UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF GRADUATE STUDIES

PREVALENCE OF NEONATAL CORD INFECTION AND PRACTICES AMONG MOTHERS AND CARE GIVERS OF NEONATES IN SALAGA MUNICIPALITY, GHANA

ANASTHESIA OWUSUA

2024

UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF GRADUATE STUDIES

PREVALENCE OF NEONATAL CORD INFECTION AND CARE AMONG MOTHERS AND CARE GIVERS OF NEONATES IN SALAGA MUNICIPALITY

BY

ANASTHESIA OWUSUA

MCH /UDS /0017/21

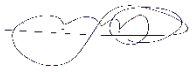
A THESIS SUBMITTED TO THE DEPARTMENT OF POPULATION AND REPRODUCTIVE HEALTH OF THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY FOR DEVELOPMENT STUDIES, IN PARTIAL FULFILMENT FOR THE REQUIREMENTS FOR THE AWARD OF MASTER DEGREE IN PUBLIC HEALTH.

JUNE, 2024

DECLARATION

Student

I hereby declare that this dissertation/thesis is the result of my original work and that no part of it has been presented for another degree in this University or elsewhere.

Signature: 

Date: 16 /09/ 2024

Name: Anasthesia Owusua

Supervisor

I hereby declare that the preparation and presentation of the thesis was supervised following the guidelines on supervision of the thesis laid down by the University for Development Studies.

Signature:  Date: **16/09/2024**

Name: Dr. John Azaare

ABSTRACT

Umbilical cord infections are major contributor to neonatal mortalities and morbidities across the globe with substantial burden in developing countries including Ghana. This study sought to determine the state of neonatal cord infection and care among mothers and care givers of neonates in Salaga district of the Northern Region of Ghana. The research employed a sequential explanatory mixed-method approach, first examining historical data (73 participants) at the facility level to determine the prevalence of umbilical cord infection in the Salaga district, and subsequently interviewed ten caregivers, five traditional birth attendants and five nurses to establish context of neonatal care in the study area. The quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) version 26 while the qualitative data was analyzed manually using thematic analysis. The study found that umbilical cord infections prevalence was 4.13% in the study area and that the prevalence increased in percentage point of 0.65% between 2021 and 2022. Majority of the neonates with umbilical cord infections suffered from cord sepsis while few others suffered from bleeding cord and cord abscess. It was also found that there was inadequate cord care knowledge among mothers. Mothers also relied heavily on traditional birth attendants due to personal connection, trust, or familiarity which reflects a critical nexus of challenges that significantly contribute to adverse outcomes as they resorted to the use of agents such as toothpaste, leaves, shea butter, and salt. The Ministry of Health, Ghana Health Service and Non-Govermental Organizations (NGOs) should develop continuous training and development programs for all Traditional Birth Attendants (TBAs) to enhance their understanding of safe birth practices, promote adherence to recommended healthcare protocols, and safeguard maternal and neonatal health outcomes.

DEDICATION

I dedicate this work to my family for their sacrifices, great love, understanding and care in my life.

ACKNOWLEDGEMENTS

I give glory to God Almighty for my health and strength in everyday life. I thank my supervisor; Dr. John Azaare for his invaluable patience, direction, assistance and feedback. I appreciate the staff and my study participants from Salaga District for agreeing to participate and support this research process of this study during data collection. I want to express my gratitude to the Department of Population and Reproductive Health of the School of Public Health, University for Development Studies, and all the departmental faculty for their support and guidance. I also extend my gratitude to my family for their support in diverse ways. I equally extend gratitude and appreciation to course mates and colleagues for the criticism and encouragement that has brought me thus far. Last but not least, earlier studies on the topic, literature from test book and published articles and journals also deserve a worthy mention from where I sourced information to enable me to ground this study. God bless everyone who in any way contributed to the success of this research.

TABLE OF CONTENT

DECLARATION iii
ABSTRACT iv
DEDICATION v
ACKNOWLEDGEMENTS vi
TABLE OF CONTENT vii
LIST OF TABLES x
LIST OF FIGURES xi
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background 1
1.2 Problem Statement 5
1.3 Research Questions 7
1.4 General Research Objectives 7
1.4.1 Specific Research Objectives 7
1.5 Conceptual Frame work 8
1.6 Significance of the study 9
1.7 Scope of the study 12
1.8 Chapter Outline 12
CHAPTER TWO 14
LITERATURE REVIEW 14
2.0 Introduction 14
2.1 Global Overview of Umbilical Cord Infections 14
2.2 Neonatal Umbilical Cord 18
2.3 Care of the Umbilical Cord 19
2.4 Umbilical Cord Infections in Sub-Saharan Africa 20
2.5 Prevalence of Umbilical Cord Infections in Ghana 24
2.6 Causes of Umbilical Cord Infections 26
2.6.1 The Mother's Birth Canal 26
2.6.2 The Neonate Surroundings 27

2.6.3 Hand of the person assisting the delivery 27
2.7 Medical and Epidemiological Causes 27
2.8 Traditional Practices affecting Umbilical Cord Infections 30
2.9 Theoretical Underpinning 32
2.9.1 Self-Care Deficit Nursing Theory 32
2.9.2 Self-Care Requisites 33
2.9.3 Universal Self-Care Requisites 35
2.9.4 Theory of Nursing Systems 35
2.10 Summary of literature review 37
CHAPTER THREE 39
METHODOLOGY 39
3.0 Introduction 39
3.1 Study Setting 39
3.1.1 The Hospital Profile 39
3.2 Study Design 40
3.3 Study Population 41
3.4 Sample size 41
3.5 Data Collection Tools 42
3.6 Data Collection Process 42
3.7 Data Cleaning and Organization 43
3.8 Data Analysis. 44
3.9 Ethical Consideration 44
CHAPTER FOUR 46
RESULTS 46
4.0 Introduction 46
4.1 Descriptive Statistics 46
4.1.1 Community distribution of cord infection 47
4.2. Diagnosis from the cases between 2021-2022 in the Salaga Municipality 47
4.3 Prevalence of Cord Infection 48
4.4. The Qualitative Results 49
CHAPTER FIVE 63
DISCUSSION 63

5.0 Introduction 63
5.1 Socio-demographic characteristics of respondents 63
5.2 Prevalence of Umbilical Cord Infection 64
5.3 Umbilical cord care practices among mother and care givers of neonates 65
5.4 Knowledge of mothers and care givers on umbilical cord care and infections 66
5.5 Traditional perspective on Umbilical Cord Care 68
CHAPTER SIX 70
CONCLUSIONS AND RECOMMENDATIONS 70
6.0 Introduction 70
6.1 Summary 70
6.2 Conclusion 72
6.3. Policy Implications 73
6.4. Recommendations 74
6.4.1. Practice 74
6.4.2. Policy 74
6.4.3. Research 75
REFERENCES 76
APPENDIX 86

LIST OF TABLES

Table 4.1 Demographic characteristics of respondents ……50

Table 4.2. Prevalence of Umbilical cord infections in Salaga Municipal hospital……53

Table 4.3 Attributes of Traditional Birth Attendance and Care Givers Interviewed in Salaga …54

LIST OF FIGURES

Figure 1.1: Conceptual framework…….9

Figure 4.1 Community distribution of cord infection in Salaga Municipal ……..51

Figure 4.2 illustrates the diagnosis from the cases between 2021-2022 in the Salaga Municipality…….52

CHAPTER ONE

INTRODUCTION

1.1 Background

Neonatal mortality in particular has become a serious worldwide concern. Microorganisms can enter through the freshly cut umbilical cord, increasing the risk of newborn sepsis and death (Coffey and Brown, 2017). According to Hogan et al. (2015), infections in the umbilical cord, particularly newborn sepsis, account for more than 15% of neonatal fatalities globally. Numerous studies have shown that the umbilical cord is an important site for bacterial colonization (Bele et al., 2020). Cord care describes a set of procedures for handling the umbilical cord following delivery, emphasizing the need for close monitoring to significantly reduce the risk of infection and newborn death.

The cord is a special structure that consists of one vein and two arteries. At full term, it usually measures 56 cm and runs from the infant's navel to the placental center (Abba, 2008). The initial 28 days of an infant's life hold immense importance as newborns are vulnerable to infections, necessitating delicate handling to avert neonatal mortality or lasting deformities. Mothers, being primary caregivers, play a crucial role in ensuring optimal development for these infants, as the health and survival of newborns hinge on the essential care provided before, during and following childbirth (Joel-Medewase et al., 2008).

The umbilical cord risk of bacterial colonization increases with exposure to the external environment, including contacts with other people (Asiedu et al., 2019; Degefie et al., 2014). In our day and age, infant mortality has become one of the world's greatest concerns. Numerous studies have shown an increase in neonatal mortality in a variety of geographical contexts, with

conditions being even worse in most developing countries. According to a 2016 World Health Organization report, the main causes of newborn fatalities are prematurity, low birth weight, infections, hypoxia, and delivery trauma. The majority of these fatalities occur in poorer nations with inadequate access to medical care.

Research has shown that mothers in underdeveloped nations do not give their umbilical cords proper care (Joel-Medewase et al., 2008; Cobo et al., 2013). Reducing avoidable neonatal mortality may be possible with the adoption of optimal umbilical cord care guidelines for newborns and throughout the first week of life (Padiyath, Bhat, and Ekambaram, 2010; Coffey and Brown, 2017). Just thirty percent of the women looked at the relationship between clean cord care practices and infant mortality in rural Uttar Pradesh, India, complied with this recommendation (Agrawal et al., 2012; Karumbi et al., 2013).

Prior studies have highlighted lack of commitment from mothers in following advised guidelines for cord care, despite the fact that these measures are critical for reducing the risk of infections and infant mortality (Buser et al., 2020; Seidler et al., 2023). Most newborn deaths are the consequence of infections, and issues pertaining to the umbilical cord can lead to some of these infections. Especially in developing countries, this has led to higher rates of newborn illness and mortality. The health of newborns is greatly impacted by umbilical cord infections, which are the second leading cause of newborn deaths globally, accounting for approximately 276,000 newborn deaths in Nigeria annually. Again, roughly one-third of Nigeria's neonatal mortality cases are related to these infections (Orobaton et al., 2015; Osuchukwu, 2014; Babbi et al., 2014; Soofi et al., 2012).

Kim et al. (2020) states that neonatal sepsis, a common medical condition with a high risk of morbidity and mortality, is characterized by systemic bacterial infections in infants. The third most common reason for newborn death is sepsis. (Amare, 2014; Kim et al., 2020). Osrin and Colbourn

(2016) state that in areas whereby a significant percentage of births take place at home, frequently in unsanitary and insufficient conditions, infections are the main reason for neonatal fatalities. According to earlier studies, neonates are more likely to pass away in the early stages of life, and 34.3% of these fatalities are attributed to neonatal infections (Waiswa et al., 2010; Yosef et al., 2021).

Thus, increasing newborn survival is a top priority on a global scale (Moran et al., 2013). Of the various variables, sepsis and infections continued to be a key and enduring cause of neonatal mortality and morbidity (Mitul, 2015; Agrawal et al., 2012). According to Coffee and Brown (2017), it is possible for bacteria to enter through the freshly cut umbilical cord and cause newborn sepsis and death. According to some research, the umbilicus continues to be a major site of infection for newborns due to exposure to unsanitary cord care techniques like cord cutting and tying (Amare, 2014; Quddus et al., 2002). Studies from various countries have applied various materials to the umbilical cord to promote healing, such as butter, ash, mud, rat feces, turmeric, oil, and cow dung (Alam et al., 2010; Amare, 2014).

According to Alam et al. (2010), Amare (2014), Thaver and Zaidi (2009), there is an increased risk of omphalitis and related complications, including death, with these umbilicus care practices. It has been demonstrated that the perfect medium for bacterial growth is the umbilical cord. Furthermore, it makes it simple for germs to enter the newborn's bloodstream, where they may cause sepsis or even death. Many of these fatalities are caused by umbilicus infections, which are the result of customs and/or cultural practices within the communities (Stewart et. Al., 2016).

Some villages in Pakistan are known to treat umbilical cords with cow dung, and communities in Ethiopia use hair lotion, petroleum jelly, and butter to promote cord healing (Amare, 2014). Numerous applications are made to the umbilical cord in Zambia's Choma District, where a large

number of deliveries take place outside of medical facilities. Just 30% of moms in rural Uttar Pradesh, India, followed the recommended guidelines for cord care, according to a study evaluating the link between hygienic practices and newborn mortality (Agrawal et al., 2012; Karumbi et al., 2013). It is common knowledge that mothers will apply products to the umbilical cord, such as cooking oil, petroleum jelly, baby lotion, and breastmilk. Some people use powdered ashes, burnt gourds, and roots (Sacks et al., 2015).

In January 2014, the WHO updated its guidelines for umbilical cord care in Ghana. The Ghana Health Service and the Ministry of Health carried out in-depth operational research on the application of chlorhexidine di-gluconate 7.1% gel for cord care in light of this new regulation. Methylated spirit, which has traditionally been used for umbilical cord care, can be substituted with the recently approved product, chlorhexidine di-gluconate 7.1% gel (WHO, 2014). Despite these recommended guidelines, mothers and other caregivers are believed to apply substances that are not authorized on the umbilical cord.

Research has demonstrated that different products and dressings are put on the umbilical cord by mothers and other caregivers. 64.3% of research participants used strong antiseptics like Dettol, while other unapproved dressings included Shea butter, salt, sand, herbs, chalk, and crushed banana peels combined with Shea butter. The mothers' and other caregivers' educational backgrounds had an impact on the dressings chosen for the umbilical cord in 2019 (Asiedu et al., 2019). Among those without a formal education, the majority (68%) were seen using illicit drugs on the cord. Mothers and other caregivers who had finished elementary school or above tended to use appropriately, like methylated spirit (Osuchukwu, 2014). The likelihood of using unapproved dressings on newborns' umbilical cords was higher among mothers without formal education.

Moreover, the place of delivery emerged as another influential factor in determining the type of dressing used. A larger proportion of women gave birth outside a healthcare facility (61.4%) compared to those delivering in a health facility (38.6%). This trend aligns with findings from studies which highlighted a higher prevalence of topical applications of unapproved substances by mothers who delivered outside a healthcare setting (Ambe et al., 2008; Joel-Medewase et al., 2008). Additionally, the relationship between mothers/caregivers and the individual recommending a specific type of dressing was substantial.

The nurses' approval largely determined the choice of an approved dressing; in contrast, traditional birth attendants/friends and grandmothers were more likely to recommend an unapproved dressing (Buser et al., 2020). Moreover, despite being significant at first during chi-square analysis, the duration for the umbilical cord to separate did not hold after multiple regression analysis. The length of time mothers and caregivers kept the umbilical cord before it naturally detached was influenced by cultural beliefs within the communities (Joel-Medewase et al., 2008).

More participants (54.8%) thought the cord ought to be severed by the fourth day (Tette et al., 2020). Reducing mortality and morbidity rates related to umbilical cord care practices requires focused, well-informed public health interventions. However, certain socio-contextual factors may provide difficulties for the implementation of directed interventions. In order to inform decisions about public health, it is crucial to understand current practices and related factors. The current study would therefore assess the umbilical cord care practices in the Salaga Municipality.

1.2 Problem Statement

Umbilical cord infections are major contributor to neonatal mortalities and morbidities across the globe with substantial burden in developing countries including Ghana. A study in northern Ghana

reported neonatal sepsis to be 37.3% (Tette et al., 2020). The umbilical cord is known gateway for entry of infectious agents and its products (Asiedu et al., 2019; Blume-Peytavi et al., 2012). Understanding umbilical cord care routines may serve major avenues for evidenced-based clinical and public health practices.

However, there is limited documented information on how mothers care for their newborns' umbilical cords, posing a challenge to policy formulation and the implementation of evidence-based preventive measures across Ghana's sixteen administrative regions. Additionally, studies reveal variations in essential neonatal care practices between urban and peri-urban settlements. In the Kessena-Nankana district of Ghana, a study showed that mothers apply traditional lotions to the umbilical cord (Moyer et al., 2012). In another study in the Northern Region, good neonatal cord care was practice among 5.2% of mothers (Saaka and Iddrisu, 2014). The first few weeks of a newborn's life are crucial for their health and well-being (Smith, 2019).

One significant aspect of newborn care is the proper handling of the umbilical cord stump, as improper care can lead to infections (Jones et al., 2020). Across the Salaga Municipality, several reasons have contributed to umbilical cord Infections. Lack of education, the use of inappropriate agents among mothers has resulted in umbilical cord infections (Jones et al., 2020). Mothers and caregivers are thought to apply illegal substances to the umbilical cord despite the fact that methylated spirit was advised (Abraham et al., 2019). Through practical observations, it was revealed that mothers from the Salaga Municipality often return to the health facility with neonatal cord infection despite going with a baby and a health cord.

In 2021, there was a total birth of 1781 of which 31 babies were diagnosed representing 1.74% and in 2022, a total birth of 1754 of which 42 babies were diagnosed with Umbilical cord infections representing 2.39% (Salaga Municipal Hospital Report, 2022). Overall, the prevalence of

Umbilical cord infections over the period understudy was 2.07%. Reasons for this rise are not well understood although health care professionals and care givers attribute this reason to multiple factors, thus the need for further exploration into the issues of neonatal cord infection. This study aims to identify the factors that contribute to the high rate of cord infection in the study area. Additionally, the home care practices of umbilical cord care in Salaga are not well understood. Therefore, the goal of the current study is to evaluate the infections and procedures for caring for umbilical cords in Salaga, Northern Ghana.

