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ORIGINAL RESEARCH

Incidence and Associated Factors of Cord Infection Among Neonates at Fort Portal and Hoima Regional Referral Hospitals

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Introduction: Untreated cord infections can result in life-threatening effects including necrotizing fasciitis. In Uganda, these effects due to cord infections are high. Proper cord care is crucial for preventing infections. This study aimed to determine the incidence of cord infection and associated factors among neonates at Fort portal and Hoima Regional Referral Hospitals.

Methods: This was a prospective cohort study in which 334 neonates born at FRRH and HRRH and their parents consented to the study were consecutively enrolled and followed up for 14 days. Neonates with abdominal wall defects and those that underwent abdominal surgery were excluded. Cord infection was characterized by the presence of pus discharge accompanied by skin redness around the umbilical area, redness with or without discharge, or a foul-smelling secretion from the cord. To identify significant predictors and assess cord care practices, Poisson regression analysis was conducted using SPSS software. A p-value of less than 0.05 was considered statistically significant.

Results: Majority were female 69.5% (232/334), 34.7% (116/334) had low birth weight (<2500g) and 32.9% (110/334) were born preterm. Cord infection was identified in 25/334 of the neonates, representing an incidence of 7.5%. The commonest symptom was foul smelling cord 48.0% (12/25), while the commonest signs were pus discharge 40.0% (10/334) and fever 28.0% (7/25). Not practicing early initiation of breastfeeding (aIRR=1.081, CI=1.009–1.159, P=0.027): not keeping the cord clean and dry (aIRR=1.244, CI=1.074–1.441, P=0.004) and not practicing hand hygiene (aIRR=1.082, CI=1.019–1.150, P=0.010) were significantly associated with cord infection.

Conclusion: The incidence of cord infection among neonates was high, where in every 10 neonates approximately one developed cord infection. Community sensitization should be conducted to all mothers to practice proper personal hygiene including handwashing. Mothers should initiate breast feeding within the first hour after delivery and keep the cords of their babies dry and clean.

Keywords: cord infection, neonates, cord care practice

Introduction

Neonatal infections, particularly cord infections, remain a significant cause of neonatal morbidity and mortality, especially in low-resource settings. The umbilical cord, a vital structure during intrauterine life, becomes a potential site for microbial invasion post-delivery, particularly when hygienic cord care practices are not observed.[1] Cord infection can rapidly progress to severe complications such as cellulitis, abscess formation, necrotizing fasciitis, and sepsis if not promptly identified and managed.[2] Globally, the incidence of cord infections varies widely; it is estimated at less than 1 per 1,000 live births in high-resource countries due to standardized hygienic practices, but ranges between 2 and 20 per 1,000 live births in developing regions.[3,4]

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In Uganda and similar low-income settings, cord infections are often linked to suboptimal delivery environments, the application of traditional substances, poor hygiene practices, and limited postnatal education.[5,6] A study in Bushenyi, Uganda reported a 27.1% incidence of cord infections, with a strong association between poor cord hygiene and infection.[2] Similarly, research from central Uganda noted that 8.5% of neonates developed cord infections within the first 28 days, despite improvements in neonatal care.[1] These findings reveal the ongoing burden of cord infection in Uganda and highlight the importance of evaluating context-specific factors contributing to infections.

Cord care practices play a pivotal role in infection prevention. World Health Organization (WHO) recommends dry cord care for facility births in low-mortality settings and antiseptic application, such as chlorhexidine, in high-mortality contexts.[7] Despite these recommendations, practices remain inconsistent across communities in Uganda, influenced by cultural beliefs, maternal education, and access to healthcare.[2,4] Factors such as delayed initiation of breastfeeding, inadequate hand hygiene, and low birth weight have also been identified as predictors of cord infections.[8]

Fort Portal and Hoima Regional Referral Hospitals serve vast catchment areas, including peri-urban and rural populations, yet data on the burden and determinants of cord infections in these facilities is limited. This study, therefore, aimed to determine the incidence of cord infections and assess associated factors among neonates born in these hospitals.

