Original Research Article

UMBILICAL CORD CARE KNOWLEDGE AND PRACTICE: WHAT IS THE STATUS OF NATIONAL CHLORHEXIDINE GEL SCALE-UP IN NNEWI NIGERIA?

ABSTRACT

Background: Use of chlorhexidine gel for cord care was scaled up in Nigeria to address the high burden of neonatal deaths from severe sepsis but there is scarcity of data on its uptake.

Aim: A cross-sectional study was conducted to examine the cord care practices of mothers in Nnewi.

Methods: Data was obtained using an interviewer-administered semi-structured questionnaire, and analyzed with SPSS version 21. P-value < 0.05 was considered statistically significant.

Results: Mean age of the 214 studied mothers was 29.6 ± 5.53 years. Majority had at least secondary education (93.5%), were income earners (83.2%), attended ante-natal clinic (ANC) (83.1%) or delivered (81.8%) in a health facility with skilled provider, and received health education on cord care during latest pregnancy (80.4%). Health education was mostly received during ANC (75.6%[130/172]) and from nurses (73.3%[126/172]). Majority knew about methylated spirit use (89.3%) and consequence of poor cord care (75.7%) but only 2.8% were aware of chlorhexidine gel use.

Umbilical stump was commonly cleaned with methylated spirit (89.3%) and or hot compress (24.8%). Thereafter, 47.7% applied nothing while others applied petroleum jelly (33.2%), toothpaste (8.9%), dusting powder (3.3%) etc. Reasons given for practices included efficacy (54.7%), advice from people (25.7%) or peer's influence (8.4%) and convenience (8.4%). Factors significantly associated with using antiseptic agent were maternal age, educational level, access to or source of health education, and frequency of ANC visits.

Conclusion/recommendation

Respondents demonstrated good knowledge and practice of standard cord care but awareness and use of chlorhexidine gel was almost non-existent. .

Hindrances to effective national chlorhexidine scale-up should be identified and addressed. There's serious need for enlightenment campaigns on chlorhexidine efficacy using public media channels such as radio jingles.

KEY WORDS

Cord care, Awareness, Practice, chlorhexidine gel, methylated spirit

INTRODUCTION

Annually, 2.4 million children die within the first 28 days of life, accounting for 47% of under-five deaths globally.[1] More than 99% of these deaths occur in low and middle income countries, especially among the poorest families.[2] Nigeria continues to have a high burden of under-five deaths. In 2019, the country was ranked to have the highest burden of under-five deaths globally and 32% of these deaths occurred during the neonatal period.[1] Approximately one in three neonatal deaths in Nigeria is due to severe infections.[3] The devitalized tissue of the umbilical cord stump can serve as an excellent medium for bacterial growth especially if unclean substances are applied to it.[4-9] In addition, the umbilical vessels remain patent for few days after birth thereby serving as pathway for bacteria that cause neonatal sepsis to enter the blood stream.[4] Cord care refers to actions taken to facilitate cord separation and prevent the newborn's umbilical stump from being colonized by pathogens.

The World Health Organization (WHO) advocates dry cord care (application of nothing) in countries with low rates of neonatal mortality.[4,5] However, use of antiseptic agents is recommended in countries with high rates of neonatal mortality and poor hygiene.[4,5] Such antiseptic agents include methylated spirit, silver sulphadiazine, gentian violet, iodine, chlorhexidine, and topical antibiotics.[4-8] Optimal umbilical cord care practices have the potential to reduce preventable neonatal deaths from sepsis.[4-8] Unfortunately, umbilical cord care is poor and unhygienic among mothers in developing countries such as Nigeria.[9]

In Nigeria, umbilical cord infection is common and a major predictor of neonatal sepsis.[10] Therefore, meticulous cord care is essential for improved newborn survival in the country. Due to proven efficacy of chlorhexidine to reduce umbilical stump infections, WHO recommends its use for home births in areas where neonatal mortality rate is above 30 per 1000 live births.[5,11-13] Nigeria falls within this category given the current neonatal mortality rate of 38 per 1000 live births and home delivery rate of about 61%.[14] However, the use of unorthodox agents such as hot compress, cow dung, herbs, ash, salt, saliva, sand, toothpaste and petroleum jelly is common in the country.[9, 15-18] The use of these agents can increase the risk of tetanus, sepsis and consequently death during the neonatal period.[15,18]

