

Factors Contributing to Umbilical Cord Infection among Neonates Admitted to the Neonatal Intensive Care Unit at Kagando Hospital, Kasese District

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Abstract—Introduction: Umbilical cord infection, also referred to as omphalitis or umbilical cord sepsis, is an important neonatal health problem because the newly cut umbilical cord can provide a pathway for bacterial invasion and may contribute to neonatal morbidity and mortality. This study assessed factors contributing to umbilical cord infection among neonates admitted to the Neonatal Intensive Care Unit (NICU) at Kagando Hospital, Kasese District.

Purpose: The study determined factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital, Kasese District.

Methods: A cross-sectional quantitative study design was used. Data were collected from 32 caretakers using an interviewer-administered semi-structured questionnaire. Respondents were selected using purposive sampling. Data were coded, tallied and summarized using frequencies and percentages, and findings were presented in tables and figures.

Results: Among the 32 respondents, 14 (43.8%) reported applying Vaseline to the baby's cord, 8 (25.0%) reported applying saliva, 4 (12.5%) reported applying breast milk and 3 (9.4%) reported applying cow dung. Eighteen (56.3%) respondents reported attending antenatal care fewer than four times. Sixteen (50.0%) reported greenish amniotic fluid and 12 (37.5%) reported becoming sick during delivery. Sixteen (50.0%) reported that their babies did not cry immediately after birth, while 2 (6.3%) reported breech presentation and 8 (25.0%) reported that their babies were born sick. All 32 (100.0%) respondents reported that health workers did not educate them on cord care. Twenty (62.5%) reported that health workers sometimes washed their hands before touching the cord, while 30 (93.8%) reported that only one to two health workers were available on the ward per shift.

Conclusion: The reported findings indicate that maternal, neonatal and health-facility factors may contribute to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital. Important concerns included potentially inappropriate substances applied to the cord, inadequate antenatal care attendance, adverse intrapartum conditions,

low immediate newborn responsiveness, inconsistent hand hygiene, lack of maternal education on cord care and inadequate staffing.

Recommendation: The Ministry of Health and relevant health managers should strengthen comprehensive cord-care education during antenatal, intrapartum and postnatal care, address harmful myths and practices, strengthen community health education, reinforce hand hygiene and infection-prevention practices, and consider staffing needs within neonatal care services.

Index Terms—Umbilical Cord Infection, Omphalitis, Neonatal Sepsis, Cord Care, Neonates, Neonatal Intensive Care Unit, Kagando Hospital

Operational Definitions

Term	Operational Definition
Apgar Score	A clinical tool used by healthcare providers to assess a newborn's condition immediately after birth.
Breech Presentation	A fetal presentation in which the fetus is in a longitudinal lie and the podalic pole presents at the pelvic brim.
Primigravida	A woman who is pregnant for the first time.
Umbilical Cord Infection	Pus discharge with erythema of the abdominal skin and umbilical cord, or severe redness extending more than 2 cm from the umbilical cord stump, with or without pus.

I. INTRODUCTION

Umbilical cord infection, also known as omphalitis, is characterized by pus discharge with erythema of the abdominal skin and umbilical cord, or severe redness extending more than 2 cm from the umbilical cord stump, with or without pus [1, 2]. The newly cut umbilical cord can provide a pathway for bacterial infection and may contribute to newborn sepsis and death [3].

Globally, neonatal umbilical cord infection remains an important health problem, particularly in settings where births occur without skilled attendants and where potentially unsafe cord-care practices are common [4, 5]. The unhealed umbilical cord may serve as an entry point for local and invasive infection and can be rapidly colonized by bacteria from the environment [6].

In low-resource settings, umbilical cord infection remains an important contributor to neonatal illness and death. Studies have reported substantial variation in prevalence across settings, including Nepal and Egypt, while neonatal deaths associated with infection continue to place a major burden on health systems in low-income countries [7, 8].