1.3 Research Questions

1. What is the prevalence of umbilical cord infection in Salaga district?
2. What is the knowledge level of mothers on umbilical cord care in Salaga Municipality?
3. How do mothers care for newborns cord in Salaga district?
4. Are there any traditional practices that are detrimental to umbilical cord care in Salaga Municipality?

1.4 General Research Objectives

To determine the state of neonatal cord infection and care among mothers and care givers of neonates in Salaga district.

1.4.1 Specific Research Objectives

1. To estimate the prevalence of neonatal umbilical cord infections in Salaga District.
2. To describe umbilical cord care practices among mother and care givers of neonates in Salaga district.

3. To assess the knowledge of mothers and care givers on umbilical cord care and infections in Salaga District.

4. To explore the traditional/local perspective on umbilical cord care in Salaga Municipality

1.5 Conceptual Frame work

The conceptual framework for this study is presented in the figure 1.1 below. The main outcome variable of this study is neonatal cord sepsis which is at the center of the diagram. Several other factors play diverse roles in affecting the sterility of neonatal cord including homecare factors. The use of certain local agents and creams, touching of the cord with infected hands, and the use of exposed or unprotected medicines on the cord could all be precursors to its infection. Another predicting variable is health system related factors. The type of care mothers received from nurses and midwives during delivery could predict the sterility of the cord after discharge. Sometimes, the tidiness of the delivery room could also lead to cord sepsis. In addition, traditional and cultural practices usually orchestrated by TBAs and grandmothers also contribute to neonatal cord sepsis. Cultural traditions, beliefs, and taboos surrounding newborn care impact the choice of cord care practices within communities. There is a need to understand the traditional, cultural, and local nuances that impact neonatal care, as these can significantly influence the adoption of specific cord care practices, impacting neonatal health outcomes.

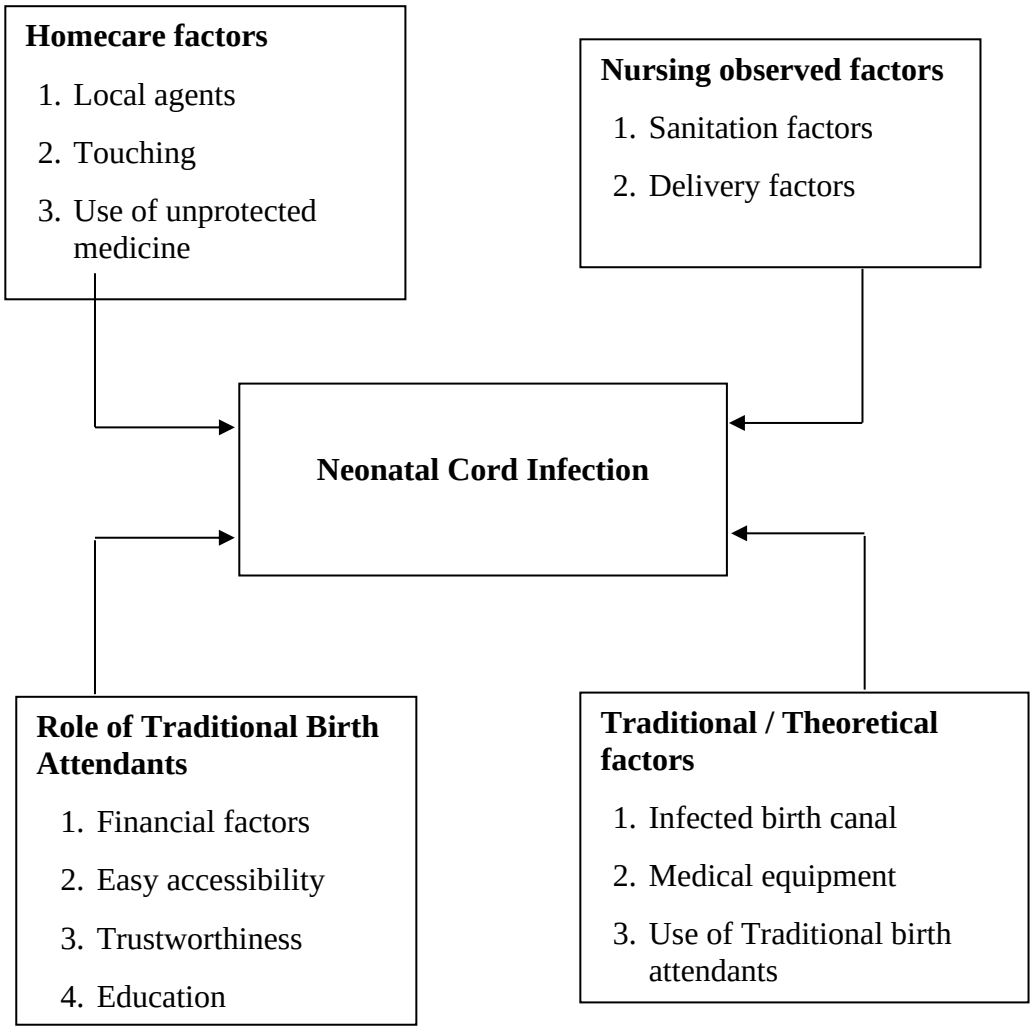


Figure 1. Multifaceted factors affecting neonatal cord infections

1.6 Significance of the study

Research on umbilical cord care practices is of paramount importance in achieving the global target of reducing neonatal mortality and morbidity by 2030. This line of investigation contributes significantly to the development and implementation of evidence-based interventions that aim to improve neonatal health outcomes. Research on umbilical cord care practices provides valuable insights into the risk factors associated with neonatal umbilical cord infections. It helps identify

cultural, environmental, and healthcare-related determinants that contribute to infection susceptibility, enabling the development of targeted interventions to mitigate these risk factors (Imdad et al., 2013).

Moreover, this research facilitates the identification of modifiable factors that, when addressed through evidence-based interventions, can effectively reduce the incidence of umbilical cord infections, contributing to the overarching goal of reducing neonatal mortality and morbidity by 2030. The research will help by identifying risk factors, causes, and offer preventive measures for umbilical infections in neonates in its recommendation. The research can directly inform strategies to prevent such infections. Implementing preventive interventions, such as enhanced hygiene practices, antiseptic cord care, and maternal education, can substantially reduce the incidence of umbilical infections, thereby contributing to a decline in neonatal mortality.

Addressing umbilical infection risk factors may necessitate broader improvements in maternal and perinatal healthcare, including antenatal care, skilled birth attendance, and postnatal support. Consequently, the research may indirectly contribute to enhancing overall maternal and child health, thereby positively impacting neonatal and under-five mortality rates. Neonatal mortality and morbidities constitute a major public health challenge in Ghana. Understanding umbilical infections as has been proposed in this study will be setting a stage to propose appropriate and targeted clinical and public health interventions.

Data from the study will be crucial for comprehending the prevalence of umbilical cord infections, their related causes, and conventional viewpoints on umbilical cord care procedures. Healthcare providers should have a thorough understanding of umbilical cord care practices, particularly from a traditional standpoint, to customize health education programs on neonatal cord care for natives, particularly mothers in the study setting. giving mothers thorough instruction on how to take care

of their umbilical cords before, during, and after receiving prenatal care from a medical professional.

Healthcare providers, including doctors and nurses, should effectively communicate these guidelines to all women and caregivers to support rural health facilities in developing standardized protocols for umbilical cord care. It is anticipated that putting such protocols into practice in the research setting will improve child health overall by lowering the incidence of neonatal sepsis as well as morbidity and mortality. Health policies and clinical practices are significantly influenced by the findings of research on umbilical cord care practices. Healthcare systems can establish standardized procedures, provide funding for focused interventions, and give evidence-based neonatal care top priority by incorporating research findings into the policymaking process.

Additionally, healthcare providers can improve their clinical practices by incorporating the latest research discoveries, ensuring that neonatal care aligns with the most up-to-date evidence, ultimately contributing to the global health objective of reducing neonatal mortality and morbidity by 2030 (Ahluwalia et al., 2012). Conducting research on umbilical cord practices fosters the development of evidence-based guidelines for healthcare providers, caregivers, and communities. These guidelines serve as the foundation for the implementation of standardized, effective, and culturally appropriate umbilical cord care practices. Furthermore, research facilitates the design and evaluation of targeted interventions, such as educational programs, training initiatives for healthcare workers, and community-based interventions, all aimed at promoting safe umbilical cord care practices (World Health Organization, 2014).

Again, knowing the reasoning behind some of the cord care protocols for infants in research environments will give policymakers new medical perspectives on how to handle these protocols to reduce the risk of cord infections. Research on umbilical cord care practices is necessary if we

hope to lower neonatal mortality and morbidity by 2030. Enhancing our understanding of infection risk factors, developing evidence-based protocols and interventions, identifying disparities, and integrating research findings into clinical practices and healthcare policies are all made possible by this research. By highlighting the importance of research in this vital aspect of neonatal care, the international community can collaboratively strive towards fostering beneficial and enduring effects on neonatal health, progressing towards the 2030 objective.

1.7 Scope of the study

According to Simon and Goes (2011), the problem to be studied within a specific boundary or domain is the scope of a research study, which deals with the parameters under which a research study operates. The "what or whom is being studied" is the unit of analysis, according to Babbie (2010). According to him, a typical unit of analysis is a group of people, particularly when the researcher is interested in examining the behavior of various individual groups. The unit of analysis for the research would be mothers and health professionals, such as nurses, midwives, caregivers, and doctors, as this is the focus of the interview. The chosen unit of analysis is deemed appropriate to this study since it focuses on the local people of the Salaga municipality.

1.8 Chapter Outline

The study is divided into six chapters. The study' background, statement of the problem, the objectives and research questions of the study are all presented in the first chapter. This chapter also provides the structure, rationale, and scope of the investigation.

Chapter two provides an overview of relevant and related literature reviews and theoretical framework used in carrying out the study. This chapter also discussed the health implications of poor umbilical cord care practices that give rise to neonatal sepsis within the Salaga municipality

and how this can be addressed using development communication strategies that would help improve upon knowledge in umbilical cord care.

The study's methodology is described in detail in Chapter 3. The population, sampling strategy, sample size, data sources, data collection tools, data analysis, and ethical considerations are all included in this. Chapter 4, which summarizes the analysis and presentation of the field data collected, contains the study results. The discussion of the study's findings considering previous research is covered in Chapter 5. The recommendations and conclusions are presented in Chapter 6.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section reviews relevant literature in support of this thesis. The section includes literature on the burden and overview of cord infection worldwide, cord infection in sub-Saharan Africa, and Ghana. The chapter also looks at the major causes of cord infection and provide a summary of the literature at the end of the chapter.

2.1 Global Overview of Umbilical Cord Infections

Umbilical Cord Infections contribute to around 36% of neonatal fatalities globally, with neonatal sepsis originating from localized umbilical cord infections that progress systemically. In low-resource settings, limited knowledge exists regarding factors predisposing to umbilical cord infection, although unsanitary practices during childbirth are probable contributors to the condition. While past research has primarily centered on neonatal tetanus, mitigation efforts have reduced tetanus cases significantly; however, without improved delivery and postnatal practices to minimize pathogen exposure to the umbilical cord stump, cord infections are likely to persist (Lucy, 2023).

While noting that topical antiseptics may be used where infection risk is high, the World Health Organization has advised since 1998 that clean and dry cord care be promoted for newborn infants. Applying a topical antiseptic reduced the risk of umbilical cord infection by about half when compared to either dry cord care or a placebo; however, the combined effect was not statistically significant (Robert et al., 2013).

Although topical triple dye appeared to be more effective than alcohol or povidone-iodine in preventing cord infection, the overall inconclusiveness of the evidence precluded specific recommendations in favor or against the use of an antiseptic (Robert et al., 2013). One important place where bacteria settle after birth is the umbilical cord. In developing countries, cord stump infection (omphalitis) caused by bacterial colonization can dramatically increase infant morbidity and death rates. Infants who encounter delays in cord separation may be more susceptible to bacterial infection because the umbilical cord offers a direct conduit for the introduction of harmful germs into the bloodstream (Lucy, 2013).

The protective flora on a newborn's skin is absent at birth, but it begins to grow normally within 24 hours. Colonization, or the pathogen's establishment at the proper portal of entry, is the initial stage of microbial infection. Typically, pathogens invade host tissues when they come into touch with outside surroundings (Bjarnsholt et al., 2022). The umbilical cord is a unique structure made up of one vein and two arteries that are encircled with a thin layer of gelatinous connective tissue called Wharton's jelly. The placenta removes waste products and gives the developing fetus nutrition and oxygen throughout pregnancy.

Through the umbilical cord, blood is transmitted from the placenta to the fetus, providing essential nutrients and oxygen while also removing waste products and carbon dioxide from metabolism (Ahluwalia et al., 2012). The umbilical cord is sterilely cut to help the newborn adjust to life outside the womb after the baby is born and the placenta separates. By firmly clamping or tying the cord to block the vessels, the bleeding is stopped. The stump loses its oxygenated blood supply when the cord is severed, aiding in its drying and separation. The stump eventually becomes stiff and black from air exposure.

Various studies have highlighted the risks associated with cord care practices and the potential for infections originating from the umbilical cord, contributing to a significant percentage of neonatal fatalities globally. The presence of both beneficial and harmful microorganisms in the cord region underscores the importance of maintaining proper hygiene during delivery and postnatal care to prevent cord infections from progressing into severe conditions like omphalitis or neonatal sepsis caused by bacterial entry into the bloodstream (Ahluwalia et al., 2012).

Local knowledge of such issues guides people's attempts to prevent and respond to illnesses and hazards that harm the spinal cord. Grandmothers, mothers, and TBAs had no idea about any risks or problems related to the cord. Those who knew about it spoke of blood, sores, and improper healing. These issues are thought to occur when the cable dries out, adheres to clothing, especially if butter isn't applied, or when it isn't bathed. (Yared, 2014). Worldwide, infections cause about 36% of newborn deaths. Neonatal sepsis can result from localized infections of the umbilical cord that spread throughout the body. Despite the fact that unsanitary childbirth practices are likely a determinant of disease, the risk factors for umbilical cord infection in developing nations are not well understood.

Most previous research has focused on neonatal tetanus infection; however, if procedures used during birth and the postnatal period do not lessen the risk of potentially harmful pathogens being exposed to the umbilical cord stump, even in environments where high rates of tetanus toxoid coverage have considerably decreased neonatal tetanus, umbilical cord infections are likely to continue (Ogundare et al., 2021). The wound is one of the finest places for bacteria to settle when the cord is severed. The main cause of ophelia is colonization, which manifests as pus discharge, inflammation, redness, or an unpleasant stench in the affected area. Hospital research in developing countries has shown that different proportions of anaerobic, Gram-negative, and Gram-

positive bacteria, including Staphylococcus aureus and Escherichia coli, predominate (Lawn et al., 2009).

There has been evidence of an association with early gestational age, low birth weight, and male sex. Hygiene-related behaviors may be intermediate determinants of omphalitis (Sazawal et al., 2016). Examples of these include different birthing surfaces, cord care (tying, cutting, topical applications), baby bathing techniques, attendant hand washing techniques, skin-to-skin contact between the mother and child, and newborn thermal care. Ogundare et al. (2021) noted that, similar to the proximal and intermediate determinants, other distal determinants, such as caretaker literacy levels, socioeconomic status, ethnicity, or caste, may also be linked to cord infection; however, these have not been investigated in connection with infectious diseases of the umbilical cord that are not tetanus-related.

Ophialilitis is one type of hazardous infection of the spinal cord. Ophelialitis is the term for an infection of the umbilical stump. Often starting as superficial cellulitis, it can develop into systemic illness, myonecrosis, or necrotizing fasciitis. It has the potential to spread to the entire wall of the abdomen (Lawn et al., 2009). In wealthy countries, omphalitis is uncommon outside of the context of umbilical vascular catheterization; however, in less developed areas, it remains a common cause of infant mortality. Only a few adult cases have been documented; it is primarily a neonatal condition. Septic delivery, unexpected home delivery, maternal chorioamnionitis, protracted membrane rupture, low birth weight, and umbilical vascular catheterization were risk factors for omphalitis.

Over the course of their first month of life, 2.4 million of the 5.1 million children who pass away before turning five globally do so. In Uganda, it is projected that 307 out of every 1000 live births pass away as neonates, or within the first 28 days of life. In sub-Saharan Africa, infections account

for about one-third of neonatal fatalities (Tumuhamye et al., 2022). Pupils, swelling, and/or redness at the umbilical cord stump are clinical indicators of ophelialitis. Hazardous bacteria that enter the bloodstream through the stump could do so. Additionally, there is necrotic tissue, which provides the perfect conditions for the growth of bacteria (Lawn et al., 2009).

The mother's birth canal, where the umbilical cord becomes contaminated during childbirth, is one of the most important sources of these germs. Long-term membrane rippling, chorioamnionitis, and home delivery are additional maternal risk factors for omphalitis. Inappropriate cord care, such as using over-the-counter medications to hasten cord separation, increases the risk of infection and frequently promotes bacterial contamination in newborns. Among the commonly found potentially harmful bacteria colonizing the umbilical cord include gram-negative bacteria such Escherichia coli, Klebsiella species, Enterobacter species, Pseudomonas species, and Staphylococcus aureus (Tumwine et al., 2022).

The World Health Organization estimates that if mothers and other caregivers followed the Essential Newborn Care (ENC) guidelines, 67% of newborn deaths globally could be avoided. In order to prevent hypothermia, these recommendations include washing the umbilical cord, waiting at least six hours before giving the baby their first bath, and starting breastfeeding as soon as the child is born (WHO, 1996; Lawn et al., 2009).