Methods

Study Design and Study Population

This study employed a prospective cohort design to determine the incidence and associated factors of cord infection among neonates. It was conducted at two major referral centers in western Uganda: Fort Portal Regional Referral Hospital (FRRH) and Hoima Regional Referral Hospital (HRRH), both of which serve diverse populations from urban, peri-urban, and rural communities. The study was carried out over a three-month period, from March to May 2025. The two study sites were selected due to their diverse catchment areas, which include both urban and rural populations. These hospitals are the primary referral centers in western Uganda and serve a wide range of communities, making them ideal locations to assess the incidence and associated factors of cord infections in neonates.

The study population consisted of all live-born neonates delivered at FRRH and HRRH during the study period. Neonates were eligible for inclusion if they were born at the study hospitals and their mothers or guardians provided informed consent. Neonates with abdominal wall defects, those who had undergone abdominal surgery, or those who were critically ill at birth were excluded. Participants were consecutively enrolled at delivery and followed up for 14 days to monitor the development of cord infections. Clinical assessment was performed to identify signs of cord infection based on World Health Organization criteria, and maternal reports on cord care practices were documented at the final evaluation.[7]

Sample Size Determination

The sample size was calculated using kish Leslie formula.[9]

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

Where;

n =the required sample size,

P = Incidence of code infection 27.1%.[2] This incidence was used for sample size estimation because it was derived from a study conducted in a tertiary hospital located in western Uganda, similar to the setting of the current study. Additionally, the study involved a comparable population of neonates, making it a relevant and reliable reference for estimating the expected incidence of cord infection.

Z =1.96 at 95% confidence interval and

δ =degree of error, 5% (0.05).

And 10% non-response rate.

Sample size = 304 participants

186 participants were consecutively selected from Hoima regional referral hospital and 148 participants from Fort Portal regional referral hospital.

Sampling Technique

Participants were selected using a consecutive sampling technique, where all neonates born at the two study hospitals during the study period (March to May 2025) whose mothers provided informed consent were enrolled. A total of 186 were selected from Hoima regional referral hospital and 148 from Fort Portal regional referral hospital.

More participants were selected from HRRH because it has a higher monthly delivery rate compared to FRRH. As both sites used consecutive sampling over the same study period, the proportional difference in the number of enrolled neonates reflects the actual delivery workload at each facility.

Data Collection Procedures

Data were collected from March to May 2025 at Fort Portal and Hoima RRH. Eligible neonates were enrolled at birth after obtaining informed consent from their mothers. Baseline information was captured using a structured questionnaire, including maternal and neonatal characteristics and cord care practices. Neonates were followed up for 14 days to assess for signs of cord infection. The clinical assessments for cord infection was done on day 7 and day 14 at the respective hospitals. We advised the caretakers of neonates to return on these days for the assessment to be done at the two hospitals. Mothers were reminded via phone call to return for final evaluation. All the clinical assessments were conducted using WHO diagnostic criteria, and mothers were interviewed about the cord care practices they had followed during the neonatal period.

Data Quality Control

To ensure data accuracy and reliability, several quality control measures were implemented. The data collection tool was pretested at Masindi General Hospital on 10 study participants and revised accordingly. This was done to evaluate the clarity, relevance, and completeness of the questionnaire, as well as to assess the feasibility of the study procedures. The pretest data were not included in the final analysis of the study results. Instead, findings from the pretest were used solely to refine the questionnaire, enhance data collector training, and improve the standardization of clinical assessments. Based on the pretest feedback, minor modifications were made to the wording of certain questions to enhance clarity and ensure consistent data capture during the main study. Data collectors underwent a three-day training on study protocols, ethical procedures, and proper clinical assessment. Equipment used for neonatal assessments was calibrated regularly. The principal investigator supervised data collection through field visits and random checks. Daily reviews of completed questionnaires were conducted for completeness and consistency, and double data entry was performed on a subset to minimize entry errors.