Sub-Saharan Africa carries a substantial burden of neonatal morbidity and mortality associated with infection, with higher risks reported in communities where non-sterile substances are applied to the umbilical cord [1]. In Pemba Island, Zanzibar and Tanzania, omphalitis was reported among 954 (5.5%) of 17,198 infants within seven days of age [9]. Other assessments have documented varying degrees of umbilical cord redness, pus and foul odour among newborns [10].

In Uganda, neonatal infection remains an important public health concern. Ministry of Health reports have highlighted newborn infection among causes of neonatal morbidity and mortality and emphasized the importance of infection prevention and quality newborn care [11].

At Kagando Hospital, records from July 2025 to December 2025 showed that 186 neonates were admitted to the NICU. Ninety-seven (52.2%) were delivered at Kagando Hospital and, among those born at the hospital, 53 (54.6%) had neonatal sepsis reported as secondary to umbilical cord infection. Of these, 4 (7.5%) died, 5 (9.4%) developed seizures and 18 (34.0%) had a hospital stay of more than two weeks. These observations motivated the study of factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital.

1.1 Problem Statement

Despite improvements in labour-suite practices, instrument sterilization, surgical techniques, use of antiseptic solutions such as chlorhexidine, and infection-prevention strategies, umbilical cord infection remains a concern for newborns and health systems because of its potential to cause morbidity, prolonged hospital stay and increased healthcare costs. At Kagando Hospital, NICU records for July to December 2025 indicated a substantial burden of neonatal sepsis among neonates born at the hospital. The reported cases included deaths, seizures and prolonged hospital admissions. However, maternal, neonatal and health-facility factors contributing to umbilical cord infection in this setting had not been systematically documented. Therefore, this study was conducted to identify factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital, Kasese District.

1.2 Purpose of the Study

The purpose of the study was to determine factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital, Kasese District.

1.3 Specific Objectives

To determine maternal-related factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital.

To determine neonatal-related factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital.

To determine health-facility-related factors contributing to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital.

1.4 Research Questions

1. What maternal-related factors contribute to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital?

2. What neonatal-related factors contribute to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital?
3. What health-facility-related factors contribute to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital?

1.5 Justification of the Study

Hygienic umbilical cord care is important in preventing neonatal umbilical cord infection. Although chlorhexidine is recommended in settings where potentially harmful traditional cord-care practices are common, evidence indicates that substances such as cow dung, oil, saliva and other non-recommended products may still be applied to the umbilical cord. Such practices can expose newborns to infection. Therefore, identifying maternal, neonatal and health-facility factors contributing to umbilical cord infection at Kagando Hospital can provide information to guide prevention and improve neonatal outcomes.

1.6 Significance of the Study

The findings may be useful to healthcare providers, hospital managers, policymakers, educators and researchers by highlighting modifiable factors associated with cord care and infection prevention.

1.6.1 Nursing Practice

The findings may help nurses and midwives strengthen aseptic techniques, maternal counselling, early recognition of cord infection and newborn infection-prevention practices.

1.6.2 Nursing Research

The findings may contribute to the body of knowledge on umbilical cord care and provide a basis for further research in similar settings.

1.6.3 Nursing Management and Administration

The information may assist hospital management in planning continuing medical education and strengthening infection-prevention and maternal education activities.

1.6.4 Nursing Education

The information may be useful to tutors and students when teaching neonatal care, infection prevention and umbilical cord care.

II. LITERATURE REVIEW

The literature reviewed maternal, neonatal and health-facility factors that may contribute to umbilical cord infection among neonates. Evidence was drawn from books, journal articles and electronic sources.

2.1 Maternal-Related Factors

2.1.1 Home Delivery

In studies of community-based omphalitis, home delivery, unhygienic cord cutting, application of unclean substances and covering the stump with unclean fabric were identified as potential contributors to neonatal infection [9].

2.1.2 Cultural Norms and Practices

Studies have documented cultural practices involving the umbilical cord, including rituals and application of substances. Such practices may influence how mothers and caregivers manage the cord after birth [12].

