

UMBILICAL CORD CARE KNOWLEDGE AND PRACTICE AMONG CAREGIVERS IN YENAGOA, BAYELSA STATE, NIGERIA

Abstract

Aim: To assess the knowledge and practice of current cord care recommendations among care givers in Yenagoa, and to identify gaps to be addressed to prevent neonatal sepsis.

Study Design: This was a descriptive cross-sectional study.

Place and Duration of study: The study was carried out at the well-child clinics (WCC) of 3 major healthcare facilities in Yenagoa namely, Agudama Primary Health Centre, Yenizuegene Comprehensive Health Centre, and Diète Koki Memorial Hospital, from August to September 2023.

Methodology: The study was conducted among 285 caregivers in the study sites. Data on cord care knowledge and practices was collected using self-administered structured questionnaires administered proportionately across the study sites. Data was analysed using the Statistical Package for Social Sciences (SPSS) version 23, from which descriptive statistics were generated. All necessary ethical considerations were upheld.

Results: In this study, 268 (97.1%) of the respondents had antenatal care, over 77% delivered in healthcare facilities, 252 (88.4%) indicated that they knew how to properly care for their children's cord and 244 (85.6%) had been taught cord care. While 269 (94.4%) respondents were aware of the use of methylated spirit for cord care, only 96 (33.8%) were aware of the use of chlorhexidine gel. Good umbilical cord care knowledge score of 51.6% was obtained while good umbilical cord care practice score was 32.7%.

Conclusion and Recommendation: Modest umbilical cord care knowledge gap and huge practice gap were found in this study. The knowledge gaps were mainly with the use of chlorhexidine gel, dry cord care, and application of substances to the cord, and these reflected remarkably in their practice. There is urgent need for improvement in umbilical cord care knowledge and practice among caregivers, a review of cord care knowledge of frontline health educators and the contents of their cord care education.

Keywords: Mothers, Caregivers, Umbilical cord care, Knowledge, Practices, Yenagoa

Introduction

Umbilical cord care are actions taken to handle the umbilical cord after delivery to ensure it does not pose a health risk to the infant. Improper care of the cord could lead to infections such as omphalitis, septicaemia, and tetanus. Infection is one of the leading causes of neonatal mortality globally.[1] Neonatal sepsis-related morbidity and mortality are particularly high in low- and middle-income countries (LMIC) which bear about 99% of the global neonatal mortality burden.[2,3] In Nigeria, neonatal sepsis accounts for up to 44% of neonatal deaths.[4] After delivery, the cord is clamped and severed leaving an exposed umbilical stump attached to the baby which gradually becomes dry, shrinks, changes colour, and falls off between 1 to 3 weeks. The withering tissue of the stump provides a suitable environment for bacterial colonization and growth, which may lead to umbilical cord infection (omphalitis) and this may become complicated with the development of cellulitis,

necrotizing fasciitis, and life-threatening systemic infection.[5] Incidence of about 8% among home deliveries in developing countries has been reported [6] and is dependent on factors such as place of delivery, cord care practices, and the baby's immune system. A rate of about 22% has been reported among newborn babies delivered at home.[7]

Omphalitis occurs primarily in the neonatal period and in low-income countries. Clinical features reported to usually start about the 3rd day of life include tenderness, erythema, and induration of the umbilicus and surrounding tissues. At certain times, a purulent foul-smelling discharge emanates from the cord which can progress rapidly to systemic infection with potentially fatal outcomes. Estimated mortality rate from omphalitis ranges between 7% and 15%.[6] Neonatal tetanus is another life-threatening infection that can be prevented through adequate cord care and the application of other precautions including immunization with tetanus-toxoid-containing vaccines.[8] The World Health Organization (2013) recommends that daily chlorhexidine (7.1% chlorhexidine digluconate aqueous solution or gel, delivering 4% chlorhexidine) be applied to the umbilical cord stump during the first week of life for newborns who are born at home in settings with high neonatal mortality (30 or more neonatal deaths per 1000 live births).[9] Clean, dry cord care is recommended for newborns born in health facilities and at home in low neonatal mortality settings. The use of chlorhexidine in these situations may be considered only to replace the application of a harmful traditional substance, such as cow dung, to the cord stump. However, following evidence of chlorhexidine's effectiveness in preventing neonatal sepsis for both home and facility births[10,11], it has been recommended for umbilical cord care in babies.[12] Its use in Nigeria has also been scaled up for both home and facility births.[13,14]