In November 2016, Nigeria launched three new policies aimed at promoting newborn health, one of which is the National Strategy to Scale Up Chlorhexidine gel for cord care.[3,11] Chlorhexidine is a bisbiguanide compound with broad spectrum antimicrobial properties that is active against gram positive and negative organisms. It disrupts the bacterial cell membrane thereby increasing its permeability, leakage and destruction, and is innocuous to the tender newborn skin. In Nigeria, it is available as 4% chlorhexidine gel in 25g tubes, and application within 2hours of birth then daily until the cord drops off or gel finishes is recommended.[3] Chlorhexidine has been demonstrated to reduce severe neonatal infection by 68% and mortality by 23%, potentially saving over 300,000 lives globally each year.[3,11] The Nigerian Government's goal at launching of chlorhexidine scale-up was to ensure its use for the cord care of at least half of all newborns in the country by the fifth year of implementation of the strategy.[3] It was hoped that the strategy would save up to 55,000 newborn lives annually in Nigeria.[3] This translates to reduction of neonatal mortality by 20% given the fact that 270,000 children die within 28 days of life annually in the country.[1] Currently, there's scarcity of data on the uptake of this strategy.

In view of the potential benefits of optimal cord, especially with chlorhexidine gel, in reducing the burden of neonatal deaths, this study was conducted to evaluate the cord care practice of mothers in the 5th year of chlorhexidine gel national scale up. Findings will provide evidence on its uptake and guide stakeholders on interventions for effective scale-up.

METHODS

Study area

A cross-sectional study was conducted to examine the cord care practice and rate of use of chlorhexidine gel among mothers seen at immunization clinics in Nnewi between 1st and 30th September, 2021. Nnewi has 4 neighborhoods namely Otolo, Uruagu, Umudim and Nnewichi.[19] As at the time of study Nnewi had 130 registered health facilities with a public:private ratio of 1:4. The public health facilities included 8 health posts/clinics, 16 primary health care centers (PHCs), one secondary level facility, one tertiary institution (Nnamdi Azikiwe University Teaching Hospital) all of which provide immunization services to children. The study was done in the only tertiary facility and selected PHCs in Nnewi.

Nnewi is a one town local government area (Nnewi North LGA) and the 2nd largest commercial city in Anambra State[19]. About 90% of deliveries in Anambra State take place in a health facility while 82% of women receive post-natal check within 48 hours of giving birth.[14]

Sample size determination

Minimum sample size was determined using the sample size formula for cross-sectional studies ($n=Z^2pq/d^2$), where Z is standard normal variate at 95% confidence interval (Z=1.96), p is expected proportion in the population based on previous study (p=0.13), q is complementary probability (q=1-p=0.87), d= precision =0.05.[20] A minimum sample size of 193 (rounded off to 200) was obtained after addition of 10% to take care of incomplete response.

Study population and sampling technique

Eligible participants were mothers above 18 years of age, who had lived in Nnewi for at least 6 months, had at least one biologic child less than one year of age and gave an informed consent. Participants were recruited using stratified sampling technique. Using the list obtained from the local government health department, the PHC were stratified according to the 4 neighborhoods in Nnewi. Then, one PHC was selected from each neighborhood by simple random sampling technique. Participants were proportionately recruited from the only tertiary facility and 4 selected PHC. The number of participants allotted to each study site was determined by multiplying the average number of infants vaccinated in the site per month with the sampling

fraction (sample size ÷ total number of infants vaccinated in the 5 sites per month). In each site, eligible participants were recruited by convenient sampling until allotted sample size was attained

Data Collection and analysis

The mothers were interviewed using a pretested interviewer-administered semi-structured questionnaire, which was developed by the principal investigator based on literature review and previous experience. The questionnaire comprised of three sections: sociodemographic characteristics, knowledge of standard cord care methods and actual cord care practice. Data was collected by 3 research assistants who were senior resident doctors in Paediatrics and were trained on the content and technique of questionnaire administration prior to commencement of the study. Written informed consent was obtained from all participants after due explanation of the nature of the study, assurance that there would be no repercussion for non-participation and assurance that that anonymity confidentiality of their responses would be maintained.