2.2 Neonatal Umbilical Cord

An organ of the fetus that joins it to the developing placenta is the umbilical cord. The fetal circulation can receive nutrients and oxygen from the mother's circulation thanks to this structure. The umbilical cord is made up of a bundle of blood vessels that are encased in an amniotic tubular sheath. It consists of one umbilical vein and two pairs of umbilical arteries. Whereas the umbilical

vein transports oxygenated blood from the placenta to the fetus, the paired umbilical arteries carry deoxygenated blood from the fetus to the placenta. Its average length is between 55 and 60 cm, and its diameter is 1-2 cm (Stewart, 2022).

During pregnancy, the placenta acts as a conduit via the umbilical cord between the mother and the fetus. The fetus receives nutrition and oxygen from the mother through the umbilical cord, which also carries carbon dioxide and other metabolites out of the body (World Health Organization, 2009; Bello and Omotara, 2010). A newborn's postpartum care is largely dependent on the umbilical cord care practices that are followed in order to maintain their health. The first 28 days of extrauterine life and the period immediately following delivery are referred to as the "neonatal" period in the Medical Dictionary.

2.3 Care of the Umbilical Cord

It is essential to keep the umbilical cord (UC) clean and dry in order to facilitate a quick and secure healing process. However, there are many different clinical approaches to UC care available worldwide, which can be confusing for parents and healthcare professionals, particularly when complications develop that diverge from the typical healing trajectory. There is disagreement over the definition of neonatal sepsis in part because of the uncertainty surrounding its diagnosis.

However, according to Shane et al. (2017), neonatal sepsis is associated with a high rate of morbidity and mortality and is characterized by both clinical symptoms (such as fever, feeding difficulties, or umbilical discharge) and physiological changes (such as an abnormal white blood cell count, atypical temperature, or rapid heartbeat). Neonatal sepsis risk is largely determined by the cleanliness of the umbilical cord, though maternal and neonatal factors also matter. An odorless, dry stump devoid of redness, warmth, pain, swelling, and swelling is indicated by a clean umbilical cord.

Maintaining cord cleanliness requires proper care procedures, such as using methylated spirit, letting babies air dry for natural healing, or sponge-bathing them to prevent total submersion in water. While chlorhexidine is recommended for home births in high neonatal mortality settings as a safer substitute for traditional cleaning agents, the World Health Organization notes that dry cord care is recommended for settings with low mortality rates (below 30 deaths per 1000 births) (Nankabirwa et al., 2017).

2.4 Umbilical Cord Infections in Sub-Saharan Africa

Asia and sub-Saharan Africa have the highest rates of neonatal mortality in the world, with approximately 29 deaths per 1000 live births, and half of those deaths occurring in the first day of life (Mokuolo, et al., 2022). Over the past 25 years, the rate of neonatal deaths, which make up 47% of all deaths in children under five, has declined more slowly than the rate of post-neonatal deaths (Walsh et al., 2015). It is believed that poor hygiene during delivery and newborn care can result in omphalitis and serious systemic infections, and that pathogen transmission through umbilical cord infections is a major cause of neonatal sepsis.

Strategies like using clean birth kits, cleaning the birth canal and neonatal skin with antiseptics like chlorhexidine, and encouraging good hygiene practices, in order to lower the risk of neonatal infections, measures have been put in place, such as handwashing during delivery and during neonatal care. There is no data from Africa, but numerous clinical trials carried out in Asia have demonstrated the efficacy of applying chlorhexidine on an umbilical cord. The World Health Organization's most recent guidelines state that the cord should be treated with chlorhexidine during the first week of life in home births in increased neonatal mortality settings (defined as ≥30 deaths per 1000 live births). Conversely, dry cord care should be given to infants in low mortality settings (Sazawal et al., 2016).

Despite their rarity, isolated incidences of cord infections still occur in hospitals and birthing facilities in affluent nations (WHO, 1998). Thus, taking proper care of the umbilical cord is an important matter that needs to be attended to. The umbilical cord stump needs to be kept clean and dry to prevent infection. The baby may contract pathogenic microorganisms after the third stage of labor through the newly cut umbilicus because of its undeveloped immune system (Coffey and Brown, 2017; Mivšek et al., 2017; Imdad et al., 2013).

More than 15% of all newborn deaths are caused by neonatal sepsis, which ranks as the third most common cause of neonatal mortality globally (Coffey and Brown, 2017). According to Nankabirwa et al. (2017), poor nations like South Asia and Sub-Saharan Africa account for 96% of all newborn fatalities each year. Umbilical cord care procedures in these settings are deeply woven with socio-cultural beliefs and customs, from the act of cutting the cord to the upkeep of the cord stump (Coffey and Brown, 2017; Walsh et al., 2015). The literature has reported the purported advantages of a number of conventional materials for cord maintenance, including mud, animal waste, animal dung, home dirt, burnt charcoal, leaf mixtures, and burnt nutmeg (Walsh et al., 2015; Herlihy et al., 2013; Coffey and Brown, 2017).

Despite efforts to improve maternal and child health, umbilical cord infections have historically presented serious risks to neonatal health and resulted in fatalities (Lawn et al., 2009). Many newborn deaths occur at home and go unreported; consequently, national and local health policies and initiatives do not address these deaths (Lawn et al., 2009; Manu et al., 2016). The primary causes of newborn death are birth asphyxia, hypothermia, low birth weight, infection, and preterm delivery. According to Lawn et al. (2009), some examples of persistent determinants are the nutrition status of the mother, the overall status of women in the family, insufficient prenatal and postnatal care, and unsuitable newborn care behaviors in the community and at home.

Sub-Saharan Africa is one of the world's regions with the highest rates of newborn death (You et al., 2015; GSS, 2015). It has been anticipated that between now and 2030, the SDG target year, 69 million additional children under the age of five will die if nothing is done to accelerate the current pace of decrease in under-five mortality (You et al., 2015, GSS, 2015). Despite their rarity, isolated incidences of cord infections still occur in hospitals and birthing facilities in affluent nations. Thus, taking proper care of the umbilical cord is an important matter that needs to be attended to. The umbilical cord stump needs to be kept clean and dry to prevent infection.

After the first twenty-four (24) hours of life, babies start to establish their own protective flora. Bacteria from the surrounding environment, including the mother's skin, vaginal flora, and caregivers' hands, colonize the umbilical cord stump (Quaye, 2019). In the 1940s, hospitals began to separate mothers from their babies. This resulted in a rise in cases since newborn nurseries were used more frequently and there was consequent cross-contamination. Around this time, osteoporosis and infections in the umbilical cord stump were first identified (WHO, 1998).

Staphylococcal aureus outbreaks emerged with the umbilicus serving as a bacterial reservoir, prompting the introduction of preventive cord treatments. The proactive application of antimicrobial agents on the cord stump proved effective in curbing these epidemics. Risk of bacterial colonization at the umbilical cord is heightened by exposure to the external environment, including contact with individuals (Asiedu et al., 2019; Degefie et al., 2014). Child mortality, particularly among newborns, remains a significant global concern in contemporary times. Studies indicate a rise in neonatal mortality rates across various regions, with a more severe impact evident in many developing nations.

Traditionally, a range of substances have been applied to umbilical cord stumps in order to speed up the drying process and lower the chance of infection (McKinney et al., 2009; London et al.,

2007; Suliman, 2007; WHO, 1998). Many techniques were employed, including coinage, sterile water, triple dye, betadine (povidone-iodine), olive oil, coconut oil, colostrum, plant extracts, and even no treatment at all (Orano, 2018).

Inflammation at the junction of the cord and abdominal skin, marked by leukocyte infiltration and subsequent cord degeneration, facilitates the separation of the umbilical cord stump (Suliman, 2007; Vural and Kisa, 2006). During the natural separating process, slime may be mistaken for tiny clusters of fuzzy mucoid material at the junction. The cable may also appear sticky, moist, or smell foul as it dries and separates from the stump. An estimated 276,000 neonatal deaths occur in Nigeria each year. Of these deaths, about 20,000 are associated with the umbilical cord, and about 60,000 are the result of infections (Orobaton et al., 2015).

Most of these deaths occur in the rural areas of northern Nigeria (Akinyemi et al., 2015). Nigeria has the second-highest neonatal death rate in the world, behind India (Lawn et al., 2009). The World Health Organization (2014) advised giving newborns delivered at home in places with high rates of neonatal death a chlorhexidine application to the umbilical cord stump during the first week of life. Studies have indicated that in resource-constrained environments, umbilical cord infections persist as the primary cause of newborn morbidity and death. This underscores the pressing requirement for effective prevention treatments (Mullany et al., 2017; Imdad et al., 2013).

For infants delivered at home, in hospitals, or in areas with low neonatal mortality, clean, dry cord care was advised. As per the findings of Miriam Okpaleke et al. (2018), the use of chlorhexidine was deemed a safer substitute in these circumstances as opposed to the application of a conventional product that is dangerous, such as cow dung, to the cord stump. Given the variety of cord care practices and beliefs that have been seen in Nigeria across time, it appears that there is a general desire to actively care for a newborn's umbilical cord (Coffey and Brown, 2017). Examples

of these practices include the use of salt, herbs, and even cow dung in the north, and mentholatum, olive oil, engine oil, red toothpaste, and olive oil in the south (Goldman, 2017). These procedures are intended to accelerate the process of the umbilical cord separating from the newborn and/or to aid in healing.

Convincing families that these practices expose the infant to infection is a challenging task, particularly in cases when the grandparents hold dissenting views (Okpaleke et al., 2018). Ghana has a relatively higher newborn mortality rate of 24 per 1,000 live births (GSS, 2015). It also shows that throughout the latter 11 months of the first year of life, a kid's danger of dying is halved for every Ghanaian infant who survives the first 28 days of life. Furthermore, more than half of all pediatric deaths occur during the first month of life. These are greater than the averages for the region and the world (GSS, 2015). With 24 deaths per 1000 live births, umbilical cord infections are a major cause of neonatal mortality in the northern region of Ghana. All regions have a high ratio of infant fatalities to mortality for children under five (GSS, 2015). In the Savelugu/Nanton municipality, the number of institutional neonatal fatalities has stayed steady at 35 in 2015, 37 in 2016, and 34 in 2017. Annual Report of the Savelugu Health Directorate, 2017.

2.5 Prevalence of Umbilical Cord Infections in Ghana

Umbilical cord care is crucial in Ghana since it is one of the main factors contributing to neonatal sepsis (Black et al., 2010). The skills and knowledge necessary to properly care for a newborn's umbilical cord are often lacking in many women and infrequently in healthcare professionals like Traditional Birth Attendants (TBAs), according to Asif et al. (2010). Many materials are applied to umbilical wounds in an effort to speed up healing, including cow dung, mustard oil, ash, mud, breast milk, saliva, water, rat feces, turmeric, oil, and shea butter, according to scant research done

in developing nations (Mullany et al., 2007; Soofi et al., 2012). These treatments raise the risk of omphalitis, which directly impacts the rates of neonatal infection and mortality.

Despite the ongoing efforts to enhance infection prevention in neonates, maternal awareness remains a significant concern, with studies in Ghana highlighting challenges such as inadequate knowledge, substandard practices, prevalence of home deliveries, and low attendance at Antenatal Care (ANC) and Postnatal Care (PNC) in alignment with WHO guidelines concerning Infection Prevention and Neoplasms (IPNs). Ghana's commitment to reducing neonatal mortality as per global targets led to the country's alignment with the health objectives outlined in the Sustainable Development Goals (SDGs) and WHO targets of decreasing neonatal mortality rates to 12 and 7 per 1000 live births by 2030 and 2035, respectively (Mohammed et al., 2021).

Forty-three percent of births in Ghana occur at home, exposing newborns to potentially unsafe care practices, in contrast to babies born in medical facilities. Mason et al. (2014) found that within the first week of life, more than two-thirds of newborn deaths occur at home without the help of a qualified healthcare professional. As a result, the WHO suggests that women attempt to give birth and seek out postnatal care in a hospital as soon as possible. Three more postnatal consultations are advised by the latest on the third day (48–72 hours), the first- and second-week following delivery (7–14 days), and six weeks following childbirth. Within 24 hours of giving birth at home, moms should receive a visit from a home health professional. In order to lower neonatal mortality, these recommendations have been made to guarantee the mother's and the child's good health outcomes as well as the regular application of essential newborn care practices (Ayete et al., 2020).

2.6 Causes of Umbilical Cord Infections

Approximately 25% of the 3 million neonatal deaths that occur globally each year are still attributed to bacterial infections, including sepsis, meningitis, and pneumonia, despite tremendous advancements in recent decades. It is still unclear how much the umbilical cord plays a role in these deaths, but whether or not there are omphalitis symptoms, it could be a common entry point for invasive pathogenic bacteria (Mohammed et al., 2021). Therefore, the neonatal mortality associated with umbilical stump bacterial contamination may represent one of the greatest public health opportunities of the twenty-first century.

Umbilical cord infections are primarily caused by the mother's birth canal, the neonate's delivery environment, and the hands of the person assisting with the delivery, according to research. According to Soofi et al. (2012), a cord infection can either remain localized in the umbilical cord (omphalitis) or spread throughout the body after entering the bloodstream (such as neonatal sepsis).

2.6.1 The Mother's Birth Canal

The birth canal is the passageway that the fetus passes through when it is born. A newborn's head often enters the birth canal first, followed by the body and the umbilical cord. Umbilical cord prolapse occurs when the umbilical cord emerges from the birth canal either ahead of or next to the baby's body. The umbilical cord may become compressed as a result. This particular issue is more prevalent in births where there is an early rupture of the membranes, or when the "waters break" before labor starts. Burdon and associates, 2018).

2.6.2 The Neonate Surroundings

The neonatal environment is the world in which a newborn baby finds himself. In the neonatal environment, there is an assessment that is given to make sure that the baby is healthy and normal. The APGAR Assessment tests the physical capabilities of a newborn and is administered in the delivery room. According to a MedlinePlus (2021) study, a newborn is given the APGAR test between one and five minutes after birth. How well the infant tolerated the birthing process is determined by the 1-minute score. The health care provider can determine the baby's level of success outside the womb by looking at the 5-minute score. Should the youngster. This evaluation is essential for determining the overall health of infants and identifying any red flags that may require additional research.

2.6.3 Hand of the person assisting the delivery

Infections such as sepsis, acute respiratory infections, neonatal tetanus, and diarrhea are thought to be responsible for 44% of neonatal deaths in high neonatal mortality settings. During childbirth and early childhood care, practicing good hand hygiene can help stop the transmission of pathogens from caregivers' hands to newborns (Larson et al., 2007). Cleaning your hands is called hand hygiene. Because a neonate's immune system is still developing, it is crucial to wash and cleanse your hands before handling them in order to prevent infections. These infections include omphalitis and septic shock, both of which are fatal.

2.7 Medical and Epidemiological Causes

Under-five mortality remains a significant challenge in sub-Saharan Africa and South Asia, with these regions collectively accounting for over 80% of the 5 million global under-five deaths recorded in 2020. Specifically, sub-Saharan Africa reported 2.8 million deaths, while South Asia recorded 1.4 million (WHO, 2022). According to WHO estimates, nearly half (47%) of these

deaths occurred within the first 28 days of life (the neonatal period), with Africa having the highest neonatal mortality rate worldwide—43% of global newborn deaths, equating to 27 deaths per 1,000 live births (WHO, 2022). Additionally, about one-third of neonatal deaths happen on the day of birth, and nearly three-quarters occur within the first week of life. Most of these preventable deaths result from complications during childbirth, preterm birth, congenital disorders, infections, and diarrhea, often worsened by malnutrition and socio-economic difficulties. (WHO, 2022; Sharrow et al., 2022).

The majority of neonatal deaths in 2019 were caused by preterm birth, infections, birth defects, and complications related to childbirth (such as birth asphyxia or lack of breathing at birth). From the end of the neonatal period through the first five years of life, birth defects, pneumonia, malaria, and diarrhea are the leading causes of death. The primary cause of children's increased risk of major illnesses is malnutrition (World Health Organization, 2018). The application of this research to the study of health-related states or events (including disease) and their determinants, as well as the treatment of illnesses and other health-related concerns, is known as epidemiology. In order to determine the risks or causes of certain health conditions, epidemiology looks at how those conditions are distributed within a population.

The World Health Organization estimates that 98% of the 4 million neonates who die annually do so in developing countries. Infections are one of the main factors contributing to neonatal mortality (World Health Organization, 2019). The neonatal health is closely related to the mother's health and the care she receives before, during, and after delivery. While the burden of neonatal morbidity and mortality has decreased in resource-rich countries due to advancements in perinatal care, fetal-neonatal infection prevention, and management, these advancements have only recently been made

in resource-limited areas, and numerous barriers still need to be removed (World Health Organization, 2019).

Almost one million of these deaths are ascribed to infectious causes such as pneumonia, meningitis, and neonatal sepsis, and the bulk of these deaths typically take place in low-income nations. Conversely, neonatal sepsis survivors are susceptible to both short- and long-term neurodevelopmental morbidity (Eman et al., 2015). Prematurity is a major risk factor for nosocomial infections and is frequently caused by fetal infections. (Et al., Lanari, 2007). In addition, labor and delivery as well as the early postnatal period are hazardous for moms and their infants during this time due to the high rate of maternal deaths during this period. Improving maternal and newborn health and survival rates may require expanding access to life-saving medical supplies and MNH abbreviation services.

In 2020, about 17% of births worldwide occurred without the assistance of a trained medical professional, and 52% of all babies were born without receiving a postnatal care visit within the first two days of their lives. Improved maternal and newborn health services, particularly through increased coverage and quality of preconception, antenatal, intrapartum, and postnatal interventions, are thought to be able to prevent up to three out of every four newborn deaths. Good maternity care is also necessary to save lives; neonatal care cannot be provided in a vacuum (World Health Organization, 2019).