Unfortunately, harmful cord care practices including the application of unsafe materials such as cow dung, sand, engine oil, and herbs, as well as the use of unsafe objects to cut and tie the cord have persisted in developing countries.[15] Studies have been carried out on umbilical cord care practices in Bayelsa State[16,17] and in Port Harcourt, River State[18], with poor practice reported. These studies didn't assess cord care practice as currently recommended by the World Health Organization (2013)[9] and in Nigeria[13], considering that the use of chlorhexidine was either not assessed alone or was grouped with methylated spirit as good practice. Assessment of cord care knowledge was done in only one of the studies, but the details were not reported limiting understanding of aspects of knowledge gaps that need to be addressed. This manuscript thus assessed the knowledge and practice of current cord care recommendations among mothers and caregivers attending the well-child clinics of 3 healthcare facilities located in Yenagoa, to identify gaps to be addressed about umbilical cord care to prevent cord infection and reduce risk for neonatal sepsis.

Materials and Methods

The study was carried out in Yenagoa, the capital city of Bayelsa State which is located within the Niger Delta region of Southern Nigeria and occupying an area of 706km². Study sites included the Agudama Primary Health Centre, the Yenizue-gene Comprehensive Health Centre and the Diets Koki Memorial Hospital, Opolo. These health care facilities, which are all located in Yenagoa, Bayelsa State; were purposively selected considering their strategic locations in Yenagoa and the level of utilization by mothers in large numbers for immunization services. This study adopted the descriptive cross-sectional design in which self-administered structured questionnaires were administered proportionately across the

study sites and used to obtain data on the cord care knowledge and practices from caregivers attending the **well-child** clinics. Data was collected for a period of six weeks.

The questionnaire had 4 sections (1 to 4). Section 1 elicited data on the socio-demographic characteristics of the respondents, Section 2 elicited data on the details of the index child including antenatal care and place of delivery, Section 3 elicited data on the umbilical cord care knowledge of the mothers. The section consisted of general umbilical cord care knowledge questions and 6 other questions which were used as measures of umbilical cord care knowledge. Section 4 elicited data on the umbilical cord care practices of the caregivers and 5 other questions which were used as measures of umbilical cord care practice. A score of 1 was awarded for each correct question and 0 for wrong responses, I don't know, or I am not sure responses. Good umbilical cord care knowledge **score** for the study population was obtained by summing up the correct responses from the 6 measures, dividing it by the sum of respondents to the 6 questions and multiplying by 100. Same was done with the **5 umbilical cord care** practice measures to get good umbilical cord care practice **score** of the study population.

All parents or caregivers at the **well-child** clinics of the study sites who gave consent to be involved in the study served as the study population and sample size of 285 was calculated using the Cochran's formula, after considering a previous prevalence of cord care practice reported by Ayub et al. (2022) [19] and a 12% attrition rate. Caregivers who met the inclusion criteria **in each study site** were enrolled consecutively until the desired sample size was met. A research assistant was recruited and adequately trained before the study commenced. The questionnaire was pretested on 30 subjects at a health care facility that was not used for this study to ensure the validity and reliability. The questionnaires were proportionately distributed across the 3 healthcare facilities. Data obtained was analysed using the Statistical Package for Social Sciences (SPSS) version 23 software, from which descriptive statistics were obtained.

Results

Socio demographic Characterises of parents/caregivers.

A total of 285 respondents were interviewed among which most of them were female 277 (97.2%), aged between 19 and 29 years 119 (49.8%) with a mean age of 29.1 ± 6.3 years, were married 204 (72.1%), were Christians 275 (97.9%), and were of the Ijaw ethnic group 160 (57.3%). It was also identified that 99 (37.6%) of the respondents were either petty traders, labourers, or messengers and 125 (46.3%) of the respondents had received up to secondary school education. The details are shown in Table 1.

