Journal of Advances in Medicine and Medical Research

33(24): 168-176, 2021; Article no.JAMMR.81457
ISSN: 2456-8899
(Past name: British Journal of Medicine and Medical Research, Past ISSN: 2231-0614, NLM ID: 101570965)

Hand Washing and Other Hygienic Cord Care Practices among Mothers in Nnewi, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Authors CUO and EFU conceptualized and designed the research. Authors CUO, FAI, UOO, EOM, KNO and ENU collected data; Author CUO analyzed data. Author CUO and EFU interpreted data. Author CUO drafted initial manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2021/v33i2431232

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/81457

Original Research Article

Received 20 October 2021
Accepted 22 December 2021
Published 25 December 2021

ABSTRACT

Background: Neonatal sepsis is a major contributor to the high burden of neonatal deaths in sub-Saharan African countries like Nigeria. Hygienic cord care has the potential to reduce neonatal mortality from infections.
Aim: We examined the rate of hand washing and other hygienic cord care practices among mothers in Nnewi Nigeria.
Methods: A cross-sectional study was conducted among 214 consenting mothers who had a biologic child less than one year of age. Mothers were interviewed using semi-structured interviewer-administered questionnaire. The major outcome variables were practice of hand washing and other indicators of hygienic cord care such as frequency of cord care, cord care after diaper change, re-use of swabs and method of cord care. Data was analyzed using SPSS version 21. P-value < 0.05 was considered statistically significant.
Results: The mean age of the mothers was 29.6 ± 5.53 years. The rate of hand washing before, after, both before and after, and neither before nor after cord care were 81.3%, 76.2%, 68.7% and

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11.2%, respectively. Majority of the mothers practiced cord care activities for ≥3 times (79.9%), did not re-use swabs for cleaning the cord (92.5%) and used methylated spirit for cord care (89.3%). However, only one mother (0.5%) used chlorhexidine gel for cord care while half did not practice cord care after diaper change. Factors significantly associated with practice of hand washing before and after cord care were access to health education during pregnancy, knowledge of the consequence of poor cord care, and use of antiseptic agent for cord care.
The respondents had a fairly good practice of hygienic cord care. However, many babies still faced the risk of sepsis due to failure of their mothers to practice hand washing both before and after cord care, and after diaper change as recommended. Intensive promotion of hygienic cord care recommendations is endorsed.

Keywords: Newborn; cord care; hand-hygiene; Anambra; South-East.

1. INTRODUCTION

Every day, approximately 6700 newborn infants less than 28 days die, accounting for 47% of under-five deaths globally [1]. More than 99% of these deaths occur in low and middle income countries [1]. A child born in sub-Saharan Africa or in Southern Asia is 10 times more likely to die in the first month of life than a child born in high-income countries [2]. In 2019, Nigeria had the second highest burden of neonatal mortality globally [2]. This high burden of neonatal deaths translates to a high burden of under-five mortality. Currently, Nigeria is ranked first among the countries where a child is most likely to die before the fifth birthday , 32% of which occur during the neonatal period.[3] These deaths are largely preventable through application of simple measures such as hygienic delivery and cord care practices. According to the most recent National Verbal Autopsy Study report, nearly half (47.3%) of all neonatal deaths in Nigeria are from infective causes such as sepsis, pneumonia, meningitis, diarrhea, tetanus [4].

The umbilical cord stump serves as an important portal of entry for both local and systemic neonatal infections. It could be colonized rapidly by pathogens from contaminated hands and environment. In addition, the umbilical vessels remain patent for few days after birth serving as pathway for bacteria that cause neonatal sepsis to enter the blood stream [5,6]. Regular maternal hand-washing during the first 14 days of life has been associated with reductions in omphalitis and all-cause neonatal mortality by 44% and 24% respectively [7-9]. Therefore, hand hygiene has been recommended as an essential component of infection prevention and control in the newborn [5,6,10,11]. The World Health organization recommends hand hygiene specifically before and after handling the newborn, before and after cord care, and after diaper change [11]. This could be achieved by simply washing the hands with soap and water. However, the extent to which mothers adhere to hand hygiene recommendations during cord care has not been well established in Nigeria.

In spite of hand hygiene recommendations, large numbers of neonates continue to die from cord infections in developing countries such as Nigeria. This study was, therefore, conducted to determine the hand washing compliance of mothers seen in immunization clinics in Nnewi.