Data Management and Analysis

Data Entry and Validation

Data were entered into IBM SPSS Statistics Version 26. A double data entry method was employed on a randomly selected subset of 10% of the total sample to minimize data entry errors. A data cleaning process was performed, where inconsistencies, missing values, and outliers were flagged and resolved by cross-referencing with the source data.

Data Handling Procedures

All collected data were stored in password-protected electronic files, ensuring confidentiality. Access to data was restricted to authorized personnel only, and backup copies were securely stored at multiple locations.

Data Analysis

Descriptive statistics such as means, standard deviations, frequencies, and proportions were used to summarize baseline characteristics. The incidence of cord infection was calculated as a proportion of new cord infection cases divided by the

baseline population at risk. To identify factors associated with cord infection, both bivariable and multivariable Poisson regression analyses were conducted. A p-value of less than 0.05 was considered statistically significant.

Ethical Consideration

Ethical approval was obtained from the Kampala International University Research and Ethics Committee. Informed consent was obtained from parents of all participants after explaining the purpose and procedures of the study. Confidentiality was maintained by anonymizing data, and participation was entirely voluntary, with the right to withdraw at any time without consequence.

Results

Baseline Characteristics and Cord Care Practices of the Study Participants

In this study, we enrolled 334 neonates, majority of whom were female, accounting for 69.5% of the study participants. About one third (34.7%) had low birth weight (<2500g), while 32.9% were born preterm. Early initiation of breast feeding was practiced for 69.5% of the participants. The cords of 85.6% were kept clean and dry, while for 70.1%, some substances like soil, ash, cow dung and herbal pastes were applied to the cord. Hand hygiene was practiced by 86.5% of the care givers (Table 1).

Table 1 Baseline Characteristics and Cord Care Practices of Study Participants

Characteristic	Frequency	Percentage
Sex		
Male	102	30.5
Female	232	69.5
Residence		
Rural	157	47.0
Urban	177	53.0
Age of guardian (years)		
<20	37	11.1
21-34	276	82.6
35+	21	6.3
Sex of guardian		
Male	28	8.4
Female	306	91.6
Occupation of guardian		
Formal employment	58	17.4
Business	32	9.6
Peasant/farmer	132	39.5
House wife/none/student	112	33.5
Education of guardian		
No formal education	164	49.1
Primary	76	22.8
Secondary	79	23.7
Tertiary	15	4.5
ANC visits		
< 4	47	14.1
4+	287	85.9
Birth weight		
< 2.50	116	34.7
2.50+	218	65.3

(*Continued*)

Table 1 (Continued).

Characteristic	Frequency	Percentage
Gestational age		
Term	224	67.1
Preterm	110	32.9
Mode of delivery		
SVD	239	71.6
CS	95	28.4
Chorioamnionitis (medical records)		
No	273	81.7
Yes	61	18.3
Labour duration (medical records)		
≤12	244	73.1
13+	90	26.9
Early initiation of BF		
No	102	30.5
Yes	232	69.5
Exclusive BF		
No	48	14.4
Yes	286	85.6
Admission after birth		
No	288	86.2
Yes	46	13.8
Maternal HIV		
Negative	309	92.5
Positive	25	7.5
Keeps cord clean and dry		
No	48	14.4
Yes	286	85.6
Uses plain water for cleaning		
No	56	16.8
Yes	278	83.2
Exposes cord to air		
No	72	21.6
Yes	262	78.4
Covers stamp with tight clothes		
No	76	22.8
Yes	258	77.2
Applies substance to stump		
No	100	29.9
Yes	234	70.1
Practices hand hygiene		
No	45	13.5
Yes	289	86.5
Immerse cord in water		
No	96	28.7
Yes	238	71.3
Monitor for signs of infection		
No	43	12.9
Yes	291	87.1

Notes: Apply substance to stump=soil, ash, cow dung and herbal pastes.
Abbreviations: ANC, Antenatal care; SVD, spontaneous vaginal delivery; CS, Cesarean section; BF, Breast feeding;HIV, Human immunodeficiency virus.