Table 1: Socio-demographic characteristics of parents/caregivers

Variable	Frequency	Percentage (%)
Sex (n=285)		
Male	8	2.8
Female	277	97.2
Age (years) (n=239)		
<19	9	3.8
19-29	119	49.8

30-39	100	41.8
40-49	10	4.2
>49	1	0.4
Mean age: 29.1±6.3 years		
Marital status (n=283)		
Single	63	22.3
Married	204	72.1
Cohabiting	14	4.9
Widowed	2	0.7
Religion (n=281)		
Christianity	275	97.9
Islam	6	2.1
Ethnic group (n=279)		
Ijaw	160	57.3
Igbo	63	22.6
Yoruba	13	4.7
Hausa	3	1.1
Others	40	14.3
Occupation (n=263)		
Senior public servant/ managers/contractors/large scale trader	52	19.8
Intermediate grade public civil servant/ Senior school teachers	18	6.8
Junior school teachers / artisans	31	11.8
Petty trader/ labourers/messengers	99	37.6
Unemployed/ homemaker/student	63	24.0
Education (n=270)		
No formal education	4	1.5
Primary	19	7.0
Secondary	125	46.3
Post-secondary	29	10.7
University/higher institution	93	34.4

Index child characteristics

Regarding the characteristics of the index children of the parents involved in this study, it was identified that 162 (56.8%) of them were males, and most of them were less than 12 months of age 211 (74.0%). Majority of the caregivers had received antenatal care (ANC) for this index child 268 (97.1%), which was mostly received in government health facilities 194 (70.0%). Also, most of the women delivered the index child at government health care facilities 155 (55.6%), and this index child was the first child of the largest proportion of the respondents 103 (36.5%). The details are shown in Table 2.

Table 2: Index child characteristics

Variable	Frequency	Percentage (%)
Sex of child (n=285)		
Male	162	56.8
Female	123	43.2

Age of child (months) (n=271)		
<12	211	74.0
12-60	59	20.7
>60	1	0.4
Received antenatal care (ANC) for child (n=276)		
Yes	268	97.1
No	8	2.9
Where ANC was received (n=277)		
Government health facility	194	70.0
Private health facility	71	25.6
Traditional Birth Attendant	10	3.6
Church	1	0.4
Others	1	0.4
Where child was delivered (n=279)		
Government health facility	155	55.6
Private health facility	62	22.2
Traditional Birth Attendant	24	8.6
Church	7	2.5
Home	31	11.1
Birth order of index child (n=282)		
1 st	103	36.5
2 nd	81	28.7
3 rd	36	12.8
4 th	33	11.7
5 th	18	6.4
6 th	10	3.5
7 th	1	0.4

Umbilical cord care knowledge

Regarding general cord care knowledge (Table 3a), 252 (88.4%) of the respondents indicated that they knew how to properly care for their children's cord, 243 (85.6%), of them had been taught how to care for the cord, and out of these, 163 (68.2%) were taught by a nurse, and 161 (66.3%) respondents were taught cord care during the antenatal care. On the use of methylated spirit, 269 (94.4%) respondents were aware that this was used for cord care.

On the 6 measures of good cord care knowledge (Table 3b), 213 (82.6%) of the respondents knew that proper cord care helps prevent cord infection and child death, only 40 (15.5%) knew that the cord should be left exposed and dry with the diaper folded below it, 96 (33.8%) were aware of the use of chlorhexidine gel for cord care, 67 (25%) respondents knew that no other substance apart from hexedine should be applied to the cord after it is cleaned, 177 (69.4%) knew that redness, yellowish discharge from cord and foul-smelling cord may be signs of cord infection, and 236 (82.8%) knew that hand hygiene should be done before and after cord care.

Good umbilical cord care knowledge score obtained after analysing responses to the 6 cord care knowledge measures was 51.6%.

