATE (if respondent is below 18 years).**

**IPEPA LYACIZUMINANO LYA MWIIMINIZI (kuti naa sikubuzigwa ujisi myaka
iitasiki 18)**

Buwvuntauzyi boonse bwapandululwa kulindime alimwi ndaswiililisa muzeezo, bubotu, ntenda akutalimvwa kabotu kubikilizya amaseseke ajatikizya buvwuntauzyi. Ndajana alimwi luziyibo lwakuti naa ndazumizya mwanangu antela mubbululu wangu, kutola lubazu mukuvwuntauzya ooku, inga waleka akatikati kakunyina kupa twaambo. Alimwi ndazyiba kuti kutola lubazumubuvwuntauzyi oobu ncakulyaaba buya.

Mebo nde (mazyina)

Ndazumizya mwanangu antela simukowa wangu kutola lubazu mukuvwuntauzya ooku.

Kusimba..... Buzuba bwamweezi..... (Mwiiminizi)

Kusimba..... Buzuba bwamweezi..... (Kamboni)

Kusimba..... Buzuba bwamweezi..... (Sikuvwuntauzya)

Naa mujisi mibuzyo nokuba makatazyo, amulembele kuli;-

1. Fuden Moono, University of Zambia, School of Nursing Sciences, P. O. Box 50110, Lusaka.
Cell phone number: 0977332908/0966217181. E-mail: moonof.fuden@gmail.com.

2. The Dean, University of Zambia, School of Nursing Sciences, P. O. Box 50110, Lusaka.
Telephone number 0211252453.

3. The Chairperson, Biomedical Research Ethics Committee, University of Zambia, School of
Medicine, P.O.BOX 50110, Lusaka.

APPENDIX VII: SEMI - STRUCTURED INTERVIEW SCHEDULE

DATA COLLECTION INSTRUMENT

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NURSING SCIENCES

**TOPIC: KNOWLEDGE OF POSTPARTUM WOMEN ON FACTORS
PREDISPOSING TO PUERPERAL SEPSIS IN CHOMA DISTRICT, ZAMBIA.**

QUESTIONNAIRE FOR POSTPARTUM WOMEN IN POSTNATAL CLINICS

DATE OF INTERVIEW:

PLACE/LOCATION OF INTERVIEW:

NAME OF INTERVIEWER:

SERIAL NUMBER:

INSTRUCTIONS FOR THE INTERVIEWER

1. Introduce yourself to the respondent.
2. Ensure that the respondent is eligible for the interview and can be included in the study.
3. Explain the purpose of the interview and assure respondent of confidentiality.
4. Request respondent for a written consent before you start the interview.
5. Do not write the name of the respondent on the interview schedule.
6. Ensure that you get a response for each question.
7. Tick the most appropriate response, or write answer on space provided.
8. Provide time for respondent to ask questions at the time of the interview.
9. Use a pencil to write in the interview schedule.
10. Thank the respondent at the end of the interview.

SECTION A: DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

[Use a tick where applicable i.e. (☐)]