For this reason, improving outcomes for women and their newborns during humanitarian crises requires ensuring access to courteous, high-quality maternal and newborn health services and supplies (Chawanpaiboon et al., 2018). The most crucial of these is whether or not women and children do not receive the services they need throughout the continuum of care and in the proper

settings. It's also critical to determine if care is effectively delivered at scale and of a caliber that matters.

2.8 Traditional Practices affecting Umbilical Cord Infections

The third most common reason for infant mortality for one month after birth is neonatal sepsis. The newborn may develop sepsis or even die consequently from bacteria entering through the recently severed umbilical cord. Adhering to appropriate guidelines for umbilical cord care during the initial week of a baby's life, particularly in unsanitary environments, could potentially avert avoidable neonatal fatalities (Patricia et al., 2017). Nevertheless, deeply entrenched traditional beliefs and practices wield significant influence over newborn health, often superseding government health policies and impeding healthcare providers' efforts to prevent neonatal illnesses and fatalities (Arumugam et al., 2023).

These ingrained practices exhibit variations across regions, cultures, religions, and communities, presenting formidable challenges to modification. In Africa, mobility restrictions imposed due to the COVID-19 pandemic have negatively impacted healthcare access and delivery, particularly affecting vulnerable populations and leading to repercussions on post-delivery newborn care. Families commonly engage in traditional newborn health practices like head shaping, nasal medications, genital cleansing, and applying heat to fontanelles (Gilbert et al., 2020). The dissemination of these indigenous practices often occurs through practical demonstrations and verbal transmission by traditional practitioners and observers.

Harmful traditional newborn practices have been observed to set neonates on perilous health paths. For instance, the practice of applying heat to fontanelles poses risks to newborns, yet its specific hazards have received limited scrutiny and discussion. In countries like Nigeria, neonatal

abdominal scarification using razor blades following febrile illnesses has been reported, sometimes resulting in intra-abdominal organ exposure. In rural Uganda, traditional healers performing false tooth extraction to alleviate fever and diarrhea have been linked to anemia and blood poisoning. In Nigeria, it is common practice to shape newborn fontanelles and shape heads with Mahogany and Neem oil; however, the effects of this practice on the growth and development of children are still largely unknown (Amponsah et al., 2023).

The care of children, especially neonates, is often characterized by invasive traditional practices that are often harmful in developing nations. One such technique is called "abdominal markings," or scarification, which entails repeatedly marking the abdomen with sharp objects like razor blades, knives, and broken bottles. The purpose of this procedure is to eliminate any suspected "bad blood" buildup in a child who has fever and/or abdominal edema. While Ghana's overall newborn death rates are on the decline, the Ashanti Region has the highest national rate of death. The clinical causes of newborn deaths are well known, despite the fact that local perceptions of illness etiology, cause of death, and care-seeking are less well understood (Ashura et al., 2020).

Prenatal care (ANC) was given by a qualified healthcare provider, such as a doctor, nurse/midwife, or auxiliary midwife, to 96% of pregnant women in Ghana, according to research; the World Health Organization recommends that 77% of these women attend four or more antenatal visits. On the other hand, trained TBAs attend 20% of deliveries, untrained TBAs assist at 9%, and skilled birth attendants attend about half (55%) of all deliveries. Furthermore, data reveal that 54% of births nationwide occur in hospitals, with the remaining 45% taking place at home (Asiedu et al., 2019).

Boah et al. (2018) state that conditions are worse in some regions of the country, such as Northern Ghana, where 71% of women report giving birth at home and 25% at a hospital or clinic. Despite

the startling fact that 97% of women got antenatal care at least once during their most recent pregnancy, 73% of women gave birth in a medical facility with qualified birth attendants. With these tactics in place, it is anticipated that the high rate of ANC use will rise in tandem with an increase in delivery from healthcare facilities. The question is the cause behind this. It was essential to identify the causes of this event. The Upper East Region of northern Ghana has thirteen districts, and while there are differences between them, the region has a high (84.1%) skilled delivery rate (Mahama et al., 2018).

Only 46.2% of expectant mothers gave birth in a medical facility, 90.7% had at least four follow-up visits before delivery, and 71.5% of expectant mothers received antenatal care at least once, according to the Builsa district's 2014 annual report. The combined data on antenatal care utilization and delivery in these facilities indicate that there is a distinction between receiving antenatal care services from these facilities and having them delivered there. Studies conducted in Ghana have found that the following factors are predictive of health facility delivery: occupation, household income, religion, and maternal age (Boah et al., 2018).

2.9 Theoretical Underpinning

2.9.1 Self-Care Deficit Nursing Theory

Renowned nursing theorist Dorothea Orem developed the Self-Care Deficit Nursing Theory, which emphasizes how important it is for people to be able to take care of themselves in order to preserve optimal health. According to Orem, self-care can improve anyone's health and wellbeing. The core concept of the theory is self-care agency, which is the ability of an individual to perform self-care activities to maintain their health and well-being (Alligood, 2014). The core of Orem's philosophy is the concept of self-care requisites, or the actions people must perform to sustain their

health and well-being. These comprise prerequisites for developmental self-care, health deviation self-care, and universal self-care.

All people share certain basic needs for self-care, like access to food, water, air, and a bathroom. Rest, play, work, and education are among the needs for developmental self-care that change as a person grows and matures. Individuals who are experiencing health problems and require professional assistance have specific needs for self-care related to health deviations (Alligood, 2014). Restoring Self-Care Demand is all of "self-care actions to be performed for a specific duration by using appropriate techniques and related action and operation sets to meet established self-care requirements." The deficit's ability to self-soothe indicates when nursing care is necessary. When an adult (or, in the case of a dependent, the parent or guardian) is unable to provide continuous, effective self-care, nursing becomes necessary.

Moreover, a nursing agency is a complex characteristic of people who have received nursing education and training and who are able to act, comprehend, and assist others in satisfying their therapeutic self-care needs through the creation or utilization of self-care agencies. The nursing system was created by a sequence of encounters between a valid client and a legitimate nurse. This system takes over and recommends clients to nursing when their need for therapeutic self-care is greater than what the self-care agency can provide. The self-care or self-care deficit theory of nursing is composed of three interrelated theories: the theory of self-care, the theory of self-care deficit, and the theory of nursing systems, which is further divided into categories of totally compensatory, partially compensatory, and supportive-educative.

2.9.2 Self-Care Requisites

All people need self-care to maintain their health and well-being, regardless of their age, gender, or particular medical concerns. Air, water, food, elimination, exercise, rest, social engagement,

solitude, and the promotion of normalcy are some examples of these prerequisites (Matney and Walker, 2019). These universal requirements must be met in order to promote general health and meet people's basic needs.

The activities that are necessary for developmental self-care vary depending on an individual's stage of development, maturity, and growth over the course of their life. These necessities include learning, working, playing, and sleeping; each of these changes as people move through different phases of life (Matney and Walker, 2019). Recognizing and adapting to these developmental requisites are essential in promoting lifelong self-care practices and supporting individuals at different points in their life journey. Health deviation self-care requisites are specific activities required by individuals experiencing health challenges or deviations from the norm.

These requisites encompass actions such as seeking professional medical assistance, adhering to prescribed treatments, managing symptoms, and adjusting lifestyle behaviors to address health conditions (Matney and Walker, 2019). Supporting individuals in meeting these health deviation requisites is essential in managing health conditions effectively and promoting recovery and well-being.

According to Dorothea Orem's Nursing Theory of Self-Care, self-care practices are essential for fostering people's independence, well-being, and overall health. Healthcare professionals can enable people to actively participate in their self-care routines and promote good health outcomes by identifying and addressing the universal, developmental, and health deviation self-care requirements.

2.9.3 Universal Self-Care Requisites

The significance of universal self-care requisites—basic actions required for people to maintain their health and well-being, is emphasized in Dorothea Orem's Nursing Theory of Self-Care. According to Orem, these prerequisites comprise necessary behaviors that are vital for every person, irrespective of age, gender, or health status (Alligood, 2019).

This theory's main focus is on the actions that people perform or carry out on their own initiative to safeguard their health, well-being, and lives. Self-relieving Requirements, sometimes known as prerequisites, are steps meant to facilitate self-care. There are three clusters made out of it. Human integrity, structure, and life processes are all dependent on the universal desire to practice self-care. the elimination of risks to people's lives, health, and wellbeing. encouraging human growth, letting people use their potential to function in social groupings, recognizing one's own shortcomings, and satisfying the requirement to fit in.

2.9.4 Theory of Nursing Systems

Dorothea Orem's Self-Care Deficit Nursing Theory incorporates nursing systems. For those who struggle to take care of themselves, these mechanisms are crucial to providing supporting care and assistance. The theory of nursing systems explains the components and structure of the nursing process to assist healthcare professionals in assessing, planning, implementing, and evaluating care interventions to satisfy the needs of individuals for self-care (Taylor, Lillis, Lynn, and LeMone, 2018). Using nursing systems theory, healthcare workers can tailor care interventions to each patient's specific self-care weaknesses.

Nurses can optimize health outcomes and improve the quality of care delivered by tailoring the nursing system to each patient's requirements and capacities for self-care. This methodical approach to care delivery guarantees tailored support, encourages self-care agency, and helps

people receiving nursing care acquire self-care competencies. An organized method of providing nursing care that is in line with the ideas of self-care deficit theory is provided by the theory of nursing systems, which is a fundamental component of Dorothea Orem's overall framework. Healthcare providers can fulfill people's needs for self-care, encourage independence and wellbeing, and build a cooperative relationship that enables people to actively engage in their care by using nursing systems (Taylor et al., 2018).

When we talk about normalcy, we mean what is fundamentally human, what is consistent with a person's genetic make-up, constitutional traits, and personal abilities. The idea of self-care agency, which describes a person's capacity to carry out self-care tasks on their own, is emphasized in Orem's theory. In the context of umbilical cord care, Orem's emphasis on self-care agency is in line with equipping mothers with the knowledge and abilities necessary to properly tend to the umbilical cord of their newborn. Orem's theory supports mothers in taking an active role in protecting their infant's health by teaching mothers about proper cord care practices, such as keeping the area clean and dry, using antiseptic solutions when needed, and recognizing signs of infection (Kacerovsky et al., 2013).

In instances where mothers require additional support or guidance in caring for their newborn's umbilical cord, Orem's theory of self-care deficit becomes relevant. Nurses and healthcare providers can identify instances of self-care deficits in umbilical cord care, where mothers may lack the knowledge, resources, or ability to perform the necessary care tasks. By assessing and addressing these deficits, healthcare professionals can intervene to assist mothers in managing umbilical cord care effectively, ultimately promoting the well-being of the newborn (Coffey and Brown, 2017).

By incorporating Orem's theory into umbilical cord care procedures, nursing interventions and health education play a critical role in promoting the health of expectant mothers and newborns. When it comes to teaching moms about evidence-based cord care techniques, keeping an eye out for infection symptoms in the umbilical cord, and advising mothers when to seek medical attention, nurses are invaluable. Healthcare professionals can equip moms with the information and abilities needed to support the best outcomes for their newborns by incorporating Orem's theory into neonatal care procedures (Padiyath et al., 2010).

Essentially, the Nursing Theory of Self-Care provides a useful framework for directing practices related to umbilical cord care, stressing the significance of mother empowerment, addressing deficits in self-care, encouraging health education, and building mother confidence in neonatal care. Umbilical cord care principle is guided by Orem self-care theory where the client is required to complete the care processes at home for full recovery, in this case the neonatal cord. However, there is care deficit in term of knowledge, and this is demonstrated using un-prescribed agents by mothers, their families and sometime traditional birth attendants.

2.10 Summary of literature review

The recently severed umbilical cord may serve as a conduit for bacteria that result in infant deaths from sepsis. By giving infants and their first week of life the best possible umbilical cord care, particularly in hygienic settings, preventable neonatal deaths may be avoided. According to a 2016 WHO report, the main causes of newborn fatalities are prematurity, low birth weight, infections, hypoxia, and delivery trauma. The majority of these fatalities occur in poorer nations with inadequate access to medical care. Studies reveal that moms in underdeveloped countries do not provide adequate care for their umbilical cords (Joel-Medewase et al., 2008; Cobo, Kacerovsky et al., 2013). Reducing avoidable neonatal mortality may be achievable by putting into practice the

best practices for umbilical cord care for infants and throughout the first week of life (Coffey and Brown, 2017; Padiyath et al., 2010). Studies conducted in Cameroon and Nigeria, two subregions of West Africa, demonstrated low levels of cord care practices among women. These findings underscored the importance of this practice given its association with increased risks of infections and infant mortality.

In the field of neonatal health, umbilical cord infection poses a serious challenge that calls for a coordinated and all-encompassing response to lessen its effects on morbidity and mortality. Our investigation has revealed the complexity of this issue by illuminating its underlying risk factors, pathogenic mechanisms, clinical manifestations, and possible therapeutic and preventive approaches. In the end, this research highlights the critical need for continued commitment and resource allocation to reduce the effects of umbilical cord infections, advance international efforts to lower neonatal mortality and morbidity, and highlight the significance of targeted interventions in addressing this crucial neonatal health issue. Our collective dedication to this vital cause is not only morally required, but also a critical first step toward achieving better newborn health and the creation of a more just and healthier world for all.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section explains the research design employed in conducting this study. It offers a comprehensive detail on the target population, sample size, data collection instruments and analysis, as well as issues of ethical consideration.

3.1 Study Setting

With an estimated population of 122,753, Salaga is the district capital of East Gonja District in Ghana's Savannah Region. Salaga played a significant role as a market town in the eighteenth and nineteenth centuries, especially in the slave trade, the local kola trade, and regulating Salaga granted the north and south a trading monopoly. Known for its diverse trade and multicultural population, Salaga, which is located in the southernmost region of the Sahel, earned the nickname "the Timbuktu of the south." Salaga and a few other cities were ruled by the formidable warrior kingdom known as the Gonja. Nonetheless, Salaga was home to indigenous Gonja as well as Hausas, Wangaras, Dagombas, Gurmas, and other regional tribes due to its cosmopolitan nature. Salaga features a hospital that acts as the primary referral facility for all of the nearby areas.

3.1.1 The Hospital Profile

The Salaga municipal hospital started as a clinic in the year 1952. In 1962, it received an upgrading to hospital status to perform its traditional roles of efficient delivery of health care based on health promotion, preventive, curative and rehabilitative care. The Salaga municipal hospital serves as a referral facility that provides expertise for comprehensive health services as well as technical

supervisory support in the clinical services to the sub-districts in the municipality. It serves as the base for organizing primary health care activities in the area. The health facilities in the salaga municipality includes The Salaga Municipal Hospital, The Salaga Health Centre, Florence Nightingale Maternity Home, Presbyterian Clinic, Precious Life Clinic, Catholic Primary Health Centre.

3.2 Study Design

The research employed a sequential mixed-method approach. The quantitative strand of this research adopted a retrospective design by examining historical data at the facility level to ascertain the prevalence of umbilical cord infection in the Salaga district. Secondary data on neonatal admissions at the Salaga Government Hospital was retrieved on umbilical cord infections between 1st January 2020 to 31st December 2022. Using an exploratory design, the study then applied a qualitative one-on-one interview method to collect data from nursing staff, mothers and traditional birth attendance to address the second part of the study objectives. A qualitative method provides a comprehensive and holistic understanding of umbilical cord infection by delving deeper into details. It allows researchers to explore the multifaceted aspects of this health challenge, encompassing epidemiological patterns, clinical outcomes, as well as the lived experiences, socio-cultural contexts, and healthcare-seeking behaviors of affected individuals and communities.

The qualitative research methods played a crucial role in allowing me to gain a deeper understanding of the complex and multifaceted dynamics surrounding umbilical cord care practices in the study site. By utilizing qualitative approaches in studying umbilical cord care, researchers can uncover nuanced insights, perspectives, and experiences that quantitative methods may overlook. In order to explore the belief systems, practices, and traditions that impact umbilical

cord care in the study site, a qualitative approach was chosen for the second part of the study. By conducting in-depth interviews, focus groups, and ethnographic studies, researchers can uncover cultural nuances, rituals, and customs related to cord care that shape maternal and neonatal health behaviors.

3.3 Study Population

Mothers with neonates (0 to 28 days) were the main target population of study, this study explored their knowledge in cord care and that attitude and practice towards newborn cords. However, traditional birth attendants, elderly women, were purposefully selected or interviews to address the question of traditional practices and perspective on cord care and infection.

For the purpose of this study, middle-aged women and above will be considered as women aged 60 years and above who have given birth and or do bath their grandchild. The middle aged and above women will be used because, the in the traditional parlance, older women are revered and therefore their advice are taken seriously, especially if the mother is an in law. They are therefore likely to carry some level of influence in the care of the newborn baby.

3.4 Sample size

Due to the multi-method approach, sampling was in two different stages. First, the sample size for the quantitative data was determined using the census approach where all neonatal cord infection records taken between 2021 and 2022 (amounting to a total of 73 cases) were considered. The second aspect of the study purposively sampled 20 qualitative participant (n=20); comprising, ten (10) mothers from the Salaga Municipal Hospital, five (5) Midwives and five (5) Traditional Birth Attendance upon reaching data saturation.

3.5 Data Collection Tools

Data extraction sheet was used to extract quantitative data. The secondary data was retrieved from the admission and discharge books from the peadiatric ward and the children welfare clinic of the Salaga Municipal Hospital. The qualitative data collection tools included an in-depth interview guide and tape recorders. The interview guide was designed for three groups; Mothers, Nurses\ Midwives and Traditional Birth Attendants.