Table 3a: General Umbilical Cord Care Knowledge

Variable	Frequency	Percentage (%)
Knows how to care for child's umbilical cord (n=285)		
Yes	252	88.4
No	6	2.1
I am not sure	27	9.5
Ever taught how to care for child's umbilical cord (n=285)		
Yes	244	85.6
No	33	11.6
I don't know	8	2.8
Who taught you how to care for your child's cord (n=239)		
A Nurse	163	68.2
A TBA	1	0.4
A Neighbour /Friend	4	1.7
Mother /Mother-in-law/Grandmothers	61	25.5
Doctor	8	3.3
Others	2	0.8
When were you taught how to care for your child's umbilical cord (n=243)		
During antenatal care	161	66.3
After I delivered my child	66	27.1
I cannot remember	16	6.6
Awareness of the use of methylated spirit for cord care (n=285)		
Yes	269	94.4
No	16	5.6

Table 3b: Umbilical Cord Care Knowledge measures

Variable	Frequency	Percentage (%)
Proper cord care helps to prevent cord infection and child death. (n=258)		
Yes	213	82.6
No	6	2.3
I don't know	39	15.1
Umbilical cord should be kept dry and exposed, with the diaper folded below it. (n=258)		
Yes	40	15.5
No	183	70.9
I don't know.	35	13.6
Awareness of the use of Chlorhexidine gel for cord care. (n=284)		
Yes	96	33.8

No	188	66.2
No other substance apart from chlorhexidine should be applied to the cord after cleaning it. (n=268)		
Yes	67	25.0
No	92	34.3
I don't know	109	40.7
Redness, foul-smelling cord and yellow discharge from cord may be signs of cord infection (n=255)		
Yes	177	69.4
No	14	5.5
I don't know	64	25.1
Knowledge of Hand Hygiene before and after Cord Care (n=285)		
Yes	236	82.8
No	3	1.1
I don't know	46	16.1

Umbilical Cord Care Practices

On the assessment of general cord care practices (Table 4a), 187 (71.6%) responded that a pair of hospital scissors was used to cut their children's cords, and 245 (92.8%) indicated that a cord clamp was used to clamp their children's cord. Regarding actual cord care practices by the respondents, 177 (62.1%) washed hands before cord care. It was also found that 102 (35.8%) respondents practiced hot water massage/compress for cord care, 184 (70.0%) covered the cords after cleaning, and this was done using diapers by 108 (58.7%) respondents.

Regarding the 5 umbilical cord care practice measures used (Table 4b), it was found that 177 (62.1%) respondents practiced hand hygiene before and after cord care, only 45 (15.8%) cleaned cord with water only, only 76 (26.7) kept cord exposed and dry with diaper folded below it. Chlorhexidine gel alone was used by 53 (20%) of respondents. Other substances applied to the cord are shown in Table 4b. Also, methylated spirit alone was applied to cord by 125 (47.2%) respondents.

Good cord care practice score of 32.7% was obtained after analysing the umbilical cord care practice measures.

Table 4a: General Umbilical Cord Care Practices

Variable	Frequency	Percentage (%)
Instrument used to cut child's cord (n=261)		
Sterile scissors	187	71.6
Razor	17	6.5
Surgical blade	13	5.0
Others	1	0.4
I don't know	43	16.5

Material used to tie/clamp child's cord (n=264)		
Cord clamp	245	92.8
Piece of cloth	3	1.1
Thread	9	3.4
Others	7	2.7
Hot water massage / compress (n=285)		
Yes	102	35.8
No	5	1.8
I don't know	178	62.5
Cover cord after cleaning (n=263)		
Yes	184	70.0
No	69	26.2
Sometimes	10	3.8
If yes, item used to cover it (n=184)		
Bandage	20	10.9
Diaper	108	58.7
Gauze	24	13.0
Piece of cloth	32	17.4

Table 4b: Umbilical Cord Care Practice measures

Variable	Frequency	Percentage (%)
Perform Hand hygiene before and after cord care (n=285)		
Yes	177	62.1
No	2	0.7
I don't know	106	37.2
Ever used chlorhexidine gel for cord care (n=285)		
Yes	108	37.9
No	177	62.1
Clean cord with gauze and water only (n=285)		
Yes	45	15.8
No	127	44.6
I don't know	113	39.6
Keep cord dry and exposed with diaper folded below it. (n=285)		
Yes	76	26.7
No	87	30.5
I don't know	122	42.8
Materials applied to cord after cleaning (n=265)		
Methylated spirit only	125	47.2
Chlorhexidine gel only	53	20.0
Vaseline	32	12.1
Menthol	23	8.7
Herbs	7	2.6
Toothpaste	3	1.1
Dusting powder	2	0.8
Religious Oil (olive oil,	2	0.8
Breastmilk	1	0.4
Salt	1	0.4