2.1.3 Herbal Medication Use

Studies in Uganda and other low- and middle-income countries have reported the use of herbal mixtures and other substances for cord care. Reported substances include petroleum jelly, herbs, saliva, onion, charcoal powder and ash [3, 13].

2.1.4 Maternal Knowledge

Knowledge may influence cord-care practices. Kyomugisha (2022) reported generally sufficient knowledge among mothers in one Ugandan setting, whereas Asiedu et al. (2023) reported insufficient knowledge among a proportion of mothers and caregivers in Ghana [14, 15].

2.1.5 Economic Status

Socioeconomic status can influence access to health services and the type of newborn-care practices used. Uwingabire et al. (2020) reported substantial financial constraints among postnatal mothers in Rwanda, while Eyeberu et al. (2022) linked socioeconomic circumstances with newborn-care practices [16, 17].

2.1.6 Antenatal Care

Attendance at antenatal care provides opportunities for maternal education, including counselling on newborn and cord care. Merga et al. (2022) reported that antenatal care attendance was relevant to exposure to information on cord care [18].

2.1.7 Place of Delivery

Health-facility delivery may provide greater opportunities for skilled birth attendance and appropriate cord care. Sivalogan et al. (2023) reported better cord-care practices among facility deliveries, while Gelana-Fedaku et al. (2022) found higher odds of potentially harmful traditional cord care among mothers who delivered at home [19, 20].

2.1.8 Level of Education

Educational attainment may influence the ability to understand health information and seek appropriate care. Teferi et al. (2024) reported poorer cord-care practices among women with lower educational attainment compared with those with tertiary education [21].

2.1.9 Source of Information

Information from health workers may support safer cord-care practices, whereas information from relatives and friends may reinforce traditional practices. Amare (2023) and Mukunya et al. (2020) highlighted the influence of family and community knowledge on cord care [22, 23].

2.1.10 Premature Rupture of Membranes

Premature rupture of membranes may increase exposure of the fetus and newborn to infection. De-Jonge et al. (2022) reported an association between premature rupture of membranes and neonatal infection [24].

2.1.11 Type of Amniotic Fluid

Abnormal or foul-smelling amniotic fluid may indicate infection and has been associated with increased risk of neonatal infection in some studies [25].

2.1.12 Maternal Intrapartum Infections

Maternal infection during labour may expose the newborn to pathogens before or during birth. Dessalegn et al. (2022) reported an association between maternal intrapartum infection and neonatal cord sepsis [26].

2.2 Neonatal-Related Factors

2.2.1 Apgar Score

Low Apgar scores have been associated with neonatal morbidity and sepsis in several studies. A low score may reflect physiological compromise and the need for resuscitation or increased clinical care [27, 28, 29].

2.2.2 Breech Presentation

Breech presentation is associated with increased risks of birth complications and neonatal morbidity. Roble et al. (2022) reported breech presentation among factors considered in relation to neonatal umbilical cord sepsis [30].

2.2.3 Infection at Birth

Neonatal infection may occur in association with maternal and intrapartum risk factors, including premature rupture of membranes. Exposure to pathogens before or during delivery can increase vulnerability of the newborn [31].

2.3 Health-Facility-Related Factors

2.3.1 Education of Mothers

Health workers can influence maternal knowledge and practices through education during antenatal, delivery and postnatal care. Community health-worker interventions have demonstrated the potential to improve maternal and newborn-care practices [32, 19, 16].

2.3.2 Performing Invasive Procedures

Invasive procedures may increase opportunities for pathogen transmission if infection-prevention measures are not consistently followed. Olaniran et al. (2019) emphasized the importance of adequate infection prevention in maternal and newborn services [33].

2.3.3 Hand Washing

Hand hygiene is a basic infection-prevention measure. Inadequate hand hygiene can facilitate transfer of microorganisms to newborns and their umbilical cords [34].

2.3.4 Vaginal Examination

Frequent vaginal examinations during labour may increase exposure to pathogens, particularly where infection-prevention practices are inadequate. Rajabi (2025) reported increased risk associated with multiple examinations [35].