Data was analyzed using SPSS version 21. Chi-square test was used to examine the association between categorical variables and Fisher's exact test was used where conditions for Chi-square was violated. P-value less than 0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristics

A total of 214 mother-infant pairs were studied. The mean age of the mothers and their infants were 29.6 ± 5.53 years and 4.4 ±2.93 months, respectively. As shown in Table 1, majority of the mothers had at least secondary education (93.5%), were income earners (83.2%), received ante-natal care (83.1%) or delivered in a facility which had skilled healthcare providers. None of the mothers delivered at home. Ownership of place of delivery was private in two-thirds (65.9%) of the participants.

Cord care knowledge

As shown in Table 2, majority of the mothers (80.4%) received health education on cord care during pregnancy for the index baby, mostly during ante-natal clinic visit (75.6% [130/172]) and from a nurse (73.3% [126/172]). An appreciable proportion of mothers (89.3%) were aware of cleaning with methylated spirit as a method of cord care but only 2.8% (6/214) of them had heard about the use chlorhexidine gel and none had heard about application of nothing (keeping umbilical stump clean and dry). Majority of the mothers (75.7%) correctly cited infection as a major consequence of poor umbilical cord care.

Cord care practice

As shown in Table 3, the common substance used for cleaning the umbilical stump (multiple response) were methylated spirit (89.3%) and or hot compress (24.8%). Thereafter, nearly half (47.7%) of the mothers applied nothing while others applied unorthodox substances such as petroleum jelly (33.2%), toothpaste (8.9%) and dusting powder (3.3%.)

Determinants of cord care practice

Common reasons cited for adopting a method of cord care were efficacy (54.7%), advice by other people (25.7%), convenience (8.4%), influence by peers (8.4%). As shown in Table 4, the factors significantly associated with not using antiseptic agent for cord care (methylated spirit or chlorhexidine gel) were age < 20 or ≥ 40 years, lower maternal education, not receiving information on cord care during pregnancy or receiving from places other than ante-natal clinics, and from a non-healthcare provider.

Mothers who used antiseptic agent had a significantly higher mean number of ANC attendance compared to those who did not.(7.6 ±3.33 versus 5.3± 2.64 times, p=0.002)

DISCUSSION

The findings that most of mothers had ANC and delivered in a health facility is encouraging and agree with National Demographic and Health Survey report on Anambra State.[14] Attendance to ANC and delivery in hospital provide good opportunity to counsel mothers on recommended

maternal-newborn care practices. The finding that most of the mothers received information on cord care from a healthcare worker during ante-natal visit was reassuring as it implies that the opportunity to counsel them was not missed. This may explain the high awareness on the use of an antiseptic agent (methylated spirit) for cord care and the consequences of poor cord care. The awareness on the use of methylated spirit was higher in the index compared to other studies.[21-25]

Having appropriate information is key to optimal cord care practice. Therefore, it is discouraging that only 6(2.8%) of mothers were aware of the use of chlorhexidine gel and none was aware of dry cord care. This translates to lack of information on current recommendations and raises concern about the quality of messages delivered during ANC visit counselling. It is possible that the ANC counsellors also lack information on current recommendations. Our findings buttress the need for adequate training of healthcare workers at grassroot level whenever a new policy is introduced. The finding that two-thirds of the mothers delivered in a private owned facility suggests a serious need to include private facilities in scale-up plans. Other channels such as jingles on public media should also be employed to ensure a wide reach during information dissemination. However, further studies are needed to examine the knowledge of relevant healthcare workers on current cord care recommendations, the quality of ANC cord care counselling and how this affects chlorhexidine uptake.

The practice of the mothers agrees with previous reports which indicate that it is a cultural norm to apply a substance or mix of substances to the umbilical stump cord in Nigeria.[3,24,25] Although this contradicts a study which reported application of nothing by two-thirds of mothers, secondary NDHS data analysis was used for the later study and that may be less reliable than primary data. Channeling the norm of application of something on the umbilical stump towards ensuring that appropriate agents are applied can go a long way in saving the lives of newborns from death due to neonatal sepsis. In this study, most mothers used a standard antiseptic agent (methylated spirit) although the practice was not in line with current recommendation of 4% chlorhexidine gel.