Discussion

The finding from this study that 51.6% of the study respondents had good cord care knowledge is close to the finding of 48.1% reported by Ndikom et al (2020) [20], but higher than 21.65% reported by Mohammed et al. (2020) [21] and remarkably lower than over 70% reported by some other researchers.[22-24] Good cord care knowledge results obtained in studies depends largely on measures used for the assessment which was found to vary in the studies and may have impacted on results obtained. It was also found in this study that although 88.4% of the respondents indicated that they have proper cord care knowledge, a finding comparable to the response of 83.3% reported by Nwonwu et al (2017) [25], this did not translate to proper knowledge following assessment with specific knowledge measures highlighting the need for in dept assessment of actual knowledge by researchers. Of note among the cord care measures assessed was the low awareness of chlorhexidine gel, the only currently recommended antiseptic for cord care, by only 33.8% of respondents in the present study. This finding is however higher than the rather low values of 11.7% and 2.8% reported in other studies.[25,26] Israel et al. (2023) [27] and Aitafo et al (2021)[28] reported chlorhexidine gel awareness of 60.7% and 63.3% but good knowledge scores of 47.1% and 34.2% respectively following further evaluation. These results differed from the high chlorhexidine cord care awareness 80.2% reported by Owusu et al. (2023).[23] Awareness of the use of methylated spirit in this study by most of the respondents is in line with findings made by many other studies. [19,21,23-26,29]

Also worrisome is the low knowledge of the need to keep the cord exposed to air and dry by a very low proportion of the respondents in this study which is similar to poor knowledge of this activity reported in other studies. [19,24,30] Dry cord care involves keeping the cord clean without the application of anything and leaving it exposed to air or loosely covered by a clean cloth. [9] High awareness of dry cord care has however been reported in other studies.[23,29,31] It is however encouraging to find that most of the respondents in this study knew the importance of good cord care which was similar to the finding by many researchers.[21,23,24,26] It however differed from the findings from some studies where low knowledge of the importance of good cord care was reported.[19,32] The finding in this study that 69.4% of respondents were aware of signs of cord infection is comparable to the high rate reported by Ango et al (2021).[22] The knowledge that hand hygiene should be performed before and after cord care is also commendable and agrees with the findings of other studies.[22,26]

The low awareness of chlorhexidine cord care and dry cord care in this study where over 90% of the respondents received antenatal care from either a government or private hospital, and about 85% were taught cord care mainly during antenatal care, raised concerns over the content of cord care education they received. This study identified that nurses were the main source of umbilical cord care knowledge as reported by other studies [18,20,26] and highlights the need for front-line health educators to be adequately informed and continuously updated on current best practices for health care. This is to enable them to appropriately educate others. This finding however differs from those of authors from Nigeria[32]; Tanzania[19], and Pakistan[33] where relations, mothers, and mothers-in-law

were the main sources of cord care knowledge. Abhulimhen-Iyoha et al. (2015) in their study highlighted the importance of adequate health education content given to mothers in hospitals.[34]