2.3.5 Inadequate Staffing

Insufficient human resources may reduce the amount of time available for individual newborn care and infection-prevention activities. Stella et al. (2021) highlighted the potential effects of unequal distribution of health workers on quality of care [36].

III. METHODS

3.1 Study Design and Rationale

A cross-sectional quantitative study design was used. The design was appropriate because information on maternal, neonatal and health-facility factors was collected during a defined study period. Data were collected using a semi-structured interviewer-administered questionnaire. The design was considered suitable for the available time and resources.

3.2 Study Setting and Rationale

The study was conducted at Kagando Hospital in Kasese District, Uganda. The hospital is located approximately 470 km from Kampala and about 46 km from Kasese municipality. It is situated in Bukonzo East Constituency, Kisinga Town Council. The area includes lowland and mountainous terrain and is predominantly inhabited by Bakonzo, with other communities including Basongora and Banyabindi. The major economic activity is farming. The setting was selected because it was accessible to the researcher and had the target respondents required to address the study objectives.

3.3 Study Population

The study population comprised caretakers attending to neonates admitted to the NICU at Kagando Hospital. Caretakers were selected because they were directly involved in the care of the neonates and could provide information relevant to the study.

3.4 Sample Size Determination

The study used the Krejcie and Morgan (1970) sample-size table. The reported target population was 35 neonates, for which the table gives a sample size of 32. Therefore, 32 respondents were included in the study.

3.5 Sampling Procedure

Purposive sampling, a non-probability sampling technique, was used to select respondents who met the eligibility criteria and were available during the study period.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion Criteria

Caretakers of neonates admitted to the NICU who consented to participate were eligible for inclusion.

3.6.2 Exclusion Criteria

Caretakers who did not consent to participate were excluded from the study.

3.7 Definition of Variables

3.7.1 Dependent Variable

The dependent variable was neonatal umbilical cord infection.

3.7.2 Independent Variables

- Maternal-related factors: age, education level, place of delivery, antenatal care attendance, source of information, substances applied to the cord, membrane rupture, amniotic fluid characteristics and maternal illness during delivery.
- Neonatal-related factors: Apgar-related newborn condition, crying at birth, breech presentation and illness at birth.
- Health-facility-related factors: staffing, maternal education, invasive procedures, hand hygiene, cord-tying materials and vaginal examinations.

3.8 Research Instrument

A closed-ended semi-structured interviewer-administered questionnaire was used. It contained sections on demographic characteristics, maternal-related factors, neonatal-related factors and health-facility-related factors contributing to umbilical cord infection.

3.9 Data Collection Procedure

Data collection was conducted over one month, with approximately eight mothers engaged per week.

3.10 Data Management

3.10.1 Coding

Responses were grouped into categories and coding frames were developed to facilitate organization and analysis of the data.

3.10.2 Data Entry

Data were entered using tally marks and double-entry procedures on separate sheets to reduce entry errors.

3.10.3 Editing

Completed questionnaires were checked for completeness, consistency, validity, relevance and accuracy immediately after data collection.

3.10.4 Data Analysis

Data were analyzed manually using tallying, frequency counts and percentages. Findings were summarized and presented using frequency tables and figures. The analysis was descriptive and did not include inferential statistical testing.

3.11 Quality Control

1. The questionnaire was developed from the available literature and pretested at Bwera Hospital using 10% of the sample size before use at Kagando Hospital.
2. A research assistant was trained to assist with administration of the interviews.
3. Completed questionnaires were checked for consistency and completeness.
4. All questionnaires were double-checked before closure and storage.

3.12 Ethical Considerations

Authorization was obtained through an introductory letter from the principal tutor of Bwera School of Nursing and Midwifery through the chairperson of the Institutional Research Committee. The letter was presented to the Principal Nursing Officer at Kagando Hospital, who granted permission to collect data. Participants were informed about the study and only those who consented participated. Names and personal identifiers were not recorded, and information collected was treated confidentially. All stakeholders were treated with honesty, fairness and respect.