2. MATERIALS AND METHODS

2.1 Study Area

A cross-sectional study was conducted to determine the practice of hand washing among mothers of infants presented for vaccination at immunization clinics in Nnewi. The study was conducted in September 2021 in public health facilities located in the 4 neighborhoods in Nnewi (Otolo, Uruagu, Umudim and Nnewichi) [12]. The public health facilities in Nnewi included 8 health posts/clinics, 16 primary health care centers (PHCs), one secondary level facility, and one tertiary institution (Nnamdi Azikiwe University Teaching Hospital). All the facilities provide vaccination services to children. Nnewi is a one town local government area (Nnewi North LGA) and the 2nd largest commercial city in Anambra State [12]. According to 2018 National Demographic and Health Survey report, 90% of deliveries in Anambra State take place in health facilities while 82% of mothers receive post-natal care within 48 hours of delivery [13]. The study was carried out in selected PHCs and the only tertiary health facility, and was part of a study which examined mother's knowledge of cord care recommendations and actual cord care practices.

2.2 Sample Size Determination

Sample size was calculated using the formula for sample size determination for cross-sectional studies (n=Z2pq/d2). Z is standard normal variate at 95% confidence interval (1.96), p is expected proportion in the population based on previous study (0.13), q is complementary probability (q=1-p=0.87), d= precision =0.05. Minimum sample size of 193 (rounded off to 200) was obtained after addition of 10% to accommodate incomplete responses.

2.3 Study Population and Sampling Technique

Eligible respondents were mothers > 18 years of age, who had lived in Nnewi for ≥ 6 months, had at least one biologic child less than one year of age and gave a written informed consent. The respondents were recruited using a stratified sampling technique. The PHC were first stratified according to the 4 neighborhoods in Nnewi. Thereafter, one PHC was selected from each neighborhood using simple random sampling technique. Respondents were proportionately recruited from the only tertiary facility and 4 selected PHCs. The number of respondents allotted to each selected facility was determined by multiplying the average number of infants vaccinated in the facility per month by the sampling fraction (sample size ÷ total number of infants vaccinated in the 5 facilities per month). In each facility, eligible respondents were recruited by convenient sampling until allotted sample size was attained.

2.4 Data Collection and Analysis

The study tool was a semi-structured pretested interviewer-administered questionnaire. Data was collected by 3 trained research assistants who were Paediatrics senior resident doctors. The research assistants were trained on the best way to elicit accurate responses and their proficiency were verified through mock interviews and role-plays. The principal investigator randomly re-interviewed some mothers who had already been interviewed by the research assistants to check for the accuracy of the information obtained. Data collected were analysed with Kappa statistic using pre-coded nominal variables to determine inter-observer agreement. The calculated Kappa was 0.874 ($p < 0.001$) which implied a near perfect agreement and a high level of consistency in the information obtained by the trained research assistants.

All respondents gave a written informed consent after due explanation of the nature of the study. Data was analyzed using SPSS version 21. The associations between categorical variables were examined using Chi-square test while Fisher's exact test was used where conditions for Chi-square was violated. P-value less than 0.05 was considered statistically significant.

3. RESULTS AND DISCUSSION

3.1 Results

Two hundred and fourteen mothers were interviewed. Their mean age was 29.6 ± 5.53 years while the mean age of their infants was 4.4 ±2.93 months. The male:female ratio of their infants was 1:1. As shown in Table 1, most of the mothers had at least secondary school education (93.5%[200/214]), were income earners (83.2%[178/214]), received ante-natal care (83.1%[178/214]) or delivered in a facility which had skilled healthcare providers. During pregnancy with the index baby, 80.4% (172/214) of the mothers received health education on cord care. About three-quarter (75.8%) of the mothers correctly cited infection as the consequence of poor cord care while 89.3% (191/214) used a standard method of cord care (cleaning with methylated spirit).

Washing of hands both before and after every cord care was practiced by 68.7% (147/214) of mothers as shown in Table 1. Relationships between maternal characteristics and hand washing before and after cord care are shown in Table 1. Mothers who were below 20 years, had no formal or only primary education, were unemployed, had ANC in a traditional birth attendant's place or delivered in a tertiary facility had the lowest proportion of women who washed hands before and after cord care. However, these relationships did not attain statistical significance.