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Incidence of Cord Infection in Neonates

Of the 334 neonates who were born at the study centres and followed up for the 14 days, cord infection was identified in 25, representing an incidence ratio of 7.5% (75 cases of cord infection per 1,000 births) with a 95% confidence interval of 4.5–10.5%.

Common Clinical Presentations of Cord Infection in Neonates

The commonest symptom was foul smelling cord seen in 48% of the neonates with cord infection, while the commonest signs were pus discharge and fever, which were present in 40% of the neonates with cord infection (Table 2).

Factors Associated with Cord Infection Among Neonates

In the multivariable analysis, the independent factor associated with cord infection was delayed initiation of breastfeeding (aIRR=1.081, CI=1.009–1.159, P=0.027). Neonates whose mothers delayed initiation of breastfeeding had the rate of cord infection increased by 8.1%. Not keeping the cord clean and dry (aIRR=1.244, CI=1.074–1.441, P=0.004) and not practicing hand hygiene (aIRR=1.082, CI=1.019–1.150, P=0.010). Neonates whose mothers did not keep the cord clean and dry had the rate of cord infection increased by 24.4%, while the rate of cord infection was increased by 8.2% among neonates to mothers who did not practice hand hygiene (Table 3).

Table 2 Common Clinical Presentations of Cord Infection

Symptom (n= 25)	Frequency (n)	Percentage (%)
Smelling	12	48.0
Swelling	7	28.0
Redness	4	16.0
Fever	1	4.0
Poor feeding	1	4.0
Signs of cord infection (n=25)		
Pus+ fevers	10	40.0
Fevers	7	28.0
Pus	3	12.0
Other discharge	1	4.0
Redness	2	8.0
Tenderness	2	8.0

Table 3 Multivariable Analysis of Factors Associated with Cord Infection Among Neonates

Characteristic	Bivariable Analysis			Multivariable Analysis		
	cIRR	95% CI	P value	aIRR	95% CI	P value
ANC visits						
< 4	1.090	0.981–1.211	0.109	1.033	0.934–1.143	0.528
4+	Ref					
Labour duration						
≤12	Ref					
13+	1.067	0.991–1.149	0.085	1.047	0.983–1.115	0.152
Early initiation of BF						
No	1.110	1.031–1.194	0.006	1.081	1.009–1.159	0.027
Yes	Ref					
Admission after birth						
No	Ref					
Yes	1.122	1.002–1.256	0.046	1.098	0.997–1.210	0.058

(*Continued*)

Table 3 (Continued).

Characteristic	Bivariable Analysis			Multivariable Analysis		
	cIRR	95% CI	P value	aIRR	95% CI	P value
Cord care practices						
Keeps cord clean and dry						
No	1.227	1.083–1.390	0.001	1.244	1.074–1.441	0.004
Yes	Ref					
Uses plain water for cleaning						
No	1.109	1.003–1.225	0.043	1.048	0.944–1.164	0.375
Yes	Ref					
Exposes cord to air						
No	1.085	0.997–1.181	0.059	1.010	0.908–1.158	0.606
Yes	Ref					
Covers stamp with tight clothes						
No	Ref					
Yes	1.047	0.990–1.107	0.106	1.018	0.884–1.172	0.804
Practices hand hygiene						
No	1.156	1.025–1.303	0.018	1.082	1.019–1.150	0.010
Yes	Ref					

Abbreviations: cIRR, crude incidence rate ratios; aIRR, adjusted incidence rate ratios.