3.13 Dissemination of Results

The final research report was prepared and copies were intended for the Uganda Health Professions Assessment Board, Bwera School of Nursing and Midwifery library, Kagando Hospital and the research supervisor.

IV. RESULTS

4.1 Demographic Characteristics

Variable	Category	Frequency	Percentage
Age	20–30 years	12	37.5
	31–40 years	15	46.9
	41–50 years	5	15.6
Religion	Catholic	15	46.9
	Anglican	12	37.5
	SDA	3	9.4
	Full Gospel	2	6.3
Occupation	Peasant	13	40.6
	Civil servant	2	6.3
	Self-employed	10	31.3
	None	7	21.9
Education	Primary	16	50.0
	Secondary	4	12.5
	Tertiary	4	12.5
	Never went to school	8	25.0

Most respondents (15, 46.9%) were aged 31–40 years, followed by 12 (37.5%) aged 20–30 years and 5 (15.6%) aged 41–50 years. Catholics constituted 15 (46.9%) respondents, Anglicans 12 (37.5%), SDA 3 (9.4%) and Full Gospel 2 (6.3%). Thirteen (40.6%) respondents were peasants, 10 (31.3%) were self-employed, 7 (21.9%) had no occupation and 2 (6.3%) were civil servants. Sixteen (50.0%) had primary education, 8 (25.0%) had never attended school, 4 (12.5%) had secondary education and 4 (12.5%) had tertiary education.

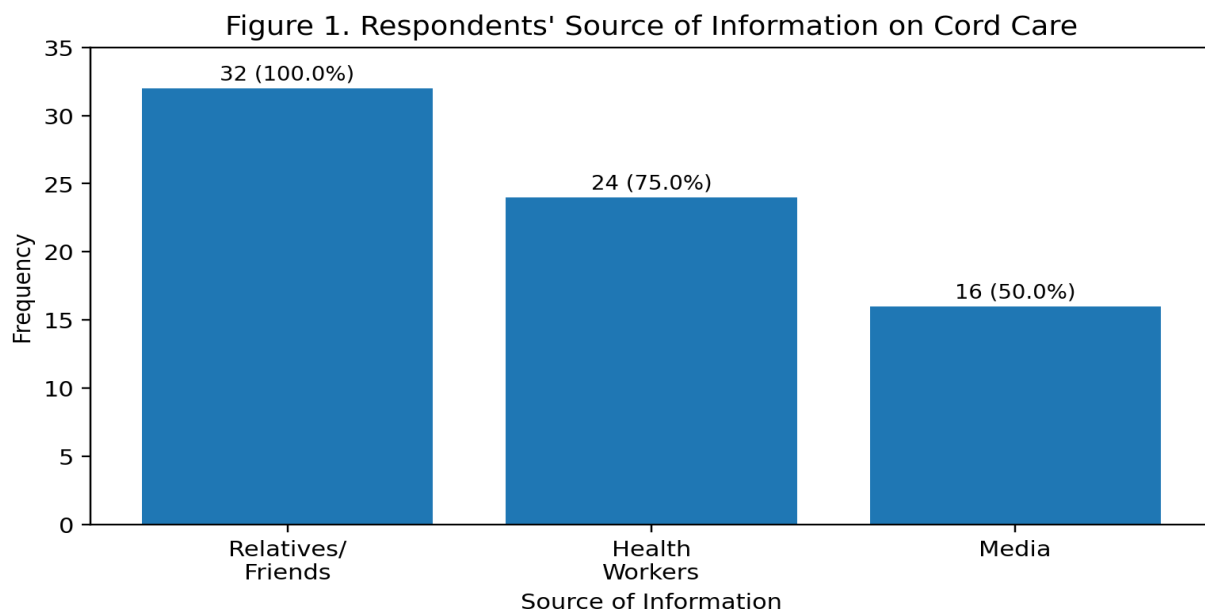
4.2 Maternal-Related Factors

Variable	Category	Frequency	Percentage
Place of delivery	Health facility	18	56.3
	Home	12	37.5
	On the way to health facility	2	6.3
Substance applied to cord	Cow dung	3	9.4