Findings are consistent on the popularity and widespread use of methylated spirit for cord care.[15-18,,22-25] However, it is not clear whether its continued use despite chlorhexidine scale up could be attributed to lack of awareness or unacceptability of the later among healthcare workers. A focused group discussion in Uganda, conducted 3 years after chlorhexidine gel was scaled-up,

showed that most healthcare workers considered methylated spirit better and more-effective than chlorhexidine gel and this may affect the information given to clients.[26] Reports from post scale-up Nigerian quasi experimental and small randomized trials indicate that the efficacy of methylated spirit was comparable to chlorhexidine gel and that the later was associated with delayed cord separation which was a source of dissatisfaction for the users.[27,28] These are contrary to reports of large randomized control trials in rural Pakistan, Bangladesh and other developing countries which demonstrated the superiority of chlorhexidine gel in preventing neonatal infections and deaths.[5,12,13,29,30] However, the superiority of chlorhexidine gel was reported to be considerable in only community rather than hospital settings. It is important to document the superiority of and concerns about chlorhexidine using large randomized control trials in both home and health facility deliveries in Nigeria. This will provide the evidence needed to reassure healthcare workers and caregivers on the necessity to replace a popular agent with a relatively newer agent and address barriers to scale up.

The finding that only one mother used chlorhexidine implied that the scale up plan was not being implemented in the state. In order to achieve scale-up targets, the best practices in Sokoto and Bauchi states where chlorhexidine was first piloted could be replicated in other states. This involved reactivation and training of Ward Development Committees (WDC) and Community Based Health Volunteers (CBHV) to counsel potential clients in the communities and provide linkage between them and the facilities.[21] In addition, there were extensive consultations with communities and influential leaders to secure support for chlorhexidine distribution program. This resulted in significant displacement of methylated spirit by chlorhexidine gel within few years.

The reasons cited for choice of methods of cord care provides insight into possible strategies that could be adopted to improve cord care practices. Since practices are mostly influenced by perceived efficacy of the agents, there should be clear messages on the efficacy of recommended agents and the dangers of applying non-orthodox agents. Awareness campaigns should target every member of the community since practices are also influenced advice by friends/family or observation of the practices of others.

The significant relationships between use of antiseptic agent for cord care and maternal age, educational level, place of ante-natal care, and access to or source of health education agree with

previous reports.[22,23] These findings were not surprising as they portray the fact that knowledge influences practice. Mothers with young or advanced age, lower level education and those who received ante-natal care or delivered at traditional birth attendants' or maternity homes could be reached during initial immunization visit with interventions that could improve cord care practice.

CONCLUSION/RECOMMENDATIONS

Majority of respondents demonstrated good knowledge and practice of standard method of cord care using methylated spirit. However, awareness and practice of current recommendation of 4% chlorhexidine gel was almost non-existent amongst them. Practice of cord care was predominantly influenced by perceived efficacy of the agent, advice by or observation of others and convenience. Mothers who had young or advanced age, lower level of education, infrequent ante-natal visits, antenatal care or delivery at traditional birth attendants' or maternity homes had higher rate of use of unorthodox agents for cord care.

The national scale-up plan for chlorhexidine gel should be evaluated to identify and address barriers to its effective implementation. Awareness campaigns, especially with the use of mass media channels such as radio jingles, should be intensified on the efficacy of chlorhexidine gel for cord care