Discussion

Incidence of Cord Infection in Neonates

Cord infection was identified in 25 out of the 334 neonates during the 14 days of follow-up, representing an incidence ratio of 7.5%. This incidence was relatively high. The exact causes could however not be determined due to design of this study. Low birth weight, observed in 34.7% of the neonates and not practicing hand hygiene, reported among 13.5% of the caretakers could be among the major contributors.

The study findings are similar to those carried out in Bangladesh.[10] The similarity in study findings could be attributed to the fact that in both studies, about a third of the study participants were of low birth weight and preterm. Low birth weight and preterm increase the risk of infections due to a less developed immune system, making them more susceptible to infections.[10] In this current study, about one third (34.7%) of the neonates had low birth weight (<2500g), while 32.9% were born preterm. Also a study south Nepal revealed that cord infections were higher in preterm.[11]

The high incidence of cord infection in this study could also be attributed poor hand washing practices among caretakers where 13.5% of them did not practice hand washing. A study conducted in Nigeria revealed that healthcare workers and caregivers who did not wash their hands properly could transfer pathogens from contaminated hands to newborns, leading to infections that could escalate to sepsis.[12] Mothers, caregivers, and healthcare workers often carry a variety of harmful microorganisms on their hands, which they acquire through contact with patients or contaminated surfaces in the environment. Routine activities such as handling respiratory secretions, changing diapers, or direct skin-to-skin contact can serve as pathways for transmitting infectious agents to neonates.[12] This is comparable with our findings where hand hygiene was practiced by 86.5% of the care givers were the rest were handling neonates with dirty hands.

Comparable to our findings, in a study in central Uganda which assessed the incidence of cord infection showed that 8.5% of the neonates developed cord infection.[1] Similarly, in south Nepal, cord infection was identified in 954 of 17,198 newborns (5.5%).[11] The proportions reported by these two studies were comparable to our findings since they fell within our confidence interval. The similarity can be explained by the similarity of participants' characteristics.

Contrary to our study, community-based cohort research carried out in eastern Uganda showed that only 3.0% of the population had cord infection (62/2052).[8] The possible explanation for the lower proportion to this eastern Uganda study could be because all participants were using chlorhexidine gel for cord care.[13]

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Contrary to our findings, in Bushenyi, 65 (27.1%) neonates had at least one sign of cord infection.[2] Similarly, in a study conducted at a tertiary hospital in western India, reported that 27.1% of neonates (n = 65) had cord infections, according to the study.[14] These high incidences can be explained by the fact that these studies only enrolled neonates who were admitted to the neonatal intensive care unit (NICU) as opposed to our study where we followed up all neonates who were born at the health centers. NICU neonates are at an increased risk of having cord infection.[15]

In the current study, the most reported symptom was a foul-smelling umbilical cord, observed in 48% of neonates. This aligns with literature that describes foul odour as an early and easily noticeable sign of cord infection, often linked to anaerobic bacterial colonization.[16] However, this finding contrasts with studies such as Ganatra[17] in India and Byamugisha[18] in Uganda, where redness and pus discharge were more commonly reported than smell. One possible explanation for this difference could be that in this current study, caregivers may have presented themselves late to the health facility, after the infection had progressed to a stage where foul smell is more prominent. Additionally, differences in hygienic cord care practices and the possible application of traditional substances could predispose to colonization with anaerobic organisms that produce strong odours.

Swelling was the second most common symptom, noted in 28% of neonates. Swelling is a classical local sign of inflammation and often indicates tissue reaction to infection. This finding is comparable to that of Mullany in Southern Nepal, where swelling and redness were frequently reported in early-stage infections.[11] The relatively high frequency of swelling in the current study suggests that some neonates presented during the early inflammatory stage. However, the proportion is slightly lower than in some community-based studies,[19] possibly because the current study is hospital-based and likely captures more advanced cases where swelling may have progressed to abscess formation or discharge.