3.6 Data Collection Process

Mothers with neonates with umbilical infections, elderly women, and traditional birth attendants (TBAs) were interviewed as key informants. Interviews was conducted one-on-one using open ended interview guide. The study involved two phases which comprises of a facility, or other suitable place located near the home or family of the juvenile, with services to the people, maintaining participation in their planning, operation, and evaluation. The two phases are used to allow for the estimation and determination of umbilical cord infections together with the risk factors and assessment of the existing traditional practices or perspectives on umbilical cord care in the Salaga District. The study design equally provided both clinical and cultural perspectives to the study, giving that health behaviours are influenced by multiplicity of factors including socio-environmental factors.

Mothers with neonates having skin and umbilical cord infections will be conveniently selected for focus group discussions (FDGs). A maximum number of five mothers with neonates having skin and umbilical cord infections were grouped in a conducive environment and in-depth FGDs were conducted.

Also, 15 middle-aged women and traditional birth attendants in households were purposively selected and interviewed one-on-one using an interview guide. These women must be residents of Salaga, must have lived in the community for a number of years and be knowledgeable in the social, and cultural practices of the community including child care practices. In furtherance, using a snowballing technique, traditional birth attendants were identified and a one-on-one in-depth interview conducted on neonatal skin and umbilical cord care practices.

The interviews were recorded and transcribed. People who speak the local dialects (Dagbani) were recruited to assist in the interviews and transcription. Notes were taken to reinforce the process. Each participant was seated and the interview was done face to face and it was in a discussion form. Each interview had a duration of 20-25minutes. The interview guide was an open-ended question which gave room for follow-up questions.

3.7 Data Cleaning and Organization

The primary qualitative data was recorded from respondents and later transcribed into codes and themes. The transcription enabled the transformation of spoken words into written form, which served as the primary data for analysis. After the transcription, the data was segmented into meaningful units such as codes or themes. These segments were labeled and organized to reflect different topics, responses, or perspectives related to umbilical cord practices.

With the secondary data, cross-checks were made to remove any duplicate entries in the dataset, ensuring that each data point is unique to maintain accuracy. Also, missing data were identified with the use of Microsoft Excel and were used to decide on how missing data were handled, which may involve imputation, deletion of records, or using statistical estimations based on the nature of the missingness.

3.8 Data Analysis.

Secondary data was retrieved from the Salaga Municipal hospital between 2021-2022 to identify the various communities with umbilical cord infections which were later statistically analyzed to and interpreted and cross-checks were made to prevent any duplicate entries from the dataset. Descriptive analysis was generated from the secondary data to identify the various umbilical cord infections from the Salaga Municipal Hospital from 2021-2022 respectively. Also, the quantitative data was analyzed with the use of Statistical Package for Social Sciences version 26 to calculate the prevalence of neonatal issues among mothers and their babies in the Salaga Municipal Hospital Results from the secondary data were then presented in graphs and charts for easy understanding.

The qualitative data was analyzed manually using the thematic approach. The use of thematic analysis was employed to come up with themes from the responses. Braun and Clarke (2006) define thematic analysis as a method for identifying, analyzing and reporting patterns within data. To ensure inter-rater/coder reliability, the transcriptions where coded by two different individuals after which the codes and sub-themes were compared and merged. As such several codes were derived from various research works and later put into themes. These themes were explained separately to fully understand the various themes generated through coding.

3.9 Ethical Consideration

The goals and purpose of the study were fully disclosed to each and every participant. Before collecting any data from these participants for the study, the researcher made sure they gave their consent. No third party was given access to the information or data collected from these participants.

The Department of Population and Reproductive Health, School of Public Health, University for Development Studies, and Regional and Metropolitan Health Directorates gave their approval for this study before it started. The Tamale Teaching Hospital's Institutional Review and Research Department granted ethical approval for this study as well; the reference number for this approval is TTH/ R and D/ SR/ 336/23. Ghana Health Service granted entrée certificate at the Salaga Municipality, with the following reference number; SR/EGM/ SH/RP/ 04/752/-23 which granted access to the study site for data to be collected. The study adhered to the ethical principles of the Helsinki Declaration. Both verbal and written consent were sought from participants and study sites. Participants' confidentiality and privacy were respected. Participation was strictly voluntary and withdrawal at any time from study was without sanctions.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the study's findings in relation to its objective. The extracted data were presented in Tables where necessary. The in-depth interviews are also presented in common with verbatim quotes.

4.1 Descriptive Statistics

The study found that thirty-eight (39) of the babies, representing 53.4% were males and 34, representing 46.6% were females. Babies who reported infections of their cord were aged 0 to 21 days. Majority (52.1%) of the babies were 1-5 days old while 2.7% were 0 day old. Mothers' age ranged from 15 to 35 years. However, most of the women were 25-34 years as shown in Table 4.1.

Table 4.1 Demographic Characteristics of Respondents

Variable	Category	n (%)
Child's gender	Female	34 (46.6)
	Male	39 (53.4)
Child's age (days)	0	2 (2.7)
	1 to 5	38 (52.1)
	6 to 10	21 (28.8)
	11+	12 (16.4)
Mother's age	15-24	33 (45.2)
	25-34	36 (49.3)
	35+	4 (5.5)

4.1.1 Community distribution of cord infection

The Figure 4.1 illustrates the community distribution of cord infection in Salaga Municipal. Out of 73 neonates and 13 communities, the community with most cord infection was Salaga, a total of 29 cord issues representing 38%, followed by Lonto, a total of 5 representing 7% and the rest as follows.

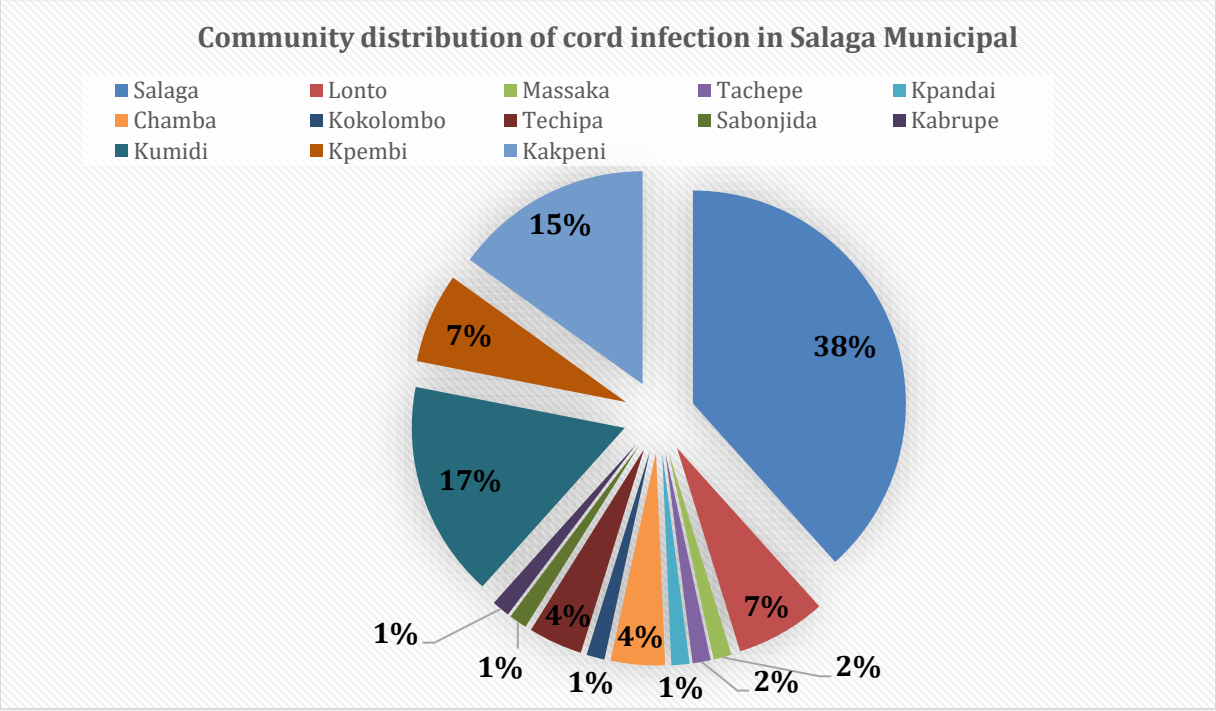


Figure 4.1 Community distribution of cord infection in Salaga Municipal

4.2. Diagnosis from the cases between 2021-2022 in the Salaga Municipality

The figure below illustrates the diagnosis from the cord cases between 2021-2022 in the Salaga Municipality. Out of seventy-three (73) babies, forty-three (43) representing 59% of babies were diagnosed of Cord Sepsis, ten (10) representing 14% of babies were diagnosed of a Bleeding Cord and twenty (20) representing 27% were diagnosed of Cord abscess.

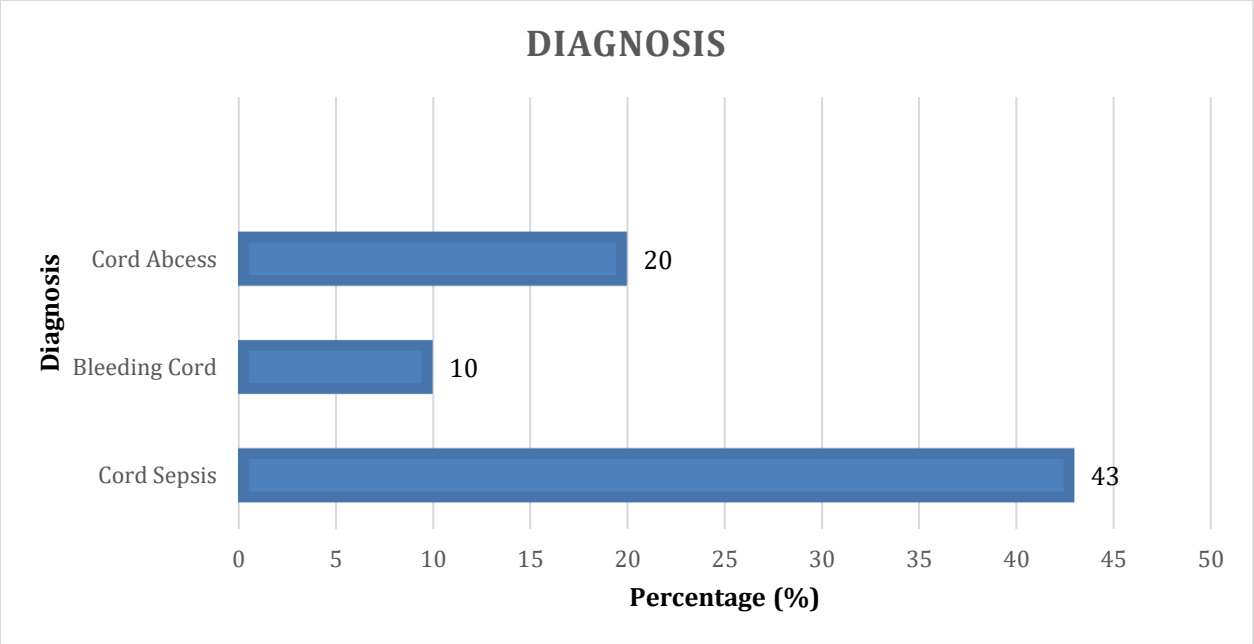


Figure 4.2 illustrates the diagnosis from the cases from 2021-2022 in the Salaga Municipality

4.3 Prevalence of Cord Infection

In 2021, there was a total birth of 1781 of which 31 babies were diagnosed representing 1.74% and in 2022, a total birth of 1754 of which 42 babies were diagnosed with Umbilical cord infections representing 2.39%. Overall, the prevalence of Umbilical cord infections over the period under study was 2.07%. Table 4.2 shows the widespread of Umbilical cord infections from 2021-2022 in the Salaga Municipal Hospital.

Table 4.2. Prevalence of Umbilical cord infections in Salaga Municipal hospital.

Year	Total Birth	Males	Females	Cord infection	Percentage
2021	1781	955	826	31	1.74%
2022	1754	944	810	42	2.39%
Total	3535	1899	1636	73	4.13%

4.4. The Qualitative Results

The study identified that 57.1% of the respondents were 14-35 years while 42.9% were 36+ years. Most of the respondents (33.3%) had 1 child but 38.1% of them have had 2 pregnancies. There were 3 (14.3) TBAs involved in the study. The mothers or caregivers were cleaners (9.5%), farmers (14.3%), House wife (23.8%), student (4.8%), traders (19.0%), and unemployed (14.3%).

From the in-depth interviews and focus group discussion, themes emerged and reported below with verbatim quotes from the midwives, traditional birth attendants (TBAs) and mothers of neonates, thus, perceived healing abilities, inadequate cord care knowledge, cost of care and trust reasons**,** inadequate hospital care due to early discharge, provision of wider household education, and the use unorthodox methods local agents.

Table 4.3 Attributes of Traditional Birth Attendants and Care Givers Interviewed in Salaga

Variable	Category	n (%)
Age group	14-35	12 (57.1)
	36+	9 (42.9)
Parity	1	7 (33.3)
	2	6 (28.6)
	3	4 (19.0)
	4	1 (4.8)
	6	2 (9.5)
	7	1 (4.8)
Gravidae	1	4 (19.0)
	2	8 (38.1)
	3	4 (19.0)
	4	2 (9.5)
	7	2 (9.5)
	8	1 (4.8)
Employment status	Cleaner	2 (9.5)
	Farmer	3 (14.3)
	House Wife	5 (23.8)
	student	1 (4.8)
	TBA	3 (14.3)
	Trader	4 (19.0)
	Unemployed	3 (14.3)

Table 4.4 Summary of qualitative results

Themes	Sub-themes
Traditional and Local Practices in Umbilical Cord Care	Perceived Fast Healing Abilities
	Use of Unorthodox Methods and Local Agents
	Cost of Care and Trust in Traditional Birth Attendants (TBAs)
Knowledge Gaps and Misconceptions	Inadequate Cord Care Knowledge
	Risks of Infection Due to Inappropriate Agents
Healthcare System Challenges	Inadequate Hospital Care Due to Early Discharge
	Provision of Wider Household Education

Theme 1: Traditional and Local Practices in Umbilical Cord Care

Perceived fast healing abilities

Umbilical cord care is critical in maintaining babies' optimal recovery and well-being. The umbilical stump, which remains linked to the newborn for one to three weeks after birth, necessitates prompt treatment to promote rapid healing and reduce the risk of infection. Mothers claimed that healing agents like Pepsodent helps the cord to fall faster as compared to the prescriptions given by health practitioners and this was a motivation for using tooth paste.

> *"I mostly use Pepsodent and Shear Butter for my baby's Cord because I know, the pepsodent help the cord to be removed faster than the prescribed ones given to us by a health practitioner".* **Mother 1**

By maintaining appropriate moisture levels, toothpaste can support the healing process, prevent excessive drying, and promote faster healing. Other women also use share butter after cleaning the cord stump. A second mother explains.

"I use hot water to clean the wound then I use Shea butter with the local salt to apply on the cord". **Mother 2**

"I use pepsodent but the nurses told us it is dangerous to be used but it gives faster healing process and ever since I started using Pepsodent, I haven't encountered any challenges so I always use pepsodent". **Mother 3.**

"I mostly use the Shea butter in cleaning the cord because it mostly works faster aside the prescribed one by the health practitioner, I also use Pepsodent". **Mother 4.**

The above responses indicate that despite the dangers surrounding the use of local agents, they focus on the fastness of the cord than the consequences. Infections can pose serious health risks and potentially result in long-term consequences. Most women use local agents because they heard it works faster than those prescribed by health practitioners.

The mother may experience guilt, worry, or anxiety due to causing harm to her baby, while the baby may experience discomfort and pain from complications arising from improper care.

"Pepsodent heals quickly but health care practitioners advise not to use but we use it at home where no one is around because of faster healing. Even though sometimes I feel anxious, but it doesn't last longer". Mother 5.

To mitigate the negative effects of using inappropriate local agents on umbilical cord care, it is crucial for healthcare providers to educate mothers and caregivers about evidence-based guidelines.

Use of unorthodox methods and local agents

TBAs have been present in many cultures and communities for centuries, serving as important healthcare providers, especially in areas with limited access to formal healthcare systems. In some regions, TBAs play a significant role in assisting women during pregnancy, childbirth, and the postpartum period. They often possess deep knowledge of local cultural and traditional practices, which they incorporate into their care. The researcher asked TBA's the medicine which is mostly applied to the cord after birth. From the responses, it was shown that most TBA's implement the idea of local agents such as leaves, shea butter, and other agents which they have been using throughout their delivery as TBA's.

> *"Mostly after cutting with knife or blade, I mostly use hot water for approximately, 2 weeks. You have to apply continuously for 2 weeks. This helps reduce the pain whiles the hot water makes the sore to heal faster. For me, this the best and I haven't had any problems ever since I started using it".* ***TBA 1***

> *"Many people use other agents for treating the cord but for me I only shea butter in treating the cord. I apply the shea butter every day till the cord falls down. Most at times, different agents such as* herbs, powders, pastes *cause infections with the cord so I only use the shea butter in treating the cord".* ***TBA 2***

This indicates that most TBA's have little knowledge on the medicine prescribed by most health practitioners and have resorted to using local agents in the treatment of the cord. From the respondents, it is known that traditional practices for cord care vary across communities and cultures. Local agents, such as teeth paste are sometimes used by TBAs to promote healing, reduce infection risk, and aid in drying and separation of the umbilical cord.