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

REFERENCES

1. United Nations Children's Fund, The State of the World's Children 2021: on my mind – promoting, protecting and caring for children's mental health, UNICEF, New York, October 2021.Assessed 2021 December 19. Available from: https://www.unicef.org/media/108161/file/SOWC-2021-full-report-English.pdf
2. United Nations Children's Fund. Ending preventable newborn deaths and stillbirths by 2030: moving faster towards high-quality universal health coverage in 2020–2025. Accessed 2021 December 15. Available from: https://www.unicef.org/media/77166/file/Ending-preventable-newborn-deaths-and-stillbirths-by-2030-universal-health-coverage-in-2020%E2%80%932025.pdf
3. Federal Ministry of Health. National Strategy for Scale-up of Chlorhexidine in Nigeria 2016. Accessed 2021 September 5. Available from: https://www.healthynewbornnetwork.org/hnn-content/uploads/NATIONAL-STRATEGY-FOR-SCALE-UP-OF-CHX-IN-NIGERIA-FINAL-002.pdf
4. World Health Organization. Care of the umbilical cord. Maternal and new born health/safe motherhood. World Health Organization; Geneva, Switzerland; 1998.
5. World Health Organization (WHO). WHO Recommendations on Postnatal Care of the Mother and Newborn. (2013).
6. Agarwal PK, Agarwal S, Mullany LC, Darmstadt GL, Kumar V, Kiran U etal. Clean cord care practices and neonatal mortality: evidence from rural Uttar Pradesh, India. Journal of Epidemiology and community Medicine 2012: 66(8): 755-758
7. Coffey PS, Brown SC. Umbilical cord care practices in low and middle income countries: a systematic Review, BMC Pregnancy and childbirth 2017:17, 68. http:/doi.org/10.1186/s12884-017-1250-7
8. Bhatt B , Malik JS, Jindal H, Sahoo S, Sangwan K. A study to assess cord care practices among Mothers of New Born in Urban Areas of Rohtak Haryana. Int J and Medical Science. 2015:(1): 55-60.
9. Joel Medewase VI, Oyedeji OA, Elemile PO, Oyedeji GA. Cord care Practices in South West Nigerian Mothers. Int J Tropical Medicine 2008: 3(2): 15-18
10. Antai TE, Effiong FO. Septicaemia among neonates with tetanus. J Trop Pediatr (2009) 3(10):210–3.
11. Spadacini BM. Nigeria commits to scaling up use of antiseptic gel to reduce newborn deaths. Frontlines March/April 2017. Available from https://www.usaid.gov/newsinformation/frontlines/march-april-2017/nigeria-commits-scaling-use-antiseptic-gel
12. Arifeen SE, Mullany LC, Shah R, Mannan I, Rahman SM, Talukder MR et al. The effect of cord cleansing with chlorhexidine on neonatal mortality in rural Bangladesh: a community-based, cluster-randomised trial. Lancet. 2012;379:1022–8.
13. Soofi S, Cousens S, Imdad A, Bhutto N, Ali N, Bhutta ZA. Topical application of chlorhexidine to neonatal umbilical cords for prevention of omphalitis and neonatal

mortality in a rural district of Pakistan: a community-based, cluster-randomised trial. Lancet. 2012;379:1029–36.
14. National Population Commission (NPC) [Nigeria] and ICF. Nigeria Demographic and Health Survey 2018: Key Indicators Report.. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF, 2019.
15. Osuorah DIC, Ukwochi U, Onah S, Ebruke B. Umbilical cord care practices and incidence of febrile Illnesses in the first month of Life among newborns- a population based study. British Journal of Medicine & Medical Research
16. Opera PI, Jaja T, Dotimi DA, Alex-Hart BA. Newborn cord care practices amongst mothers in Yenogoa, Bayelsa State, Nigeria. Int J Clin Med. 2012; 3(1):22-7
17. Abhulimhen –Iyolha BIM. Determinants of cord care practice among mothers in Benin city Edo State, Nigeria, Nigeria J Clin Pract.2012;15(2):210-3
18. Joseph KL. Assessment of Determinants of umbilical cord infection among newborns in Punwani maternity hospital 2015. Available from: http://erepository.unobi.ac.ke/handle/11295/94140. Accessed 0n 5 December 2021
19. United Nations Programme on Human Habitation/Anambra State Government. Structure Plan for Nnewi and Satellite Towns 2009. UN-HABITAT, Nairobi: Kenya
20. Charan J, Biswas T. How to calculate sample size for different study designs in medical research?. Indian journal of psychological medicine, 2013; 35(2), 121–126. https://doi.org/10.4103/0253-7176.116232
21. Abegunde, D., Orobaton, N., Beal, K. et al. Trends in newborn umbilical cord care practices in Sokoto and Bauchi States of Nigeria: the where, who, how, what and the ubiquitous role of traditional birth attendants: a lot quality assurance sampling survey. BMC Pregnancy Childbirth 17, 368 (2017). https://doi.org/10.1186/s12884-017-1551-x
22. Aitafo J, West B, Okari T. Awareness, Attitude and Use of Chlorhexidine Gel for Cord Care in a Well-Baby Clinic in Port Harcourt, Nigeria. International Journal of Health Sciences and Research 2021. 11. 180-189. 10.52403/ijhsr.20210826.
23. Afolaranmi TO, Hassan ZI, Akinyemi OO, Sule SS, Malete MU, Choji CP and Bello DA Cord care practices: a perspective of contemporary African Setting. Front. Public Health 6:10. doi: 10.3389/fpubh.2018.00010
24. Ango UM, Adamu A, Umar MT, Tajudeen MA, Ahmad AZ, Abdulrahman H. Knowledge and practices of umbilical cord care among mothers attending antenatal care in the health facilities in Sokoto Metropolis, Nigeria. International Journal of Contemporary Medical Research 2021;8(1):A1-A7
25. Osuchukwu EC, Okoronkwo II, Ezeruigbo AS. Umbilical cord care and management outcome among mothers in Calabar South Local Government Area of Cross River State – Nigeria. International Journal of Nursing, Midwife and Health Related Cases 2018; 4(1):1-11.