Table 1. Maternal characteristics and practice of recommended hand washing

Characteristics	Hand washing before and after cord care		Total (%)	p-value
	Yes	No		
Age (years)				
<20	1(33.3)	2(66.7)	3(1.4)	0.346
20 - 29	73(68.9)	33(31.1)	106 (49.5)	
30 - 39	69(71.1)	28(28.9)	97 (45.3)	
≥40	4(50.0)	4(50.0)	8 (3.7)	
Highest educational level				
No formal education or primary	9(64.3)	5(35.7)	14 (06.5)	
Secondary	82(68.3)	38(31.7)	120(56.1)	
Post- secondary	56(70.0)	24(30.0)	80(37.4)	0.906
Occupation				
Unemployed/student/apprentice	21(58.3)	15(41.7)	36 (16.8)	
Trader	63(67.0)	31(33.0)	94(43.9)	0.459
Artisan	22(73.3)	8(26.7)	30(14.0)	
Civil servant	33(75.0)	11(25.0)	44(20.6)	
Professionals	8(80.0)	2(20.0)	10(4.7)	
Place of ante-natal care				
TBA/Maternity (private)	20(55.6)	16(44.4)	36(16.9)	
PHC(public)	31(79.5)	8(20.5)	39(18.2)	0.165
Secondary level (private)	74(71.8)	29(28.2)	103(48.1)	
Tertiary (public)	22(61.1)	14(38.9)	36(16.8)	
Place of delivery				
TBA/Maternity (private)	24(61.5)	15(38.5)	39(18.2)	
PHC(public)	35(83.3)	7(16.7)	42(19.6)	0.081
Secondary level (private)	70(68.6)	32(31.4)	102(47.7)	
Tertiary (public)	18(58.1)	13(41.9)	31(14.5)	
Health education on cord care	125(72.7)	47(27.3)	172(80.4)	0.011*
Yes	22(52.4)	20(47.6)	42(19.6)	
No				
Method of cleaning the cord				
Antiseptic agent (methylated spirit)	138(72.3)	53(27.7)	191(89.3)	0.001*
Others (hot compress or salt solution etc)	9(39.1)	14(60.9)	23 (10.7)	
Correctly cited infection as consequence of poor cord care	118(72.8)	44(27.2)	162 (75.7)	0.021*
Yes	29(55.8)	23(44.2)	52(24.3)	
No				
Total (%)	**147(68.7)**	**67 (31.3)**	**214(100.0)**	

TBA=Traditional birth attendant, PHC=Primary Healthcare center *Statistically significant