The use of local agents in cord treatment is a traditional practice that has been passed down through generations. However, the scientific evidence regarding the efficacy and safety of these practices is limited, and there may be potential risks associated with their use, such as infection or delayed healing. Most TBA's have their own method of treating an infected cord. The researcher asked TBA's about how they care for a baby with an infected cord and from the respondents it was shown that cord treatment differs from one TBA to another. With the question on whether TBA's conduct delivery often and what role do you play in children, respondents answered as follow:

> *"I get about fifteen to twenty deliveries in a month mostly from the Fulani community, I do get delivery contract from other surrounding communities nearby since I am the only traditional birth attendant in this area".*

By addressing the question on how normally TBA's care for the cord after conducting the childbirth process, it was revealed that:

> *"Immediately after delivery, I measure about the height of my fore finger, and tired with a black tread and cut with a blade. I then bath the baby with lukewarm water and dress the fresh cord with shea-butter, Pepsodent or herbal preparation I make depending on how the cord looks. The babies which come with bigger cords I use Pepsodent with a local salt so it can shrink and fall faster".* TBA 2

With the question asked about some challenges TBA's encounter with neonatal cord care, it was revealed that:

> *"Mothers who eat sugar, eggs, and certain type of meat, their babies come with bigger cord and sometimes bleed after delivery. These are mothers who don't listen to my advice. Another difficulty I face is that sometimes they call me for delivery when the baby's head*

is almost in the virginal, it makes me to rash the delivery process due to that I sometimes receive the baby with my hands. The last challenge I get is that the mothers don't go to the hospital to check their blood and they don't come to me for blood medicine, this makes them to bleed uncontrollably after delivery and I sometimes lose the baby or the mother". TBA 4

With regard to how TBA's detect/diagnose cord infections in new borns, it was revealed that:

"They come with bleeding from the cord stump, they also come with white water (puss exudates) from the cord or sometimes I see the area around the cord getting dark or greenish. This causes the cord stump not to heal in time" TBA 2

With regards to how TBA's manage infection of the cord stump, the study participant explained as follows.

"I have herbal preparation that I have been using to treat the cord infection. Or I buy Pepsodent, Kawa, orange leaves and miss them together with the skin of reptile to treat the infected cord. For that one, we usually call it black medicine. We mostly catch frog and other reptiles and remove their skin, burn it with palm oil and apply on the infected region. It's a matter of local treatment and it's really works faster as compared to the once prescribed by Health Practitioner's". TBA 1

"I get about twenty to twenty-five deliveries in a month. Immediately after delivery, I tire the cord with a tread and cut with a sharp knife, I clean the baby with clean cloth, and apply shea-butter on the cord stump before I clean the mother. Other times if the cord looks greenish, big, or bleed excessively, I make a herbal preparation to stop the bleeding. Or better still I mostly use leaves in treating the cord. That is, I go to the farm, get some leaves,

grind it and apply it on the umbilical cord and within 3-4 days, the problem is solved. When I apply that on the cord, the infection no longer pops up again. (But I can't tell the particular leaves I use)" TBA 2

"Immediately after delivery I hold the cord with the scissors the hospital gave me (forceps) and I measure with a ruler my trainer gave me before I cut. I bath the baby with hot water and dress the cord with the hot water and I apply a medicine the trainers gave me (chlorhexidine cream, or spirit). However, if the baby looks yellow or has a weak cry, I then use my herbal preparation before I refer them to the hospital if it is worse. Some of the challenges I encounter is that I don't have enough money to be sending the equipment's I use in delivery babies to the hospital for proper cleaning (auto claving) as my trainer taught me. So, I boil the things in hot water and dry then reuse when the need arises". TBA 3

From the responses gathered, it was seen that every TBA prefers what she thinks it's best for her ever since she started delivering babies. Some think the best agent in treating an infected cord is leaves, others think black medicine where they burn a frog with palm oil and apply it on the cord for faster treatment.

TBA encompasses the traditional care and support provided by individuals within communities who lack formal medical training. Cord treatment practices vary across cultures, with some TBAs using local agents. However, the utilization of local agents should be approached with caution, considering potential risks and the importance of evidence-based practices in promoting optimal maternal and newborn health. The integration of TBAs into formal healthcare systems through training and supervision can help strike a balance between cultural practices and ensuring safe and quality care during childbirth.

Cost of care and trust reasons

Mothers from the Salaga municipal shared that regardless of the education they receive from health practitioners, it is advisable to consult a Traditional Birth Attendant (TBA) for faster healing. TBAs often have longstanding relationships with the communities they serve. Mothers may have a personal connection, trust, or familiarity with a TBA, making them more comfortable seeking their assistance for umbilical cord care, especially if they have prior positive experiences or recommendations from other community members. In certain situations, seeking the services of TBAs may be more cost-effective for mothers compared to formal medical care. This can be particularly relevant in communities with limited financial resources or where formal medical services are expensive or inaccessible. Some mothers may have grown up in communities where traditional practices for umbilical cord care are commonly followed. They may prefer to continue these practices for cultural or personal reasons, leading them to seek TBAs who are knowledgeable about and experienced in traditional methods.

> *"I consult both a herbalist and a health practitioner for advice, but for me I prefer a Traditional birth attendant because I know them well and they don't charge much".* **Mother 9.**

> *TBA's gave me medicine throughout my pregnancy. They take care of me after birth and my babies as well. Using their medicines on my baby's cord has never given me any problem before, my baby brought me to the hospital because, he is a weak child".* **Mother 10**

One of the interviewees made it clear that mothers should consult both a herbalist and a health practitioner for advice but to her, she prefers a TBA because she knows them well and they don't

charge much. Consulting with qualified healthcare professionals, such as doctors, midwives, or nurses, who can provide evidence-based care is crucial to minimize potential risks and ensure the well-being of both the mother and the baby. Every situation is unique, and it's important to make informed decisions based on reliable information and the best interests of both the mother and the baby.

Theme 2: Knowledge Gaps and Misconceptions

Inadequate cord care knowledge

Improper umbilical cord care due to lack of knowledge can increase the risk of infection for both the mother and the baby. When the umbilical cord stump is not handled properly, bacteria can pass through the site and cause infections such as umbilical cord infections or omphalitis. These infections can be serious and lead to complications if not treated promptly. Mothers from Salaga Municipalities demonstrated lack of knowledge or understanding with regards to handling of umbilical Cord and insisted that local and crude methods be applied in cord care with some level of pressure from family members.

Two mothers explain their situation, thus,

> *"I think that irrespective of the one prescribed by the hospital, you should also go for the local ones for faster fall of the cord".* **Mother 6.**

> *"...the herbal concussion is said to be dangerous, but my mother in-law forces me to use it, though I know the hospital medicine is the ideal but if I refuse my mother in-laws medicine and something happens, I can't bear the family pressure. So, I just have to use what I am giving".* **Mother 7.**

The above information demonstrates that mothers do lack understanding on the effect of using other agents rather than the one prescribed by a medical practitioner and due to that they have experienced many challenges as a result of their lack of understanding.

Lack of knowledge regarding the ingredients and proper usage of local agents can increase the risk of allergic reactions in either the mother or the baby. Some local agents may contain substances that can result in skin irritations, rashes, or other allergic responses. It is important to have the necessary knowledge to select safe and suitable products for umbilical cord care to avoid such reactions. When proper care practices are not followed, the healing of the umbilical cord stump can be delayed.

Risks of infection due to use of inappropriate agents

Umbilical cord care is a critical aspect of newborn care, aiming to facilitate the healing and prevention of infection at the site where the umbilical cord was attached. Over the years, various practices and agents have been recommended for cord care, but not all of them are appropriate or safe

These inappropriate agents can introduce harmful bacteria or irritants, increasing the risk of neonatal infections and resulting in adverse outcomes for the newborn. The question asked was "What are some of your experiences with Cord among mothers?"

> *"For my experience of cord infections is that mothers mostly use bitter salt in order for the cord to fall faster".* **Midwife 1.**

> *"It has been so much overwhelming when it comes to Cord care in the municipality because most deliveries come from TBA's and before they get here, the cord is already being infected. Due to this, we sometimes have to intervene surgically because they try removing*

the cord physically by themselves and even with the use of local agents which is not always prescribed." **Midwife 2.**

The widespread use of inappropriate agents can perpetuate ineffective practices, hindering the adoption of evidence-based care guidelines. This can lead to fragmented or inconsistent care approaches, especially in communities where cultural practices heavily influence newborn care practices.

Theme 3: Healthcare System Challenges

Inadequate hospital cares due to early discharge

Umbilical cord care is a crucial aspect of newborn care, and it does not only involve the physical management of the umbilical stump but also provides an opportunity for healthcare providers to offer guidance, support, and education to mothers. Adequate time and attention are essential for healthcare providers to answer questions, address concerns, and provide reassurance, helping mothers develop confidence in caring for their newborns.

"When a woman delivers, cord care is done for mothers to see in order for them to know and I advise mothers to wash hands thoroughly before working on the cord and are allowed to go home". **Midwife 1**

"Initially, the hospital has to bath the baby before discharging them but looking at the protocols here, that policy is not always looked at. 6 hours after delivery, you must go home due to lack of beds and water in the hospital. So, we give chlorhexidine to the mother educating them on what to do but most of them go without obeying what health practitioners say because they have their own formulas or agents which they see it to be the best for a cord to fall". **Midwife 2.**

Limited interaction may hinder the establishment of a strong nurse-mother relationship, potentially leading to reduced satisfaction with the care received. Effective communication, empathy, and emotional support are foundational elements in building trust and facilitating a positive healthcare experience.

Provision of wider household education

Umbilical cord care is a crucial aspect of newborn care that requires proper knowledge and skills to ensure the well-being of both the infant and the mother. Comprehensive education plays a pivotal role in equipping mothers with the necessary understanding and competence to confidently provide optimal care for their newborn's umbilical cord. The researcher asked why it was important for mothers to care for the umbilical cords. From the responses, it was shown that **e**ducation empowers mothers by providing them with knowledge and practical skills related to umbilical cord care. By understanding the purpose of umbilical cord care, mothers can appreciate the importance of practicing appropriate hygiene, recognizing signs of infection, and ensuring a safe healing process. Education can also dispel common misconceptions and cultural practices that may be harmful or ineffective, enabling mothers to make informed decisions regarding their newborn's health.

> *"Mothers should always seek health practitioners to prevent cord infections. Education should be given more on the causes, effects and dangers of cord infections before a mother is discharged to go home."* Midwife 1

> *"There's a saying that when you throw a stone to a wall, it comes back to you. Our workload is overwhelming and making these mothers come back to add their issues to our workload is so frustrating, therefore educating them is extremely important. Educating*

them shouldn't be only the mother but relatives should all be involved in the education with regards to cord care so that when they go home, they don't come back and increase our tasks here, so it is very important to educate them". Midwife 2.

Increased education for mothers in umbilical cord care brings numerous benefits. Firstly, it fosters a sense of confidence and self-efficacy, enabling mothers to actively participate in their newborn's care.

The lack of quality time for mothers by nurses and midwives during umbilical cord care poses significant challenges and implications. Addressing this issue requires a concerted effort to allocate adequate time, enhance communication skills, and prioritize personalized care. By enhancing the nurse-mother relationship and optimizing educational opportunities, healthcare providers can better support mothers in providing optimal care for their newborns.

CHAPTER FIVE

DISCUSSION

5.0 Introduction

In this chapter, the study results are discussed and presented. The discussion considered the findings in their uniqueness while drawing comparison to similar existing studies. The Chapter also has the summary of the study and conclusion thereof.

5.1 Socio-demographic characteristics of respondents

In the analysis of the secondary data, male neonates apparently recorded more of neonatal cord infection compared to their female counterpart and this is intriguing as studies elsewhere explains the dynamics keenly. For instance, there was evidence of gender bias in a pooled sample of Bangladesh and Nepal, where female infants were less likely than male infants to receive sanitary cord care. The consequences of potential gender bias in newborn care procedures in Nepal, was stated that female infants were more likely than male infants to have cord infection (Mullany et al. 2010). More research is necessary in light of this gender bias evidence, as well as potential focused behavior modification and counseling initiatives. Babies who reported infections of their cord were aged 0 to 21 days. Majority (52.1%) of the babies were 1-5 days old while 2.7% were 0 day old According a report, the mean age at which a neonatal umbilical cord infection first appears in term infants is five days; however, in premature infants, it only appears three days earlier (Vinmec Healthcare system, 2019). Mothers' age ranged from 15 to 35 years. However, most of the women were 25-34 years (Mahama et al., 2018).

5.2 Prevalence of Umbilical Cord Infection

Overall, this study found that cord infection was 2.07% prevalent between 2021 and 2022, using the available records. Although, the source and validity of the data remain at the facility level and was beyond the scope of this study, the prevalence is quite significant, coming from the total diagnoses cord infection of 73 in absolute terms. Also important to note was that cord infection increased between 2021 and 2022 using the data available to this study. The study found a 0.65 percentage point increase in neonatal cord infection between 2021 and 2022 in the study site.

Newborn survival is a major objective on the global health agenda and a high priority for programs that attempt to ensure child survival (Carvajal-Aguirre et al., 2017). It is difficult to persuade families that these methods put the newborn at risk of infection, especially if the grandparents don't agree (Okpaleke et al., 2019). The study found that most of the newborns with cord issues were diagnosed with cord sepsis while few of them were diagnosed with a bleeding cord and cord abscess. Neonatal sepsis continues to be a major cause of morbidity and mortality (Mitul, 2015; Agrawal et al., 2012).

Other studies also reported that in developing nations with high rates of harmful cord care practices, newborn sepsis and mortality rates persist (Mallick et al., 2019; UNICEF, 2021). Overall, the prevalence of Umbilical cord infections over the period under study was 2.07%. This showed that there was an increase in Umbilical cord infections among babies in the Salaga Municipality. In a study by Mahama et al. (2018), only about 36% of 418 newborns had safe cord care in Lawra district of Ghana. Of the 17,198 infants in a study in Pemba Island, Zanzibar, and Tanzania, 954 (5.5%) developed omphalitis within seven days of their birth (Mullany et al 2009). This highlights the occurrence of problems related to umbilical cord care. Understanding the prevalence of umbilical cord infections is crucial for healthcare providers and policymakers in

Salaga to develop targeted strategies, enhance healthcare services, and improve neonatal health outcomes within the municipality. Recognizing and addressing the prevalence of these issues, efforts can be directed towards reducing complications, promoting optimal umbilical cord care, and ultimately enhancing the well-being of newborns in the Salaga Municipality.

5.3 Umbilical cord care practices among mother and care givers of neonates

Umbilical cord care is a critical aspect of newborn care, aimed at promoting the healing of the umbilical stump and preventing infections. This study found that mothers and caregivers use healing agents like Pepsodent, Shear Butter, hot water and Shea butter with the local salt to help the cord to fall faster as compared to the prescriptions given by health practitioners.

Lack of knowledge and education regarding the ingredients and proper usage of local agents can increase the risk of allergic reactions in either the mother or the baby. Local agents may contain substances that can result in skin irritations, rashes, or other allergic responses. Saaka and Iddrisu (2014) also found that to speed up the healing process of the cord stump, there are several methods that are used by mothers and caregivers including: shea butter, methylated spirits, shea butter mixed with powder, "Akpeteshie," a local alcoholic beverage, grounded shea nuts, and shea butter mixed with amoxicillin. It is important to have the necessary knowledge to select safe and suitable products for umbilical cord care to avoid such reactions.

Toothpaste typically contains various ingredients known for their antimicrobial properties, such as fluoride and triclosan (Prakash et al., 2022). Umbilical cord care practices among mother and care givers of neonates in Salaga district revealed that umbilical cord care is critical in maintaining babies' optimal recovery and well-being. The umbilical stump, which remains linked to the newborn for one to three weeks after birth, necessitates prompt treatment to promote rapid healing

and reduce the risk of infection. Understanding the procedures that promote rapid healing is critical for providing good umbilical cord care and increasing baby health outcomes. Mothers from Salaga also demonstrated that healing agents like Pepsodent helps the cord to fall faster as compared to the ones prescribed by health practitioners.

According to research, toothpaste often contains hydrating agents, such as glycerol or sorbitol, which help to keep the umbilical stump moisturized (Samuel et al., 2022). According to Kapoor et al. (2021) it was shown that toothpaste, when applied to the umbilical stump, effectively reduces the microbial load and inhibits the growth of pathogenic bacteria. In their research, it was demonstrated that the use of local agents without proper understanding or following evidence-based guidelines can increase the risk of infections in both the mother and the baby. Sacks et al (2021) similarly stated that local agents that are not sterilized or are contaminated can introduce harmful bacteria to the umbilical cord site, leading to infections such as omphalitis or neonatal tetanus.

5.4 Knowledge of mothers and care givers on umbilical cord care and infections

The study found that mothers and caregivers are ignorant on the effect of local application of the neonatal cord, thus, the constant practice of applying local and unapproved agents such a Pepsodent tooth paste. With regard to the negative effects of using local agents in umbilical cord. Their lack of appreciation regarding the negative effects of using local agents in umbilical cord care can have significant detrimental effects on both the mother and the baby. Education, adherence to evidence-based guidelines, and close monitoring of the healing process are crucial in ensuring optimal care, promoting healing, and preventing complications. It is essential for healthcare professionals to provide guidance and support to mothers and caregivers to ensure the well-being of both the mother and the baby during this critical period.