Variable	Category	Frequency	Percentage
	Vaseline	14	43.8
	Saliva	8	25.0
	Breast milk	4	12.5
	None	3	9.4
ANC attendance	Less than 4 times	18	56.3
	4 times	8	25.0
	5 times and above	6	18.8

Most respondents (18, 56.3%) reported a health-facility delivery, 12 (37.5%) reported home delivery and 2 (6.3%) delivered on the way to a health facility. Fourteen (43.8%) reported applying Vaseline to the cord, 8 (25.0%) saliva, 4 (12.5%) breast milk and 3 (9.4%) cow dung, while 3 (9.4%) reported applying nothing. Eighteen (56.3%) respondents attended antenatal care fewer than four times, 8 (25.0%) attended four times and 6 (18.8%) attended five or more times.

Figure 1. Respondents' Source of Information on Cord Care



All 32 (100.0%) respondents reported receiving information on cord care from relatives and friends; 24 (75.0%) reported health workers as a source and 16 (50.0%) reported media as a source. Multiple responses were possible.

Variable	Category	Frequency	Percentage
Time of membrane rupture	Before start of labour	8	25.0
	Early but during labour	8	25.0
	At delivery	16	50.0

Variable	Category	Frequency	Percentage
Colour of amniotic fluid	Clear	10	31.3
	Greenish	16	50.0
	Not sure	6	18.8
Became sick during delivery	No	20	62.5
	Yes	12	37.5

Sixteen (50.0%) respondents reported that membranes ruptured at delivery, 8 (25.0%) before the start of labour and 8 (25.0%) early during labour. Sixteen (50.0%) reported greenish amniotic fluid, 10 (31.3%) clear fluid and 6 (18.8%) were unsure. Twelve (37.5%) reported becoming sick during delivery, while 20 (62.5%) did not.

4.3 Neonatal-Related Factors

Variable	Category	Frequency	Percentage
Baby cried at birth	Yes	16	50.0
	No	16	50.0
Breech presentation	Yes	2	6.3
	No	30	93.8
Baby born sick	Yes	8	25.0
	No	24	75.0

Sixteen (50.0%) respondents reported that their babies cried immediately after birth and 16 (50.0%) reported that their babies did not. Two (6.3%) reported breech presentation and 30 (93.8%) reported no breech presentation. Eight (25.0%) reported that their babies were born sick, while 24 (75.0%) reported that they were not born sick.