26. Ambale C, Ngatia B, Machakos N. Assessment of Chlorhexidine use for cord care at Kangundo level 4 Hospital. Research Square 13th Dec 2019 : https://doi.org/10.21203/rs.2.18832/v1
27. Shwe DD, Afolaranmi TO, Egbodo CO, Musa J, Oguche S, Bode-Thomas F. Methylated spirit versus chlorhexidine gel: A randomized non-inferiority trial for prevention of neonatal umbilical cord infection in Jos, North-Central Nigeria. Niger J Clin Pract. 2021;24(5):762-769. doi:10.4103/njcp.njcp_535_20
28. Okpaleke M, Ndikom CM. Umbilical cord separation time: chlorhexidine vs methylated-spirit. Afr J Midwifery 2019; 13(3):1–9. https://doi.org/10.12968/ajmw.2018.0014
29. Sinha A, Sazawal S, Pradhan A, Ramji S, Opiyo N. Chlorhexidine skin or cord care for prevention of mortality and infections in neonates. Cochrane Database Syst Rev. 2015; (3):CD007835. doi:10.1002/14651858.CD007835.pub2
30. Imdad A, Mullany LC, Baqui AH, et al. The effect of umbilical cord cleansing with chlorhexidine on omphalitis and neonatal mortality in community settings in developing countries: a meta-analysis. BMC Public Health. 2013;13 Suppl 3(Suppl 3):S15. doi:10.1186/1471-2458-13-S3-S15

Table 1 Sociodemographic characteristics

Characteristic	Frequency	Percent
Age (years)		
<20	3	1.4
20-29	106	49.5
30-39	97	45.3
≥40	8	3.7
Highest educational level		
None	3	1.4
Primary	11	5.1
Secondary	120	56.1
Post-secondary	80	37.4
Occupation		
Unemployed/student/apprentice	36	16.8
Trader	94	43.9
Artisan	30	14.0
Civil servant	44	20.6
Professionals	10	4.7
Place of ante-natal care		
TBA or maternity home	36	16.9
Primary level facility	39	18.2
Secondary level facility	103	48.1
Tertiary level facility	36	16.8

Place of delivery (ownership)		
TBA/maternity home (private)	39	18.2
PHC (public)	42	19.6
Secondary level facility (private)	102	47.7
Tertiary level facility (public)	31	14.5
Home delivery	0	0.0