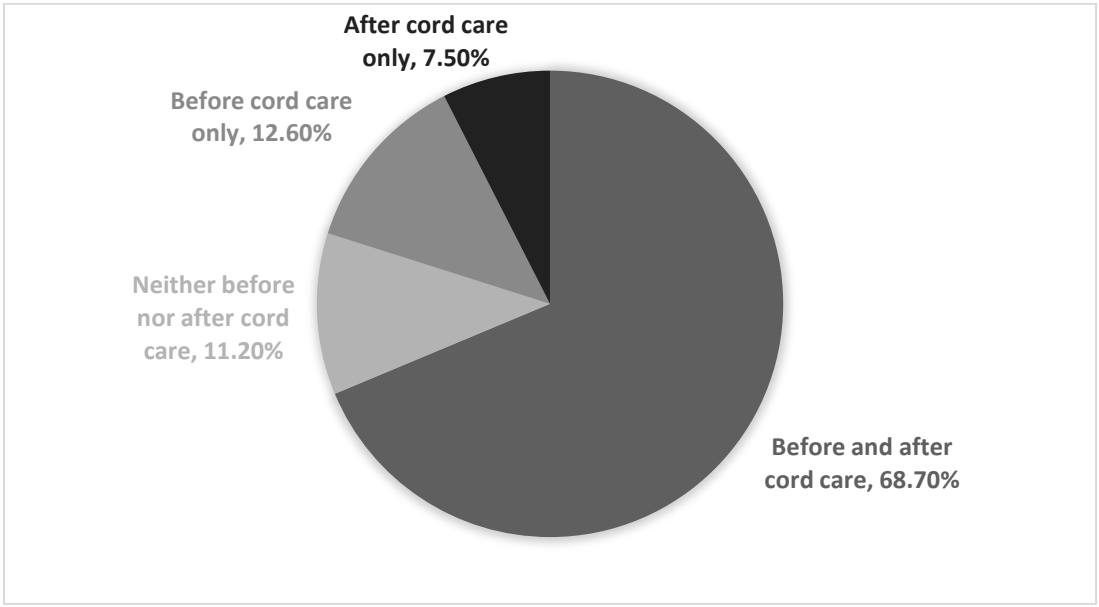

Fig. 1. Practice of hand washing in relation to cord care among the mothers

Table 2. Practice of other indicators of hygienic cord care among the mothers

Characteristic	Frequency	Percent
Frequency of cord care per day		
1 to 2	43	20.1
3 to 4	111	51.9
5 to 6	41	19.2
≥7	19	8.9
Cord care after each diaper change		
Yes	105	49.1
No	109	50.9
Reuse of swab for cord care		
Yes	16	7.5
No	198	92.5
Cord care practice (multiple response)		
Cleaning with methylated spirit	191	89.3
Hot compress	53	24.8
Home-made Solutions (Salt or seasoning cube)	3	1.4
Tooth paste	19	8.9
Dusting powder	7	3.3
Petroleum jelly	71	33.2
Penicillin ointment	6	2.8
Household ash	3	1.4
Chlorhexidine gel	1	0.5
Breastmilk	1	1.5
Oils	4	1.8

The frequency of cord care ranged from once to 12 times daily with a median of 4 (IQR 2) times. As shown in Figure 1, 11.2% {24/214) of mothers neither washed hands before nor after cord care while 68.7% (147/214) washed hands both times. Majority of the mothers practiced cord care activities for 3 or more times (79.9%[171/214]) and did not reuse swab for cleaning the cord (92.5%[198/214]). About half of the mothers (50.9%[109/214]) did not practice cord care after each diaper change while 10.7% (23/214) of them used unorthodox methods of cord care.

3.2 Discussion

The practice of hand washing before cord care by a substantial proportion (81.3%) of the mothers implies a good effort at preventing umbilical stump infection. The findings are comparable to other African reports [14,15]. In Benin Nigeria, 86.9% of mothers were found to wash hands before cord care [14,15]. The above reports are in contrast to a Nigerian observational study which reported "no hand hygiene action" for 81% of home cord contact activities [16]. Although the later study was observational in nature with minimal possibility of recall bias, the limited sample size (16 cord contacts) and high dropout rate limits the generalizability of the findings.

Despite hand washing practice by a substantial proportion of mothers before cord care, a fifth of them fell short of standard recommendations. The finding that 11.2% washed hands neither before nor after cord care is a source of concern given the potential high risk of infections to their infants. In an earlier report, mothers' practice of hygienic cord care was found to be strongly influenced by nurses [14]. This could be attributed to delivery of health talks at antenatal clinics, by nurses. The relationship between health education and hand hygiene was strongly demonstrated in this study as a significantly higher proportion of mothers who had access to health education on cord care washed hands according to WHO recommendation. Access to information during health education may also explain the significant relationship between practice of hand washing recommendations and using standard methods of cord care as well as citing infection as a consequence of unhygienic cord care. It is believed that information on both areas are also gathered during the health education. There is no doubt that knowledge influences practice. It behooves the health worker, therefore, to ensure that every pregnant woman receives counselling on hygienic cord care, with emphasis on hand washing with soap and water both before and after cord care.

Health talks should be strengthened at ante-natal clinic visits to ensure that every pregnant mother is reached with messages on the benefits of hand washing during postnatal home care. The finding that almost all pregnant women access ante-natal care from a health facility guarantees the success of this approach. The fact that most mothers deliver in a health facility can also be leveraged upon by incorporating messages on hygienic cord care into discharge protocols. There should be clear messages on the fact that hand washing prevents infection since this knowledge was found to positively influence adherence to hand washing recommendation. The above efforts should target not only the public but also the private facilities which accounted for about two-thirds of antenatal clinic attendance and deliveries in this study. In addition, mass media channels such as radio jingles should be employed to achieve a wider reach. Health education interventions have been proven to be very effective in low and middle income countries [17,18]. In Bangladesh, mothers who were randomized to receive intensive perinatal promotion of handwashing with soap washed hands 4 times more frequently than controls [17].