Redness of the cord was reported in only 16% of the neonates. This is notably lower compared to findings from Ganatra's study, which reported redness in over 60% of infected neonates.[20] The discrepancy may be due to differences in the stage of infection at presentation. Redness is typically one of the first signs of cord infection and may go unnoticed or unreported by caregivers, particularly in low-resource settings where health literacy may be limited. Additionally, if caregivers present late, redness may have already evolved into more advanced signs such as pus discharge and odour, which could explain the lower frequency in this study.

Fever was reported in 4% of the neonates as a symptom, and was observed in 28% as an isolated sign, and in 40% in combination with pus discharge. The relatively low frequency of fever as a standalone symptom could suggest that caregivers recognize local signs more readily than systemic ones. However, when combined with pus, fever appears to be a key clinical sign of more severe or systemic infection. This pattern is consistent with hospital-based studies, where cases are more likely to have progressed to systemic involvement.[21] The higher rate of fever in combination with pus rather than in isolation also reflects the natural progression of cord infection starting locally and, if untreated, becoming systemic.

Poor feeding was noted in only 4% of the neonates, indicating that systemic manifestations were relatively rare. Poor feeding is a nonspecific but important indicator of sepsis in neonates. Its low frequency suggests that most infections were still localized at the time of presentation or that systemic symptoms were under-recognized by caregivers. In comparison, studies that actively screen for neonatal sepsis (eg, using laboratory markers) often report higher rates of systemic signs like lethargy and poor feeding, which may not be as easily recognized or reported in routine clinical practice.[22]

In terms of clinical signs, pus discharge (with or without fever) was the most frequently observed, seen in 52% of neonates (40% with fever, 12% without). This finding is consistent with both local and international studies where pus is a hallmark of cord infection.[23,24] Pus reflects a suppurative response to bacterial invasion, often indicating established infection. The relatively high proportion in this study could reflect delayed presentation, which allows time for infection to progress and form purulent discharge. Compared to community-based studies, where pus may be less common due to early detection, hospital-based data like this tend to report higher pus prevalence.[25]

Other signs such as other types of discharge (4%), redness (8%), and tenderness (8%) were less commonly observed. While these are also classic signs of local infection, their lower frequency could again be due to the timing of presentation and variability in clinical documentation or caregiver reporting. Some signs like tenderness require active elicitation during physical examination and may be underreported if the neonate is irritable or if examinations are not thorough due to resource constraints.

Factors Associated with Cord Infection Among Neonates

Multivariable analysis identified delayed initiation of breastfeeding as an independent factor significantly associated with cord infections among neonates. Specifically, neonates whose mothers did not initiate breastfeeding within the first hour after birth exhibited an 8.1% higher incidence of cord infections. These findings are consistent with a study from Tanzania, which reported that early breastfeeding initiation was associated with reduced risk of neonatal infections.[11] A similar trend was observed in Central Uganda, where delayed breastfeeding initiation was found to increase the likelihood of cord infection in newborns.[1] Another study in Uganda revealed that initiation of breastfeeding later than 1 hour after birth was associated with increased neonatal infections including cord infections.[6] Newborns who are delayed to breastfeed are deprived of an opportunity to fully benefit from the immunological protection offered by colostrum which predisposes the neonate to infections.[26]

In our study, maternal secondary education level was not significantly associated with cord infection. This contrasts with findings from Bushenyi-Uganda[2] which reported a significant association between maternal education level and cord infection. A possible explanation for this difference is that, in our setting, mothers were routinely educated about proper cord care immediately after delivery, which may have minimized the influence of education level. In contrast, participants in the Bushenyi study were enrolled after admission to the NICU with morbidity, likely after the cord infection had already developed thus missing the opportunity for immediate postnatal education. This could have made maternal education a more critical factor in that context.