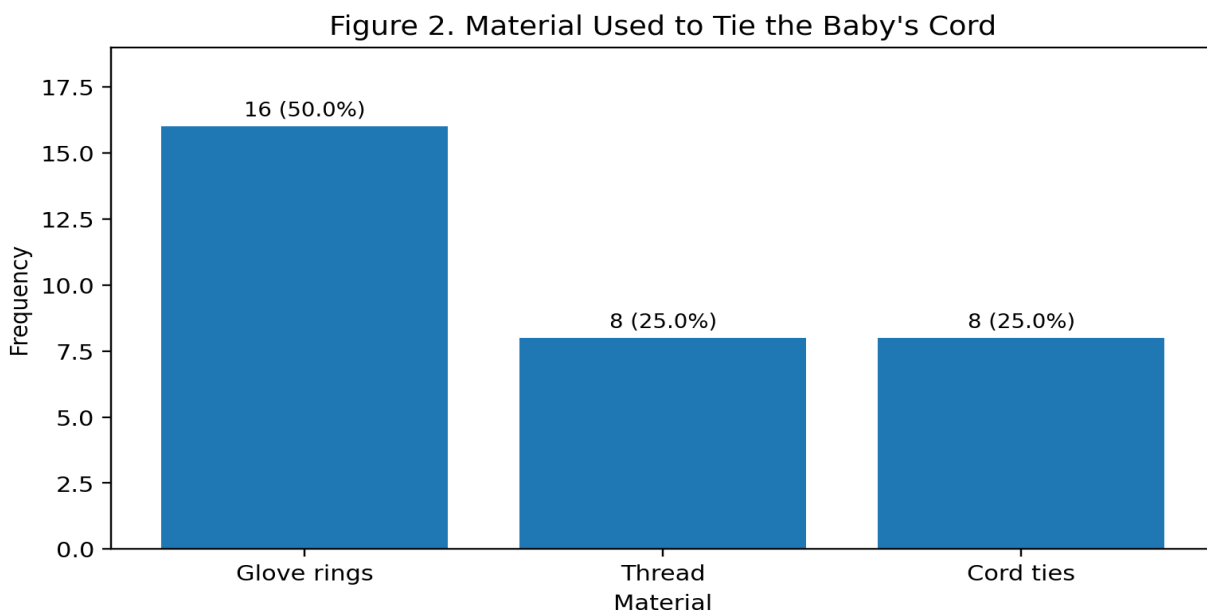
4.4 Health-Facility-Related Factors

Variable	Category	Frequency	Percentage
Health workers educated mother on cord care	Yes	0	0.0
	No	32	100.0
Health workers washed hands before touching cord	Yes	6	18.8
	No	6	18.8
	Sometimes	20	62.5

Variable	Category	Frequency	Percentage
Health workers on duty per shift	1–2	30	93.8
	3–4	2	6.3
	5–6	0	0.0
	7 and above	0	0.0

All 32 (100.0%) respondents reported that health workers did not educate them on cord care. Twenty (62.5%) reported that health workers sometimes washed their hands before touching the cord, 6 (18.8%) reported that they did not wash their hands and 6 (18.8%) reported that they did. Thirty (93.8%) respondents reported that one to two health workers were available on the ward per shift, while 2 (6.3%) reported three to four.

Figure 2. Material Used to Tie the Baby's Cord



Sixteen (50.0%) respondents reported use of glove rings, 8 (25.0%) thread and 8 (25.0%) cord ties.

V. DISCUSSION

5.1 Maternal-Related Factors

Although more than half of the respondents reported delivering in a health facility, 12 (37.5%) delivered at home and 2 (6.3%) delivered on the way to a health facility. Home delivery may reduce access to skilled birth attendance and appropriate cord-cutting and cord-care practices. This finding is consistent with literature indicating that home delivery and unhygienic cord practices may increase the risk of neonatal infection [9, 19].

Application of substances to the umbilical cord was common. Vaseline was reported by 14 (43.8%), saliva by 8 (25.0%), breast milk by 4 (12.5%) and cow dung by 3 (9.4%). The finding demonstrates continued use of substances other than recommended cord-care practices. Similar reports from low- and middle-income countries have documented use of petroleum jelly, herbs, saliva, ash and other substances [3, 13].

Antenatal care attendance was also notable. Eighteen (56.3%) respondents attended fewer than four antenatal care visits, compared with 8 (25.0%) who attended four and 6 (18.8%) who attended five or more. Antenatal care provides opportunities for health education, including counselling on newborn and cord care. Merga et al. (2022) similarly highlighted the importance of antenatal care exposure for maternal education on cord care [18].

Half of the respondents reported membrane rupture at delivery, while 25.0% reported rupture before labour and another 25.0% early during labour. Sixteen (50.0%) also reported greenish amniotic fluid. These findings suggest that intrapartum conditions should be considered when assessing newborn infection risk. Previous studies have associated premature rupture of membranes and abnormal or foul-smelling amniotic fluid with neonatal infection [24, 25].

5.2 Neonatal-Related Factors

Half of the respondents reported that their babies did not cry immediately after birth. Although crying at birth is not itself a direct measure of Apgar score, lack of immediate crying may indicate a need for assessment and possible resuscitation. Studies have reported associations between low Apgar scores and neonatal sepsis or morbidity [27, 29].