The lack of a statistically significant relationship between adherence to hand washing recommendations and educational status, occupation, place of ANC or place of delivery was surprising. However, this buttresses the fact that health education was of utmost importance irrespective of the socio-economic status and other parameters. Although not explored in the index study, previous reports indicate that most mothers in developing countries such as Nigeria, Bangladesh and Cambodia perceive use of only water to be adequate and often rinse hands with only water rather than thoroughly washing them with soap and water [16,19-21]. Therefore, health education, should include key requirements for effective hand washing such as use of soap and clean water, as well as hand washing technique.

The respondents demonstrated a fairly good practice as regards other indicators of hygienic cord care such as cord care frequency, avoidance of re-use of swabs, use of antiseptic agent for cord care. The frequency of at least 3 times per day by almost 80% of mothers agrees with reports from Ghana and Uganda but is higher than frequencies reported in Plateau State Nigeria and Ethiopia [22-25]. Methylated spirit has been documented as the most popular agent for cord care in Nigeria [5,25-28]. However, the finding that only one mother (0.5%) used chlorhexidine gel, 5 years after its national scale-up, and much lower than 18.3% reported for South-East Nigeria is quite discouraging [5]. This reflects poor status of chlorhexidine scale up in the region and calls for concerted efforts to ensure effective implementation of the national scale-up plan.

Soiled diaper is a major source of bacteria for potential umbilical stump colonization. It has been suggested that cord care should be practiced after each diaper change especially if the cord is visibly soiled with faeces [29]. However, this is perceived to delay cord separation as some gut bacterial flora is felt to enhance the process. This may explain the practice of cord care by only half of the mothers in the index study following a diaper change. Many reports and recommendations are silent on cord care with respect to diaper change. Therefore, more studies are needed to establish benefit of cord care after diaper change. This will inform recommendations on cord care in relation to diaper change.

4. CONCLUSION

A considerable proportion of the respondents practiced recommended hand washing before and after cord care. This was positively influenced by access to health education during pregnancy, knowledge of the consequence of poor cord care, and use of antiseptic agents for cord care. The respondents had a fairly good practice with respect to other indicators of hygienic cord care.

Intensive promotion of standard cord care practices is recommended to eliminate non-adherence to hand washing recommendations for cord care.

5. LIMITATION

Our study was limited by failure to determine quality of hand washing as well as other methods of hand hygiene. In addition, the practice of hand washing was based on verbal reports by the mothers. This is prone to recall bias and possibility of over-estimation of rate of hand washing. However, the findings are in keeping with previous African studies and provide insight into the level of hand washing and possible interventions to improve maternal postnatal handwashing practices.

CONSENT

All respondents gave a written informed consent to participate in the study

ETHICAL APPROVAL

Approval for this study was obtained from the Research Ethics Committee of Nnamdi Azikiwe University Teaching Hospital (NAUTH) Nnewi, Anambra State.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. 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:https://www.unicef.org/media/77166/file/Ending-preventable-newborn-deaths-and-stillbirths-by-2030-universal-health-coverage-in-2020%E2%80%932025.pdf
2. WHO FACT SHEET Newborns: improving survival and well-being.
   Available:https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality
3. United Nations Children's Fund, The State of the World's Children: on my mind – promoting, protecting and caring for children's mental health, UNICEF, New York; 2021.
   Assessed 2021 December 19.
   Available:https://www.unicef.org/media/108161/file/SOWC-2021-full-report-English.pdf
4. National Population Commission (NPC) [Nigeria] and CIRCLE, Social Solutions International, Inc. 2020. Nigeria 2019 Verbal and Social Autopsy Study: Main Report. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and Social Solutions International, Inc.
5. Federal Ministry of Health. National Strategy for Scale-up of Chlorhexidine in Nigeria 2016.
   Accessed 2021 September 5.
   Available:https://www.healthynewbornnetwork.org/hnn-content/uploads/NATIONAL-STRATEGY-FOR-SCALE-UP-OF-CHX-IN-NIGERIA-FINAL-002.pdf
6. World Health Organization. Care of the umbilical cord. Maternal and new born health/safe motherhood. World Health Organization; Geneva, Switzerland; 1998.
7. Blencowe, H., Cousens, S., Mullany, L.C, Lee AC, Kerber K, Wall S et al. Clean birth and postnatal care practices to reduce neonatal deaths from sepsis and tetanus: a

systematic review and Delphi estimation of mortality effect. BMC Public Health. 2011;11:S11.
Avaialble:https://doi.org/10.1186/1471-2458-11-S3-S11