Generally, the study found that the mothers and caregivers have poor knowledge on umbilical cord care. This finding is similar to other studies conducted in South India (Padiyath, et al., 2010) and Nigeria (Osuchukwu et al., 2017; Ndikom et al., 2020). Lack of knowledge among mothers may result in practices that hinder the natural healing process, such as excessive cleaning or using inappropriate local agents. This can lead to a longer healing time and potential complications, prolonging discomfort for both the mother and the baby. To prevent these negative effects, it is crucial to have accurate knowledge and understanding of umbilical cord care. Seek information from reliable healthcare professionals, such as doctors, nurses, or midwives, who can provide guidance based on medical expertise. However, the respondents' differing educational backgrounds, the accessibility of health information, the place of delivery, their cultural affiliations, and their place of residence, among other factors, could all be contributing factors to the variation in knowledge regarding cord care (Afolaranmi et al., 2018). They can educate you on proper care practices, such as keeping the area clean and dry, using mild soap if necessary, and avoiding excessive manipulation or application of unnecessary substances.

The study shows that inadequate cord care knowledge played an important role when it comes to umbilical cord practices moist mothers after interviewing midwives. It is crucial to understand the factors driving the use of inappropriate agents to develop targeted interventions that promote safe and evidence-based umbilical cord care practices. The use of inappropriate agents in umbilical cord care presents significant implications and challenges for neonatal health. Understanding the factors driving such practices and exploring potential solutions is crucial for improving newborn care outcomes (Coffey and Brown 2017).

5.5 Traditional perspective on Umbilical Cord Care

Despite multiple studies showing that cutting the chord with a clean device is common, traditional techniques of cutting with dirty objects still exist (Sitrin et al. 2017; Coffey and Brown 2017). For example, the umbilical cord is sometimes cut against a rupee in Nepal, which is considered a "good luck currency" and is typically dirty. Birth kits in Nepal presently include a sterile plastic coin in honor of this deeply rooted ritual (PATH 2002; Sharma et al. 2016). Other stories state that cutting the chord with a sickle or knife is common in Bangladesh and Nepal; the instrument can be put next to the woman on a filthy mat, the floor, or even a banana leaf (Sharma et al. 2016; Darmstadt 2006).

However, Traditional/local perspective on umbilical cord care in Salaga Municipality showed that most mothers prefer TBA's to health practitioners in the Salaga Municipality. These materials are applied to the cord regardless of whether the birth occurred at home or in a medical institution; in the event that the birth occurred in a facility, a substance would be applied to the cord when the child was brought home (Coffey and Brown 2017). Given the possible hazards that TBA's delivery procedures offer to infant health, especially with regard to infections and umbilical cord care, these practices have drawn criticism.

Evidence-based interventions are necessary to enhance mother and newborn health outcomes, as research has demonstrated the effect of TBA practices on the occurrence of neonatal cord infections. Lawn et al. (2009) showed that TBA-delivered births are associated with a higher risk of neonatal infections, including umbilical cord infections, due to practices that may compromise hygiene standards and increase the likelihood of bacterial contamination. From the research, it was revealed that most TBA's have their way of working around pregnant women and have a skill of delivering babies which at the long run cause umbilical cord infections. Padiyath et al. (2010)

similarly stated that most TBAs are not equipped with the knowledge and abilities needed to tend to the umbilical cords of the babies. Again, it was revealed that TBA's have little knowledge on the medicine prescribed by most health practitioners and have resorted to using of local agents in the treatment of the cord. However, traditional practices for cord care vary across communities and cultures.

On the other hand, the study found that mothers prefer to use the services of TBAs due to their cost effectiveness, trustworthiness and sense of responsibility. Other studies reported similar findings that as compared to certified midwives, TBAs are more compassionate and caring (Awotunde et al., 2017; Sialubanje et al., 2015; Ebuehi and Akintujoye, 2012). Mothers also feel that upon arriving at the clinic, the midwives will be yelling at you as though you are ignorant (Allou, 2018). Similarly, Okafor et al. (2014) indicated that TBA offers the use of herbs, which are thought to be beneficial and speed up the healing process.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

In this chapter, the study draws conclusions to the findings and suggests various recommendations for future researchers, caregivers and policy makers

6.1 Summary

In sum, this study sought to research into how wide spread umbilical infection is in the Salaga District given its records of neonatal cord infection. Specifically, the study addressed four objectives such as prevalence of cord infection in Salaga district, umbilical cord care practices among mother and care givers of neonates in the Salaga district, assessed the knowledge of mothers and care givers on umbilical cord care and infections in Salaga municipality and explored the traditional/local perspective on umbilical cord care in Salaga Municipality.

Contingent to the study objectives, a mixed method approached was used; first employing quantitative methods to estimate the prevalence of cord infection in the study area and then using a qualitative interview technique to collect data from mothers, nursing staff and traditional birth attendants for a thematic analysis.

Mitigating the risks associated with inappropriate umbilical cord practices and traditional birth attendance necessitates a multifaceted approach. Education and awareness campaigns targeted at expectant mothers and their families are crucial to impart evidence-based cord care practices and dispel misconceptions regarding beneficial but harmful substances applied to the umbilical cord. These initiatives should underscore the importance of following aseptic techniques and seeking

skilled birth attendants for safe deliveries, thereby reducing the risk of complications such as bleeding cord, cord abscess, and cord sepsis.

The study found that 53.4% were males and 46.6% were females. Babies who reported infections of their cord were aged 0 to 21 days. Majority (52.1%) of the babies were 1-5 days old while 2.7% were 0 day old. Mothers age ranged from 15 to 35 years. Out of the seventy-three (73) babies with umbilical cord infections, 59% of babies were diagnosed of cord sepsis, 14% of babies were diagnosed of a bleeding cord, and 27% were diagnosed of cord abscess. Overall, the prevalence of umbilical cord infections over the period under study was 2.07%.

Mothers claimed that that healing agents like Pepsodent helps the cord to fall faster as compared to the prescriptions given by health practitioners and this was a motivation for using tooth paste. These inappropriate agents can introduce harmful bacteria or irritants, increasing the risk of neonatal infections and resulting in adverse outcomes for the newborn. Mothers from Salaga Municipalities demonstrated lack of knowledge or understanding with regards to handling of umbilical Cord and insisted that local and crude methods be applied in cord care with some level of pressure from family members.

Furthermore, it was that mothers may have a personal connection, trust, or familiarity with a TBA, making them more comfortable seeking their assistance for umbilical cord care, especially if they have prior positive experiences or recommendations from other community members. In certain situations, seeking the services of TBAs may be more cost-effective for mothers compared to formal medical care. Adequate time and attention are essential for healthcare providers to answer questions, address concerns, and provide reassurance, helping mothers develop confidence in caring for their newborns.

Again, the study identified that TBAs play a significant role in assisting women during pregnancy, childbirth, and the postpartum period. They often possess deep knowledge of local cultural and traditional practices, which they incorporate into their care. The TBAs implement the idea of local agents such as leaves, shea butter, and other agents which they have been using throughout their delivery as TBA's.

6.2 Conclusion

The study found that umbilical cord infections prevalence was high in the study area and that the prevalence increased in percentage point of 0.65% between 2021 and 2022. This presents a significant threat to the lives of the neonates. Majority of the neonates with umbilical cord infections suffered from cord sepsis while few others suffered from bleeding cord and cord abscess. The multifaceted nature of umbilical cord practices, encompassing the use of agents such as Pepsodent, leaves, shea butter, and shea butter with salt.

It was also found that there was inadequate cord care knowledge among mothers. Mothers also relied more on traditional birth attendants due to personal connection, trust, or familiarity reflects a critical nexus of challenges that significantly contribute to adverse outcomes. Cost-effective for using TBAs as compared to formal medical care and inadequate time and attention are essential for healthcare providers to answer questions, address concerns, and provide reassurance, helping mothers develop confidence in caring for their newborns contributes to umbilical cord infections. The implications of these challenges underscore the urgent need for comprehensive interventions, education, and community engagement to rectify these critical issues and ensure the optimal health of newborns.

6.3. Policy Implications

From the findings of this study, it is critical to perhaps develop and implement standardized cord care protocols that align with evidence-based guidelines and best practices. These protocols should outline clear procedures for cleaning, handling, and monitoring the umbilical cord stump, emphasizing aseptic techniques, cleanliness, and early identification of infection signs. By establishing uniform protocols across healthcare facilities, communities, and maternity care settings, policymakers can ensure consistent and quality care for newborns, reducing the risk of cord infections.

It also important for the Ministry of Health policy and planning department to policy to launch comprehensive health education programs targeted at expectant parents, caregivers, community health workers, and healthcare providers to raise awareness about umbilical cord care practices. These programs should focus on educating individuals on proper cord care hygiene, recognizing signs of infection, and seeking prompt medical attention when necessary. By promoting health literacy and empowering individuals with knowledge, policymakers can enhance community engagement, encourage adherence to recommended care practices, and ultimately decrease the incidence of umbilical cord infections.

The nursing and medical care groups can also be helpful by introducing an integrated umbilical cord care education and services into maternal and child health programs, antenatal care visits, and postnatal care initiatives. Although this is probably already part of antenatal care services, it is important to prioritize this and be sure that all mothers discharged home after child birth receive adequate information on cord care and this is evaluated during postnatal care periods. By embedding cord care counseling, demonstrations, and follow-up assessments into routine maternal and child health services, policymakers can ensure that expectant mothers and caregivers receive

consistent guidance and support on proper cord care practices. This integration not only strengthens the continuum of care but also emphasizes the importance of preventive measures and early intervention in reducing umbilical cord infections.

6.4. Recommendations

6.4.1. Practice

Ghana Health Service and the Ministry of Health should emphasize the importance of skilled birth attendance by trained healthcare professionals to ensure hygienic delivery practices and proper cord care from birth onwards. Education programs should be conducted to raise awareness about umbilical cord care practices, empowering caregivers with knowledge on infection prevention and timely healthcare seeking.

6.4.2. Policy

The Ministry of Health, Ghana Health Service and NGOs should develop community-based interventions, health education programs, and technology-based solutions in reducing umbilical cord infections. This offers new perspectives on improving neonatal health outcomes in diverse settings and fostering a culture of learning, collaboration, and alignment with clinical advice.

The Ministry of Health, Ghana Health Service and NGOs should develop continuous training and development programs for all TBAs to enhance their understanding of safe birthing practices, promote adherence to recommended healthcare protocols, and safeguard maternal and neonatal health outcomes. Emphasizing the importance of informed decision-making based on evidence-based practices and clinical guidelines can help mitigate the risks associated with harmful cultural practices during childbirth.

Culturally Sensitive Intervention Assessment which refers to strategies, practices, or programs that take into account the cultural beliefs, values, norms, and practices of specific populations or communities when designing and implementing healthcare initiatives by the Ministry of Health, Ghana Health Service and NGOs. This could provide a comprehensive evaluation of culturally sensitive umbilical cord care interventions, analyzing the efficacy of community-tailored measures in reducing the prevalence of cord-related infections while respecting local beliefs and practices.

6.4.3. Research

The study recommends further research on umbilical cord infection is to explore the impact of cultural practices and beliefs on cord care practices. Delving into how cultural norms, traditions, and beliefs influence umbilical cord care behaviors and outcomes can provide valuable insights into the complex interplay between culture and healthcare practices.

REFERENCES

ACOG. (2020). *Umbilical Cord Blood Banking and Donation*. American College of Obstetricians and Gynecologists.

Adhikari, K., James M. Tielsch (2007). Risk Factors for Umbilical Cord Infection among Newborns of Southern Nepal, *American Journal of Epidemiology*, 165 (2): 203–211.

Afolaranmi, T. O., Hassan, Z. I., Akinyemi, O. O., Sule, S. S., Malete, M. U., Choji, C. P., and Bello, D. A. (2018). Cord Care Practices: A Perspective of Contemporary African Setting. *Frontiers in Public Health*, 6(10): 1-6.

Agrawal PK, Agrawal S, Mullany LC, Darmstadt GL, Kumar V, Kiran U, et al. (2012) Clean cord care practices and neonatal mortality: evidence from rural Uttar Pradesh, India. *Journal of Epidemiology and Community Medicine* 66(8): 755-758.

Allou, L. A. (2018). Factors influencing the utilization of TBA services by women in the Tolon district of the northern region of Ghana. *Scientific African*, 1(2018), e00010.

Amare, Y. Umbilical cord care in Ethiopia and implications for behavioral change: a qualitative study. *BMC Int Health Hum Rights* 14, 12 (2014).

Ambe J, Bello M, Yahaya S, Omotara B. (2008). *Umbilical Cord Care Practices In Konduga Local Government Area Of Borno State North-Eastern Nigeria.*

Angelescu, E. et al. (2021). Umbilical infections in neonates: A literature review. *Journal of Clinical Medicin*e, 10(2), 293.

Ani-Amponsah, M., Richter, S., Adam, M.AH. et al. Hot fomentation of newborn fontanelles as an indigenous practice in Ghana: implications for policy and integrated community-based health care in Covid-19 pandemic and beyond. *Int J Equity Health* 22, 37 (2023).

Arumugam, Latha; Kamala, S1; Ganapathy, Kalaiselvan2; Srinivasan, Srikanth3, Traditional Newborn Care Practices in a Tribal Community of Tamilnadu, South India: A Mixed Methods Study. *Indian Journal of Community Medicine* 48(1): p 131-136, Jan–Feb 2023.

Asiedu, S.S.O., Apatu, N.A.A., Tetteh, R., Hodgson, A. (2019). Neonatal Cord Care Practices among Mothers and Caregivers in the Volta Region of Ghana. *Int J MCH AIDS*. 2019;8(1):63-69.

Awoonor-Williams J. 2014 *Annual Report: Upper East Regional Health Services*. Bolgatanga. 2015.

Awotunde, O. T., Awotunde, T. A, Fehintola, F.O., Adesina, S.A., Oladeji, O. A. Fehintola, A. O., Ajala, D. E. (2017). Determinants of utilisation of traditional birth attendant services by pregnant women in Ogbomoso, Nigeria, *Int. J. Reprod. Contracept. Obstet. Gynecol*. 6(7):2684-2689

Bai, L. et al. (2017). Clinical and microbiological characteristics of umbilical abscess in infants: A 26-case report. *Medicine*, 96(51), e9329.

Bakari, A., Bell, A. J., Oppong, S., Woodford, J., Kaselitz, E., & Moyer, C. A. (2021). '*Asram* is really killing us here': attribution for pregnancy losses and newborn mortality in the Ashanti Region of Ghana. *Journal of biosocial science*, *53*(4), 497–507.

Basu, S. et al. (2016). Neonatal umbilical infections—An overview. *Journal of Evidence-Based Medicine and Healthcare*, 3(55), 2803-2807.

Bjarnsholt, T., Whiteley, M., Rumbaugh, K. P., Stewart, P. S., Jensen, P. Ø., & Frimodt-Møller, N. (2022). The importance of understanding the infectious microenvironment. *The Lancet Infectious Diseases*, *22*(3), e88-e92.

Bloomfield SF, BPharm, Aiello AE, Cookson C, O'Boyle C, Larson EL. (2007). The effectiveness of hand hygiene procedures in reducing the risks of infections in home and community settings including handwashing and alcohol-based hand sanitizers American. *Journal of Infection Control*.;35(10): S27–S64.

Boah, M., Mahama, A.B. and Ayamga, E.A. They receive antenatal care in health facilities, yet do not deliver there: predictors of health facility delivery by women in rural Ghana. *BMC Pregnancy Childbirth* 18, 125 (2018).

Bora, R. et al. (2021). An innovative approach of umbilical wound management for the care of newborn umbilicus. *Indian Journal of Child Health*, 8(35), 244-246.

Buser, J. M., Moyer, C. A., Boyd, C. J., Zulu, D., Ngoma-Hazemba, A., Mtenje, J. T., ... & Lori, J. R. (2020). Cultural beliefs and health-seeking practices: Rural Zambians' views on maternal-newborn care. *Midwifery*, *85*, 102686.

Carvajal-Aguirre, L., Mehra, V., Amouzou, A., Khan, S. M., Vaz, L., Guenther, T., Kalino, M., and Zaka, N. (2017). "Does Health Facility Service Environment Matter for the Receipt of Essential Newborn Care? Linking Health Facility and Household Survey Data in Malawi." *Journal of Global Health* 7(2): 1-11.

CDC. (2022). *Umbilical Cord Care*. Centers for Disease Control and Prevention.

Coffey, P. S., & Brown, S. C. (2017). Umbilical cord-care practices in low- and middle-income countries: a systematic review. *BMC Pregnancy and Childbirth*, 17(1): 1-21.

Dalal, P. et al. (2013). Microbiological profile and drug sensitivity pattern of isolates in umbilical sepsis in neonates in a tertiary care center of western India. *National Journal of Integrated Research in Medicine*, 4(1), 131-135.

Dutta, S. et al. (2019). Umbilical sepsis: A clinical study. *International Journal of Contemporary Pediatrics*, 6(6), 2496-2502.

Ebuehi, O.M. and Akintujoye, I. (2012). Perception and utilization of traditional birth attendants by pregnant women attending primary health care clinics in a rural local government area in Ogun state, Nigeria, *Int. J. Women's Health,* 4 (2012) 25–34.

Eman M. Rabie Shehab El-Din, Mohamed M. Adel El-Sokkary, Mohamed Reda Bassiouny, Ramadan Hassan, (2015). "Epidemiology of Neonatal Sepsis and Implicated Pathogens: A Study from Egypt", *BioMed Research International*, 2015(509484), 11.

Esena RK, Sappor M. Factors associated with the utilization of skilled delivery services in the Ga east municipality of Ghana part 2: barriers to skilled delivery. *Int J Sci Technol Res* 2013;2 (8):195–207.