TBA=traditional birth attendant, PHC=primary health care center

Table 2: Knowledge about core care

Characteristic	Frequency	Percent
Access to health education on cord care		
Yes	172	80.4
No	40	18.7
Can't remember	2	0.9
Where was health education received from (n=172)		
During ante-natal clinic visit	130	75.6
Religious meetings	2	1.2
Non-religious meetings	4	2.3
Family or friends	36	20.9
Source of health education (n=172)		
TBA	4	2.3
Doctor	6	3.5
family members or friends	36	20.9
Nurse	126	73.3
Aware of use of methylated spirit for cord care		
Yes	191	89.3
No	23	10.7
Aware of use of		

chlorhexidine gel for cord care		
Yes	6	2.8
No	208	97.2
Aware of dry cord care		
Yes	0	100.0
No	214	0.0
Major consequence of poor cord care		
Bleeding	1	0.5
Death	2	0.9
Rashes	2	0.9
Delayed stump separation	12	5.6
Decay of umbilical stump	22	10.3
Infection	162	75.7
No idea	13	6.1

TBA=traditional birth attendant

Table 3: Cord care practice among the mothers

Cord care practice	Frequency	Percent
Use of antiseptic agents		
Yes	191	89.3
No	23	10.7
Substance used for cleaning umbilical cord (multiple response)		
Methylated spirit	191	89.3
Salt solution	1	0.5
Hot compress	53	24.8
Seasoning cube solution	2	0.9
Substance applied after cord cleaning		
Tooth paste	19	8.9
Dusting powder	7	3.3
Petroleum jelly	71	33.2
Penicillin ointment	6	2.8
Ash	3	1.4
Chlorhexidine gel	1	0.5
Breastmilk	1	1.5
Engine oil	2	0.9
Palm oil	2	0.9
None	102	47.7
Reason for practice		
Convenience	18	8.4

Affordable	4	1.9
Effective	117	54.7
Advice by other people	55	25.7
Influence by peers	18	8.4
No reason	2	0.9

Table 4: Factors that influence ability to use standard method of cord care

Characteristics	**Use of standard method**			**p-value**
	YES	**NO**	**Total (%0**	
Age (n=214)				0.017†
<20	2(66.7)	1(33.3)	3(1.4)	
20 - 29	93(87.7)	13(12.3)	106(49.5)	
30 - 39	91(93.8)	6(.2)	97(45.3)	
≥40	5(62.5)	3(37.5)	8(3.7)	
Occupation (n=214)				
Unemployed	32(88.9)	4(11.1)	36(16.8)	0.258
Trader	83(88.3)	11(11.7)	94(43.9)	
Artisan	24(80.0)	6(20.0)	30(14.0)	
Civil servant	42(95.5)	2(4.5)	44(20.6)	
Professionals	10(100.0)	0 (0.0)	10(4.7)	
Highest educational level (n=214)				
None or primary	10(71.4)	4(28.6)	14(6.5)	0.02*
Secondary	105(87.5)	15(12.5)	120(56.1)	
Tertiary	76(95.0)	4(5.0)	80(37.1)	
Received information on cord care during pregnancy (n=214)				
Yes	158(91.9)	14(8.1)	172((80.4)	
No	32(80.0)	8(20.0)	40(18.7)	0.022†
Can't remember	1(50.0)	1(50.0)	2(0.9)	
Place where information was received from (n=172)				

During ANC	124(95.4)	6(4.6)	130(75.6)	
Other places	34(81.0)	8(19.0)	42(24.4)	0.006[†]
Information source n=172)				
Family or friends	30(81.1)	7(18.9)	37(21.5)	
Nurse	122(94.6)	7(5.4)	129(75.0)	0.007[†]
Doctor	6 (100.0)	0(0.0)	6(3.5)	
Place of ante-natal care (n=214)				
TBA/Maternity home	28(71.8)	11(28.2)	39(18.2)	0.001[*]
Primary level facility	39(92.9)	3(7.1)	42(19.6)	
Secondary level facility	97(95.1)	5(4.9)	102(47.7)	
Tertiary level facility	27(87.1)	4(12.9)	31(14.5)	
Parity(n-214)				
1	50 (90.9)	5(9.1)	55(25.7)	
2	50(86.2)	8(13.8)	58(27.1)	
3	34(94.4)	2(5.6)	36(16.8)	0.514
4	34(91.9)	3(8.1)	37(17.3)	
≥5	23(82.1)	5(17.9)	28(13.1)	

[*]Statistically significant Chi-square test, [†]Statistically significant Fisher's exact test
TBA=traditional birth attendants, PHC=primary health care center, ANC=ante-natal clinic