In the current study, hand hygiene was significantly associated with cord infection where the rate of cord infection increased by 8.2% among neonates to mothers who did not practice hand hygiene. A study conducted in Nigeria revealed that healthcare workers and caregivers who do not wash their hands properly can transfer pathogens from contaminated hands to newborns, leading to infections that can escalate to sepsis.[12]

Hands of mothers, caregivers, and healthcare personnel frequently carry a wide range of infectious microorganisms, often picked up through interactions with patients or contaminated surfaces.[27] Activities such as handling respiratory secretions, changing diapers, or direct skin contact with infants are common routes through which these pathogens may be transmitted to newborns.[1] In our study, more than a third of the neonates that developed cord infection, their mothers did not practice hand hygiene.

Comparable to our findings, a study conducted in Kenya, which aimed at identifying umbilical cord care practices among mothers attending the Kahawa Health Centre (KHC) found that the odds of neonatal sepsis were 13 times higher among infants whose caregivers practiced improper hand hygiene compared to those who practices proper hygiene.[28]

Caregiverswho did not keep neonates' cords dry and clean were more likely to have neonates with cord infection. Dry cord care is a practice that involves maintaining cleanliness of the newborn's umbilical cord stump without the use of antiseptics or other substances.[29] The approach focuses on keeping the area hygienic, occasionally cleaning it with mild soap and water when needed, and ensuring the stump is exposed to air. This exposure promotes natural drying, which supports the stump's safe detachment over time.[30] Dry cord care is a commonly endorsed approach by healthcare professionals, as it supports the body's natural healing process. This method helps lower the risk of infection and facilitates the spontaneous separation of the umbilical cord stump, typically occurring within one to three weeks following birth.[30] This is comparable to our study where among 286 neonates whose mothers kept their cords dry and clean, only 13 (4.5%) suffered cord infection.

Comparable to our study, a study conducted at a tertiary hospital in western India, reported that keeping the cord clean and dry was one of the main factors that reduced the risk of cord infection.[14]

Study Limitations

There was absence of microbiological culture and sensitivity testing to confirm the causative organisms of the cord infections. The diagnosis of cord infection was based solely on clinical signs and symptoms, following the WHO's diagnostic criteria. Data on cord care practices were self-reported by caregivers, which may be subject to recall bias or social desirability bias, as mothers might have over-reported optimal care practices.

Conclusion

This study found a relatively high incidence of cord infection among neonates at FRRH and HRRH, with an incidence rate of 7.5%. The commonest clinical presentations included foul-smell, pus at the umbilical stump and fever. Factors significantly associated with cord infection included poor cord care practices such as not keeping the cord clean and dry, inadequate hand hygiene, and delayed initiation of breastfeeding by mothers/caretakers. These findings emphasize the importance of strengthening maternal education on proper neonatal hygiene, early recognition of signs of infection, and the promotion of safe cord care practices.

Recommendations

Health workers should consistently educate mothers on the importance of initiating breastfeeding within the first hour after birth, as it has been shown to reduce the risk of cord infection through enhanced neonatal immunity.

Postnatal counselling should emphasize the need to keep the umbilical cord clean, dry, and untouched by non-sterile substances. Mothers and caretakers should be trained on safe practices and discouraged from using traditional substances like herbs, powders, or oils on the stump.

Routine and structured education should be provided to both mothers and other caregivers on the importance of handwashing before handling the baby. This should be included in both antenatal sessions and postnatal discharge instructions.

Community health workers (VHTs) should be trained and supported to follow up neonates within the first two weeks postpartum to monitor for signs of cord infection and reinforce good cord care practices at the household level.

Data Sharing Statement

Data can be obtained upon requested from the corresponding author (Mohamed Abdi Hassan, Email: mohamedabdih576@gmail.com.

Ethics Approval and Consent to Participate

The study was approved by the Kampala International University—Research Ethics Committee (Ref no: KIU-2024-789). Parents of all participants gave their written consent by signing the consent form. This study complies with the Declaration of Helsinki.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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The authors confirm they have no conflicts of interest in this work.

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