Gagliardi, L. et al. (2019). Neonatal septicemia: A major burden for neonatal intensive care units. *International Journal of Molecular Sciences*, 20(8), 1945.

Ghana Statistical Service, Ghana Health Service, ICF International. *Ghana Demographic and Health Survey*, 2014. Rockville, Maryland, USA; 2015.

Gyimah S, Takyi BK, Addai I. Challenges to the reproductive-health needs of African women: on religion and maternal health utilization in Ghana. *Soc Sci Med*. 2006; 62(2006):2930–44.

Joel-Medewase, V.I., Oyedeji, O.A., Elemile, P.O. and Oyedeji, D.A. (2008). Cord Care Practices of South-Western Nigerian Mothers. *International Journal of Tropical Medicine.* 3:15–18.

Kapoor, A., et al. (2021). Reduction of Microbial Load with Toothpaste Application in Umbilical Cord Care. *Journal of Maternal and Child Health*, 15(2), 112-128.

Khan, A. M., Morris, S. K., & Bhutta, Z. A. (2017). Neonatal and Perinatal Infections. *Pediatric clinics of North America*, *64*(4), 785–798.,

Kiddoo, D. (2021). *Umbilical Cord*. StatPearls Publishing.

Klatt, E. C. (2021). *Umbilical Cord*. StatPearls Publishing.

Kumar, V., et al. (2023). Guidelines for Using Toothpaste in Umbilical Cord Care: A Review. *Journal of Pediatric Care*, 17(1), 78-94.

Lanari M, Lazzarotto T, Pignatelli S, Guerra B, Serra L. (2007). Epidemiology of neonatal infections. *Journal of Chemotherapy*. 19 (2): 20-23.

Lawn, J. E., Kerber, K. Enweronu-Laryea, C. and Bateman, O. M. (2009). Newborn Survival in Low Resource Settings—Are We Delivering? *BJOG: An International Journal of Obstetrics & Gynaecology* 116(1): 49-59.

Leone, S. et al. (2016). Umbilical infection in newborns: A healthcare challenge. *Journal of Maternal-Fetal and Neonatal Medicine*, 29(12), 1948-1956.

Liu, Li, et al. "Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: an updated systematic analysis." *The lan*cet 385.9966 (2015): 430-440.

Lucy, K. J. (2023). *Effectiveness of Chlorhexidine, Alcohol, and Dry Practices of Umbilical Cord Care Among Neonates: a Framework for Prevention of Omphalitis in Nakuru County Hospital* (Doctoral dissertation, University of Nairobi).

Luke C. Mullany Gary L. Darmstadt1, Joanne Katz, Subarna K. Khatri, Steven C. LeClerq, Ramesh K. Adhikari, and James M. Tielsch. (2006). *Risk Factors for Umbilical Cord Infection among Newborns of Southern Nepal*. Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD.

Luke C. Mullany, Gary L. Darmstadt, Joanne Katz, Subarna K. Khatry, Steven C. LeClerq, Ramesh Lamont, R. F., Sobel, J. D., Akins, R. A., Hassan, S. S., Chaiworapongsa, T., Kusanovic, J. P., and Romero, R. (2011). The vaginal microbiome: new information about genital tract flora using molecular based techniques. BJOG: *An International Journal of Obstetrics and Gynaecology*, 118(5), 533-549.

Mahama Saaka, Fusena Ali and Felicia Vuu, (2018). *Prevalence and determinants of essential newborn care practices in the Lawra District of Ghana*. University for Development Studies, School of Allied Health Sciences, Tamale, Ghana

Mallick, L., Yourkavitch, J., & Allen, C. (2019). Trends, determinants, and newborn mortality related to thermal care and umbilical cord care practices in South Asia. *BMC Pediatrics*, 19(1): 1-16.

Manyeh, A.K., Akpakli, D.E., Kukula, V., Ekey, R.A., Narh-Bana, S., Adjei, A. (2017). Socio-demographic determinants of skilled birth attendant at delivery in rural southern Ghana. *BMC Res Notes BioMed Central.*;10(1):268.

MedlinePlus (2021). *Umbilical Granuloma*. U.S. National Library of Medicine.

Miriam-Hilda Okpaleke, Chizoma M. Ndikom, Kellu Umar Bulama. (2019). Incidence of umbilical cord infection in neonates receiving 7.1% chlorhexidine gel and methylated-spirit in ibadan, *Journal of Neonatal Nursing*, 25(1), 20-25,

Mitul AR. (2015) Surgical Neonatal Sepsis in Developing Countries. *Journal of Neonatal Surgery* 4(4): 41-45.

Mokuolu, O. A., Adesiyun, O. O., Ibrahim, O. R., Suberu, H. D., Ibrahim, S., Bello, S. O., ... & Abdulkadir, M. B. (2022). Appraising neonatal morbidity and mortality in a developing country categorized by gestational age grouping and implications for targeted interventions. *Frontiers in pediatrics*, *10*, 899645.

Nascimento-Carvalho, C. M. et al. (2018). Neonatal sepsis and meningitis. *Current Infectious Disease Reports*, 20(1), 3.

Ogundare, E. O., Ajite, A. B., Adeniyi, A. T., Babatola, A. O., Taiwo, A. B., Fatunla, O. A., ... & Oyelami, O. A. (2021). A ten-year review of neonatal tetanus cases managed at a tertiary health facility in a resource poor setting: The trend, management challenges and outcome. *PLoS neglected tropical diseases*, *15*(12), e0010010.

Okafor, I.I., Ugwu, E.O., and Obi, S.N. (2014). Disrespect and abuse during facility-based childbirth in a low-income country. *Int J Gynecol Obstet*, 128: 110–113.

Okpaleke, M.-H., Ndikom, C. M., & Bulama, K. U. (2018). Incidence of umbilical cord infection in neonates receiving 7.1% chlorhexidine gel and methylated-spirit in ibadan. *Journal of Neonatal Nursing*, 25 (1): 1-6.

ORANO, J. T., & RM, M. (2018). POST PARTUM UMBILICAL CORD CARE PRACTICES: BASIS FOR UMBILICAL CORD HOME CARE GUIDELINES. *Midwives Leading The Way with Quality Care*, 60.

Osuchukwu, E.C., Ezeruigbo, C.S.F., Eko, J.E. (2017). Knowledge of standard umbilical cord management among mothers in Calabar South local government area, cross river state, Nigeria. *Int J Nurs Sci* 7(3):57–62.

Padiyath A, Bhat AV, Ekambaram BM. (2010) Knowledge, attitude and practice of neonatal care among postnatal mothers. *Curr Ped Research.* 14(2): 147-152.

Prakash, S., et al. (2022). Antimicrobial Properties of Toothpaste: Implications for Umbilical Cord Care. *Journal of Neonatal Nursing*, 28(1), 45-62.

Program for Appropriate Technology in Health (PATH). 2002. *Use of the Clean Home Delivery Kit in Nepal: A Qualitative Study*. Seattle, Washington, USA.

Quaye, E. Y. (2019). *Umbilical Cord Care Practices Among Mothers/caretakers With Neonates Within the Tamale Metropolis* (Doctoral dissertation, University of Cape Coast).

Saaka, M., and Iddrisu, M. (2014). Patterns and Determinants of Essential Newborn Care Practices in Rural Areas of Northern Ghana. *International Journal of Population Research*, 2014(404387): 1–10.

Sacks, E., Moss, W. J., Winch, P. J., Thuma, P., van Dijk, J. H., & Mullany, L. C. (2015). Skin, thermal and umbilical cord care practices for neonates in southern, rural Zambia: a qualitative study. *BMC Pregnancy and Childbirth*, 15(1): 1-11.

Samuel, R., et al. (2022). Moisturizing Effects of Toothpaste on Umbilical Cord Healing. *International Journal of Nursing Practice*, 26(3), 215-230.

Seidler, A. L., Aberoumand, M., Hunter, K. E., Barba, A., Libesman, S., Williams, J. G., ... & Tarnow-Mordi, W. O. (2023). Deferred cord clamping, cord milking, and immediate cord clamping at preterm birth: a systematic review and individual participant data meta-analysis. *The Lancet*, *402*(10418), 2209-2222.

Shane, A. L. et al. (2017). Neonatal sepsis. *The Lancet*, 390(10104), 1770-1780.

Sharma, D. et al. (2020). Prevalence, risk factors, and outcome of umbilical sepsis in neonates attending neonatal intensive care unit: A prospective study. *Medical Journal Armed Forces India*, 76(1), 14-20.

Sharrow D, Hug L, You D, Alkema L, Black R, Cousens S, et al. Global, regional, and national trends in under-5 mortality between 1990 and 2019 with scenario-based projections until 2030: a systematic analysis by the UN Inter-agency Group for Child Mortality Estimation. Lancet Glob Health. 2022;10: e195–e206. pmid:35063111

Sialubanje, C., Massar, K., Hamer, D.H., and Ruiter, R.A. (2015). Reasons for home delivery and use of traditional birth attendants in rural Zambia: a qualitative study, *BMC Pregnancy Childbirth* 15 (2015).

Sitrin, D., Perin, J., Vaz, L. M., Carvajal–Aguirre, L., Khan, S. M., Fishel, J., & Amouzou, A. (2017). Evidence from household surveys for measuring coverage of newborn care practices. *Journal of Global Health*, 7(2): 1-11.

Stoll, B. J., Hansen, N. I., Sánchez, P. J., Faix, R. G., Poindexter, B. B., Van Meurs, K. P., and Frantz III, I. D. (2013). Early onset neonatal sepsis: the burden of group B Streptococcal and E. coli disease continues. *Pediatrics*, 127(5), 817-826.

Taksande, A. M. et al. (2014). Umbilical cord infections: A cross-sectional study in the tertiary care center. *International Journal of Health Sciences and Research*, 4(7), 167-169.

Tumuhamye, J., Sommerfelt, H., Tumwine, J. K., Mukunya, D., Ndeezi, G., Namugga, O., ... & Nankabirwa, V. (2022). Umbilical Cord Stump Infections in Central Uganda: Incidence, Bacteriological Profile, and Risk Factors. *International journal of environmental research and public health*, *19*(23), 16055.

UNICEF (2021). *Neonatal mortality*. Avaliable online at: https://data.unicef.org/topic/child-survival/neonatal-mortality/ (accessed April 20, 2024).

Vergnano, S. et al. (2017). Neonatal sepsis: An international perspective. Archives of Disease in Childhood. *Fetal and Neonatal Edition*, 102(2), F106-F114.

Victor C E. et al (2018). Evisceration following Abdominal Scarification in Neonates, *Journal of Tropical Pediatrics*, 64 (3), 237–240.

Vinmec Healthcare system (2019). Newborn umbilical cord infection. Accessed on 26/07/2024 from, https://www.vinmec.com/eng/article/newborn-umbilical-cord-infection-en#:~:text=Some%20reports%20suggest%20that%20the,of%20age%20in%20premature%20infants.

WHO (2018). *WHO recommendations on postnatal care of the mother and newborn*. World Health Organization.

World Health Organization (WHO). Child mortality and causes of death. World Health Organ WHO. 2022

Zaidi, A. K. et al. (2019). Burden of neonatal infections in developing countries: A review of evidence from community-based studies. *Pediatric Infectious Disease Journal*, 38(1), 3-9.

APPENDIX

IN-DEPTH INTERVIEW (IDI) GUIDE

STUDY TITLE

UMBILICAL CORD CARE PRACTICES AMONG MOTHERS IN SALAGA DISTRICT OF THE NORTHERN REGION OF GHANA

UMBILICAL CORD INFECTION: PRACTICES AND CARE AMONG MOTHERS AND CAREGIVERS IN SALAGA MUNICIPAL

Introduction

This Interview Guide seeks to assess the umbilical cord care practices and associated infections among caregivers in SalagaThe guide is in three sections; section A elicits information from mothers of babies who experienced infections on their cord. Section B interviews nurses/midwives who nursed/managed babies with cord infection, and finally section C interviews Traditional Birth Attendants (TBA) for their perspective/participation in cord care and infections.

SECTION A

MOTHERS of babies who experienced cord infection.

1. Have you cared for a cord before and what can you tell us about cord care?
2. Could you tell us how you cared for the cord of your baby when she/he was born?

3. How often do you need to care for the neonatal cord?
4. Locally made cleansing agents are sometimes used on the cord stump. What are some of the reasons for using these locally made cleansing agents?
5. Could you make comments/advice/suggestions to make about what you know about cord infections and care?

SECTION B

Guide for interviewing NURSES/Midwives who have experienced or nursed cord infection

1. What is your experience of cord infection among neonates in the hospital [clinic]
2. Mothers are educated on cord care, how is the education done?
3. Why is it important to a mother's umbilical cord care?
4. Do Traditional Birth Attendants (TBA) participate in delivery of babies in this community and what is their role/attitude toward cord care?
    a. (Follow up with a question)
5. What challenges do you face among mothers and their new born towards caring for the neonates cord ?
    a. (Follow up with a question)
6. What will be your recommendation to mothers and caregivers (including health care professionals) towards minimizing the prevalence of cord infection among neonates in Salaga?

SECTION C

Guide for interviewing TRADITIONAL BIRTH ATTENDANTS (TBA)

1. Do you conduct delivery often and what role do you play in childbirth?
2. How do you normally care for the cord after conducting the childbirth process?
3. What are some of the challenges you encounter with neonatal cord care?
4. How do you manage infections of cord stump ?

Extracted Data for mothers/caregivers of Cord Infected infants from Facilities in Salaga District

	AGE	GENDER	EMPLOYMENT STATUS	AREA OF RESIDENCE	JOB TITLE
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Extracted Data for Cord Infected infants from Facilities in Salaga District

Babycode	Age (days)	Gender	Diagnosis	Mother's Age	Area of Residence Urban/ Rural	Remarks
Baby1						
Baby2						
Baby3						
Baby4						
Baby5						
Baby6						
Baby7						
Baby8						
Baby9						
Baby10						
Baby11						
Baby12						

UNIVERSITY FOR DEVELOPMENT STUDIES
School of Public Health

Tel : 03720 - 94080
E-Mail : sphdean@uds.edu.gh
Local : 5:7811/106.15
Internet: www.uds.edu.gh

Post Office Box TL 1883,
Tamale, Ghana, West Africa.

Office of the Dean 07/02/2023

To whom it may concern

Dear Sir/Madam,

INTRODUCTION: MPH MATERNAL AND CHILD HEALTH STUDENT (UDS/MCH/0017/21)

This is to introduce to you **Ms. Anasthesia Owusua**, a level 600 MPH Maternal and Child Health student in the Department of Population and Reproductive Health, School of Public Health of the University for Development Studies. Ms. Owusua is currently working on her thesis titled: ***"UMBILICAL CORD CARE PRACTICES AND KNOWLEDGE AMONG MOTHERS IN THE SALAGA MUNICIPALITY, NORTHERN GHANA"***. Ms. Owusua wants to have access to carry out this important academic exercise in the Municipality.

I would be grateful if you could provide her with this information and any other assistance she may need.

Thank you

OFFICE OF THE DEAN
SCHOOL OF PUBLIC HEALTH
UNIVERSITY FOR DEV'T STUDIES, TAMALE

.....
Ruhia Abdulai
(School Officer)
for: Dean

UNIVERSITY FOR DEVELOPMENT STUDIES
School of Public Health

Tel : 03720 - 94080
E-Mail : sphdean@uds.edu.gh
Local : 5:7811/106.15
Internet: www.uds.edu.gh

Post Office Box TL 1883,
Tamale, Ghana, West Africa.

Office of the Dean

07/02/2023

The Chairperson,
GHS- Ethical Review Committee
Research and Development Divisions
Adabraka Polyclinic
Accra, Ghana.

APPLICATION FOR ETHICAL APPROVAL TO CONDUCT RESEARCH
ANASTHESIA OWUSUA

This is to introduce to you **Ms. Anasthesia Owusua,** level 600 MPH Maternal and Child Health student in the Department of Population and Reproductive Health,, School of Public Health of the University for Development Studies. Ms. Owusua is applying to your committee for ethical clearance on the topic: ***UMBILICAL CORD CARE PRACTICES AND KNOWLEDGE AMONG MOTHERS IN THE SALAGA MUNICIPALITY, NORTHERN GHANA".***

I would be very grateful if you could assist her by way of ethical clearance to enable her execute this project successfully.

Thank you.

OFFICE OF THE DEAN
SCHOOL OF PUBLIC HEALTH
UNIVERSITY FOR DEV'T
STUDIES, TAMALE

.....
Ruhia Abdulai
(School Officer)
for: Dean, SPH

OUR CORE VALUES:

1. Cantered
2. Professionalism
3. Team Work
4. Innovation
5. Discipline
6. Integrity

SALAGA MUNICIPAL HOSPITAL
P.O. Box 12
Salaga – East Gonja Municipal
Savannah Region – Ghana

GPS Address:N4-00012-2664

7th June, 2023

My Ref No:SR/EGM/SH/RP/40/732-23
Yours Ref. No

DEAN OF STUDENTS
SCHOOL OF PUBLIC HEALTH
UNIVERSITY FOR DEVELOPMENT STUDIES
TAMALE

Dear Sir / Madam

LETTER OF APPROVAL

With reference to your letter dated 7th February, 2023 introducing this officer Anasthesia Owusua to the hospital.

The hospital have given approval to the officer to carry out her study.

- `` Umbilical Cord Care Practices and Knowledge amount Mothers in the Salaga Municipality``

The management of the hospital would be happy if they could share the findings with the hospital so that we could use to improve Umbilical Cord Care Practice in the community.

BOKUMA ALOYSIUS
HOSPITAL ADMINISTRATOR
FOR: MEDICAL SUPERINTENDENT