For Official Use Only

1. How old are you?

☐

[1] Below 25years

☐

[2] 25 to 34years

☐

[3] 35 to 44years

☐

[4] 45 to 54years

☐

2. What level of education did you complete?

☐

[1] None

☐

[2] Primary

☐

[3] Secondary

☐

[4] Tertiary

☐

3. What is your occupation?

☐

[1] House wife

☐

[2] Self-employed

☐

[3] Formally employed

☐

4. What is your marital status?

☐

[1] Married

☐

[2] Unmarried

☐

For Official Use Only

5. Where do you live?

☐

[1] Rural ☐

[2] Urban ☐

6. How many deliveries have you had?

☐

[1] One ☐

[2] Two ☐

[3] Three ☐

[4] More than three ☐

SECTION B: HEALTH FACILITY FACTORS

7. How far is your home from the nearest health facility?

☐

[1] 0-5km ☐

[2] More than 5km ☐

8. Did you have any health education on puerperal sepsis at antenatal and
postnatal Clinic?

☐

[1] Yes ☐

[2] No ☐

9. What hygienic practices did you observe from the person assisting you?

☐

[1] Washed hands before assisting ☐

[2] Used gloves ☐

[3] Cleaned my private part ☐

[4] Washed hands before assisting, used gloves and cleaned my private part

☐

For Official Use
Only

[5] Washed hands before assisting and used gloves ☐

[6] Washed hands before assisting and cleaned my private part ☐

**SECTION C: OBSTETRIC FACTORS PREDISPOSING POSTPARTUM WOMEN TO
PUERPERAL SEPSIS**

10. Where do you normally have your children born? ☐

[1] Home ☐

[2] Health facility ☐

11. What was the mode of delivery for your last child? ☐

[1] Spontaneous vaginal delivery ☐

[2] Caesarean delivery ☐

[3] Instrument / assisted delivery ☐

12. What was the duration of labour for your last delivery? ☐

[1] Within 18 hours ☐

[2] More than 18 hours ☐

13. How long did it take for you to deliver following rupture of the
membrane? ☐

[1] Within 24 hours ☐

[2] More than 24 hours ☐

14. Were you assisted during delivery? ☐

[1] Yes ☐

[2] No ☐

For Official Use
Only

15. If the answer to question 14 above is yes, who assisted you?

☐

[1] Unskilled attendant

☐

[2] Skilled attendant

☐

**SECTION D: INDIVIDUAL FACTORS PREDISPOSING POSTPARTUM WOMEN
TO PUERPERAL SEPSIS**

16. Did you have adequate nutritious food throughout your last pregnancy period?

☐

[1] Yes

☐

[2] No

☐

17. What type of sanitary towels do you use after delivery?

☐

[1] Maternity pads

☐

[2] Cotton wool

☐

[3] Pieces of cloth

☐

[4] Maternity pads, cotton wool and pieces of cloth

[5] Pieces of blankets and cloth

☐

18. What is your source of water?

☐

[1] Tap water

☐

[2] Ground water

☐

[3] Surface well

☐

19. How available is your water supply?

☐

[1] Regular

☐

[2] Irregular

☐

For Official Use
Only

20. How many times do you bath after delivery?

☐

[1] Twice daily

☐

[2] Three times or more

☐

21. If you suspected you had puerperal sepsis related symptom, where would you seek treatment?

☐

[1] Health facility

☐

[2] Non health facility

☐

[3] Not sure

☐

22. Why would you go to the place you have chosen in question 24 above?

☐

[1] So that they can examine, diagnose and treat me

☐

[2] This is where I deliver from

☐

[3] This is where we find doctors and if they fail we can go for prayers

☐

23. Did you go for antenatal care before delivery?

☐

[1] Yes

☐

[2] No

☐

24. If yes to question 26 above, why? (Give reasons)

☐

[1] To check if baby and mother are well

☐

[2] To see if baby is OK

☐

25. Were you diagnosed of any disease before, during and after delivery up to six weeks?

☐

[1] Yes

☐

[2] No ☐

26. If yes to question 28 above, Specify? ☐

[1] Hypertension, malaria and anaemia ☐

[2] Fungal infection, HIV/AIDS and Syphilis ☐

[3] Edema, varicose veins, leg pains, headache, stomach pains and abscess on vulva ☐