Breech presentation was reported for 2 (6.3%) neonates. Although the number was small, breech presentation can be associated with birth complications and neonatal morbidity. Roble et al. (2022) included breech presentation among factors considered in neonatal umbilical cord sepsis [30].

Eight (25.0%) respondents reported that their babies were born sick. This may reflect the presence of neonatal illness at birth and reinforces the need for prompt newborn assessment, infection prevention and early management of sick neonates.

5.3 Health-Facility-Related Factors

Hand hygiene was an important reported concern. Twenty (62.5%) respondents stated that health workers sometimes washed their hands before touching the cord, while 6 (18.8%) reported that they did not wash their hands and 6 (18.8%) reported that they did. Hand hygiene is a fundamental component of infection prevention because contaminated hands can transmit microorganisms to vulnerable newborns [34].

Maternal education on cord care was also a major reported gap. All 32 (100.0%) respondents stated that health workers had not educated them on cord care. This finding is particularly important because health workers are an important source of evidence-based information and can address harmful myths and practices. Community and health-worker education has been identified as an important component of improving newborn-care practices [32, 19, 16].

Staffing was another reported concern. Thirty (93.8%) respondents reported that only one to two health workers were available per shift, while 2 (6.3%) reported three to four. Limited staffing may affect the amount of time available for close newborn monitoring, education and adherence to infection-prevention practices. This finding is consistent with literature highlighting the importance of adequate human resources for quality maternal and newborn care [36].

VI. CONCLUSION

The study identified several reported factors that may contribute to umbilical cord infection among neonates admitted to the NICU at Kagando Hospital. Maternal-related factors included home or non-facility delivery, application of substances to the umbilical cord, inadequate antenatal care attendance, membrane rupture and abnormal amniotic fluid. Neonatal-related concerns included failure to cry immediately after birth, breech presentation and illness at birth. Health-facility-related concerns included lack of maternal education on cord care, inconsistent hand hygiene and limited staffing. These findings point to the need for strengthened maternal education, community engagement and infection-prevention practices.

VII. LIMITATIONS OF THE STUDY

The sample size was small, with only 32 respondents, which limits the extent to which the findings can be generalized beyond the study setting.

Purposive sampling was used, which may introduce selection bias.

Several variables relied on respondents' recall and self-report, which may introduce recall or reporting bias.

Limited funding affected the researcher's ability to undertake a larger study.

VIII. RECOMMENDATIONS

The Ministry of Health should strengthen comprehensive education on safe umbilical cord care during antenatal, intrapartum and postnatal care, with particular attention to myths and harmful practices.

Health facilities should provide clear, consistent demonstrations and counselling on evidence-based cord care before mothers and newborns are discharged.

Community health education should be strengthened so that mothers, grandmothers, partners, traditional birth attendants and other influential caregivers receive consistent information on safe cord care.

Health managers should reinforce hand-hygiene compliance and monitor infection-prevention practices in neonatal care areas.

Health-facility management should review staffing levels in neonatal units and advocate for adequate human resources to support close newborn monitoring and quality nursing care.

Community health workers should be equipped with accurate, up-to-date information and appropriate tools to reinforce safe cord-care practices and support early recognition and referral of newborn illness.

Religious and community leaders should be engaged as trusted messengers to address cultural beliefs and practices that may encourage application of unsafe substances to the umbilical cord.

Further studies with larger probability-based samples and stronger analytical designs should be conducted to quantify associations between identified factors and confirmed umbilical cord infection.

IX. NURSING IMPLICATIONS

The findings have important implications for nursing and midwifery practice. Nurses and midwives should treat cord care as an integral part of newborn infection prevention, ensure consistent hand hygiene, provide practical and culturally sensitive education to mothers and caregivers, and identify newborns requiring closer assessment. Health workers should also reinforce early recognition of signs of infection, appropriate referral and timely treatment. At the management level, staffing and availability of infection-prevention supplies should be monitored to support safe neonatal care.

Conflict of Interest

No conflict of interest was reported in relation to this study.

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