Good cord care **practice score of 32.7% obtained** in this study is low but comparable to 34% reported by Duru et al. (2022) [17], is higher than 21% reported by Ayub et al. (2022) in Tanzania [19] and lower than the finding in studies in which good cord care practice was found.[22,24,35,36] Good cord care practice level is also dependent on parameters assessed which may affect the results obtained. The finding of poor cord care practice despite good knowledge of slightly above 50% suggests that knowledge does not always translate to good practice. Still on measures of good cord care practice measures, it was found that only 53 (20.0%) of the respondents applied chlorhexidine gel alone to their children's cord which is poor though not surprising considering the low knowledge level of chlorhexidine for cord care obtained. This finding is in line with the low practice level reported by Aitafo et al. (2021) [28], Duru et al. (2022) [17] and Aku et al (2023) [37] and other studies in which chlorhexidine use of less than 10% was reported. [25,26,29,38] Low rate of 46.1% was also reported by Astatkie et al (2022) [39] even after a national scale-up in Ethiopia. However, Olubiyi et al. (2023) in Nigeria [40], reported an utilization rate of 84.8% and suggested an improvement in its use. This however was not corroborated by findings in this study. Methylated spirit was the most common substance applied to the cord in this study, and this was done by almost half of the respondents. It is sad to find in this study that several other unsafe materials were still used for cord care. This is in line with the findings made in studies that many mothers and caregivers in Low- and Middle-Income Countries (LMICs) desired to actively apply something other than chlorhexidine to the cord showing a range of various materials applied to the cord.[15, 41]

In this study, the practice of keeping the cord dry and exposed with diapers folded below it by only 26.7% of respondents is low and correlates with the finding that about 70% of the respondents cover their children's cords. This is like the report from the studies conducted by authors [17,25,35] where this practice was also low. Commendable, though with room for improvement is the practice of hand hygiene by over 60% of the respondents in the present study which is in line with the findings of other studies.[17,22,30,33] The finding that about 75% of the babies had their cords cut with sterile scissors or surgical blades and that over 90% of the cords were clamped with cord clamps is also commendable and in keeping with findings in many studies in which the cords were mostly cut with scissors or surgical blades[16-18,38] and cord clamped with cord clamps.[22,35,38] Our findings differ from findings from studies where razor blades were most commonly used [22,35] as well as in studies where materials such as hair and sewing thread, and strings of cloth, rubber bands were most commonly used to tie the cord.[24,34] The use of proper instruments to cut and to clamp the cord may not be completely under the control of the caregivers, but these are important components of cord care that could contribute to cord sepsis if not properly done; the instruments used may also be a reflection of the quality of healthcare service at the facility where the mother chose to deliver her baby. Warm compress for cord care continues to be practiced by many as shown in this study where it was done by 35.8% of the respondents and should be discouraged; its rate of practice obtained in this study is comparable to the rates reported by Dathini et al. (2018) [29] and Onubogu et al. (2022) [26] but lower than the practice of up to 87.0% of respondents reported by Duru et al. (2022) [17].

Conclusion

Umbilical cord care knowledge and practice among caregivers at the WCC of 3 healthcare facilities in Yenagoa was assessed in this study. General cord care knowledge and practice were assessed along with objective measures of both. Results obtained showed a modest knowledge gap and a huge practice gap. Identified umbilical cord care knowledge gaps were mainly with the use of chlorhexidine gel, dry cord care and application of substances to the cord and these reflected remarkably in their practice, with the umbilical cord care knowledge score of 51.6% which was better than practice score of 32.7%.

The low umbilical cord care practice score and the modest knowledge score obtained in this study where most respondents had antenatal care, delivered in healthcare facilities, and received health education on umbilical cord care during antenatal care is a major concern because contact with healthcare facilities is expected to provide platforms for proper health education. Findings from this study call for urgent improvement of caregivers umbilical cord care knowledge and practice. The findings also call for urgent review of the knowledge level of the frontline health educators on proper umbilical cord care, as well as a review of the contents of umbilical cord care health education given to the mothers to ensure they are appropriate. Persisting umbilical cord care practice gap after identified cord care knowledge gaps have been addressed will require further research to determine other causes not addressed in this study.

Competing Interests

We declare that no competing interests exist.

Authors' contributions

1st Author designed the study, wrote the protocol, performed the statistical analysis, and wrote the first draft of the manuscript. The 2nd author managed distribution of the questionnaires, followed up necessary approvals and ethical clearance, and managed the initial data analyses. Both authors managed the literature searches, read, and approved the final manuscript.

Consent

The purpose of the study was written, and the content was read and explained to each parent/caregiver and thereafter a copy handed over to them. They were clearly informed that this study was voluntary, and their verbal consent was then obtained.

Ethical Approval.

Ethical clearance for this study was obtained from the Ministry of Health, Bayelsa State before the study was commenced.

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