**SECTION E: TRADITIONAL /CULTURAL PRACTICES PREDISPOSING
POSTPARTUM WOMEN TO PUERPERAL SEPSIS**

27. Have you heard of women using traditional herbs soon after delivery? ☐

[1] Yes ☐

[2] No ☐

28. If yes to question 30 above, how do they use the traditional herbs? ☐

[1] I don't know ☐

[2] Bathing/insertion of herbs into vagina ☐

[3] Drinking and bathing herbs ☐

[4] Tattoo sacral area and thighs ☐

29. What traditions or cultural beliefs do you know that can predispose delivered
mothers to puerperal sepsis? ☐

[1] Don't know ☐

[2] Inserting/applying herbs in the vagina ☐

[3] Drinking traditional herbs ☐

[4] Bathing in herbs ☐

[5] Poor personal hygiene ☐

SECTION F: KNOWLEDGE ON FACTORS PREDISPOSING POSTPARTUM WOMEN TO PUERPERAL SEPSIS

For Official Use
Only

30. What is Puerperal sepsis?

☐

[1] Able to define puerperal sepsis ☐

[2] Not able to define puerperal sepsis ☐

31. What are the signs and symptoms of puerperal sepsis?

☐

[1] Abnormal vaginal discharge ☐

[2] Pelvic pain ☐

[3] Fever ☐

[4] Delay in reduction of size of uterus ☐

[5] Backache and painful feet ☐

32. Is it important to attend postnatal clinic?

☐

[1] Yes ☐

[2] No ☐

[3] Not sure ☐

33. If yes to question 35 above, why? (Give reasons)

☐

[1] For immunization ☐

[2] For immunization and growth monitoring of baby ☐

[3] For health education ☐

[4] For screening of diseases for both mother and baby ☐

34. What do you think are some of the factors that predispose postpartum women to puerperal sepsis? ☐

[1] Delivery in unhygienic environment ☐

[2] Use of unclean sanitary towels ☐

[3] Insertion of herbs in the vagina after delivery ☐

[4] Poor personal hygiene ☐

[5] Anaemia ☐

[6] Malnutrition ☐

35. What do you think should be done to prevent puerperal sepsis? (Give reasons) ☐

[1] Good personal hygiene and nutrition ☐

[2] Insertion of herbs into the vagina ☐

[3] Attending antenatal and postnatal for health education and seeking medical care ☐

[4] Delivering from health facilities ☐

[5] Taking medicines after delivery ☐

[6] Not sure ☐

36. How do you take care of vaginal/perineal tears following child birth? ☐

[1] Don't know ☐

[2] Use spirit to clean ☐

For Official Use
Only

[3] Bathing with cold or warm water ☐

[4] Bathing using salty water ☐

[5] Bathing using soap ☐

[6] Bathing using traditional herbs ☐

END OF INTERVIEW. THANK YOU FOR YOUR TIME.

APPENDIX IX: SCORING SHEETS MAJOR STUDY VARIABLES

Marking key for Socio-demographic factors

No.	Variables	Questions	Score
1	Age	How old are you?	1
2	Level of education	What level of education did you complete?	1
3	Occupation	What is your occupation?	1
4	Marital status	What is your marital status?	1
5	Residence/locality	Where do you live?	1
6	Parity	How many deliveries have you had?	1
		Total	6

Marking key for Health facility factors

No	Variable	Questions	Score
7	Distance to health facility	How far is your home from the nearest health facility?	1
8	Hygiene lessons	Did you have any health education on puerperal sepsis at antenatal and postnatal Clinic?	1
9	Hygienic practices by health care providers	What hygienic practices did you observe from the person assisting you?	3
		Total	5

Marking key for Obstetric factors

No.	Variables	Questions	Score
10	Place of delivery	Where do you normally have your children born?	1
11	Mode of delivery	What was the mode of delivery for your last child?	1
12	Duration of labour	. What was the duration of labour for your last delivery?	1
13	Prolonged labour	How long did it take for you to deliver following rupture of the membranes?	1
14	Assistance during delivery	Were you assisted during delivery?	1
15	Assistant during delivery	If the answer to question 14 above is yes, who assisted you?	1
		Total	6

Marking key for Individual factors

No.	Variables	Questions	Score
16	Nutrition	Did you have adequate nutritious food throughout your last pregnancy period?	1
17	Hygienic practices by mothers	What type of sanitary towels do you use after delivery?	2
18	Hygienic practices by mothers	. What is your source of water?	1
19	Hygienic practices by mothers	How available is your water supply?	1
20	Hygienic practices by mothers	How many times do you bath after delivery?	1
21	Health seeking behaviour	If you suspected you had puerperal sepsis related symptom, where would you seek treatment?	1
22	Health seeking behaviour	Why would you go to the place you have chosen in question 24 above?	1
23	Antenatal attendance	Did you go for antenatal care?	1
24		If yes to question 23 above, why?	1
25	Ill health- HIV/ Anaemia	Were you diagnosed of any disease before, during and after delivery up to six weeks?	1
26	Ill health- HIV/ Anaemia	If yes to question 25 above, Specify?	1
		Total	12

Marking key for Cultural factors

No.	Variable	Questions	Score
27	Cultural practices	Have you heard of women using traditional herbs soon after delivery?	0
28		If yes to question 27 above, how do they use the traditional herbs?	0
29		What traditions or cultural beliefs do you know that can predispose delivered mothers to puerperal sepsis?	0
		Total	0

Marking key for Knowledge (Outcome variable)

No	Variable	Questions	Score
30	Knowledge	What is Puerperal sepsis?	1
31		What are the signs and symptoms of puerperal sepsis?	5
32		Is it important to attend postnatal care?	1
33		If yes to question 35 above, why?	1
34		What do you think are some of the factors that predisposing postpartum women to puerperal sepsis?	5
35		What do you think should be done to prevent puerperal sepsis?	4
36		How do you take care of vaginal/perineal tears following child birth?	3
		Total	20