8. Mullany LC, Darmstadt GL, Katz J, Khatry SK, LeClerq SC, Adhikari RK et al: Risk factors for umbilical cord infection among newborns of southern Nepal. Am J Epidemiol. 2007;165(2):203-11.
DOI:10.1093/aje/kwj356
9. Rhee V, Mullany LC, Khatry SK, Kats T, LeClerq S, Darmstadt GL et al: Maternal and birth attendant hand washing and neonatal mortality in southern Nepal. Arch Pediatr Adolesc Med. 2008;162(7): 603-8.
DOI:10.1001/archpedi.162.7.603.
10. World Health Organization (WHO). WHO Recommendations on Postnatal Care of the Mother and Newborn; 2013.
11. WHO, UNICEF, UNFPA. Pregnancy, childbirth, postpartum, and newborn care: a guide for essential practice. Geneva: World Health Organization; 2003.
12. United Nations Programme on Human Habitation/Anambra State Government. Structure Plan for Nnewi and Satellite Towns. UN-HABITAT, Nairobi: Kenya; 2009.
13. 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.
14. Abhulimhen-Iyoha BI Ofili A, Ibadin MO. Cord care practices among mothers attending immunization clinic at the University of Benin Teaching Hospital, Benin City. Nigeria Journal Paediatrics. 2011;38(3):104-108
15. Agossou J , Hounnou-d'Almeïda M , Adédémy J , Noudamadjo A , N'gobi D, Ayivi B. Newborn umbilical cord care in Parakou in 2013: practices and risks. Open Journal of Pediatrics. 2016;6: 124-135.
DOI: 10.4236/ojped.2016.61019.
16. Nalule Y, Buxton H, Flynn Oluyinka O, Sara S, Cumming OE. et al. Hygiene along the continuum of care in the early post-natal period: an observational study in Nigeria. BMC Pregnancy Childbirth 2020;20:589.
Available:https://doi.org/10.1186/s12884-020-03282-3
17. Ram PK, Nasreen S, Kamm K, Allen J, Kumar S, Rahman MA et al. Impact of an Intensive Perinatal Handwashing Promotion Intervention on Maternal Handwashing Behavior in the Neonatal Period: Findings from a Randomized Controlled Trial in Rural Bangladesh. Biomed Res Int. 2017;2017:6081470.
DOI:10.1155/2017/6081470
18. Biswal M, Angrup A, Rajpoot S, et al. Hand hygiene compliance of patients' family members in India: importance of educating the unofficial 'fourth category' of healthcare personnel. J Hosp Infect. 2020;104(4): 425-429.
DOI:10.1016/j.jhin.2019.09.013
19. Horng LM, Unicomb L, Alam MU, et al. Healthcare worker and family caregiver hand hygiene in Bangladeshi healthcare facilities: results from the Bangladesh National Hygiene Baseline Survey. J Hosp Infect. 2016;94(3):286-294.
DOI:10.1016/j.jhin.2016.08.016
20. Nalule Y, Buxton H, Macintyre A, Ir P, Pors P, Samol C et al. Hand Hygiene during the Early Neonatal Period: A Mixed-Methods Observational Study in Healthcare Facilities and Households in Rural Cambodia. Int J Environ Res Public Health. 2021;18(9):4416.
Published 2021 Apr 21.
DOI:10.3390/ijerph18094416
21. Parveen S, Nasreen S, Allen JV, Kamm KB, Khan S, Akter S et al. Barriers to and motivators of handwashing behavior among mothers of neonates in rural Bangladesh. BMC Public Health. 2018;18:483.
Avaialble:https://doi.org/10.1186/s12889-018-5365-1
22. Coffey PS, Brown SC. Umbilical cord-care practices in low- and middle-income countries: a systematic review. BMC Pregnancy Childbirth. 2017;17:68.
23. Hill Z, Tawiah-Agyemang C, Okeyere E, Manu A, Fenty J, Kirkwood B. Improving hygiene in home deliveries in rural Ghana: how to build on current attitudes and practices. Pediatr Infect Dis J. 2010;29(11):1004–8.
24. Kayom VO, Kakuru A, Kiguli S. Newborn care practices among mother-infant dyads in urban Uganda. Int J Pediatr. 2015;2015:815938.
DOI:10.1155/2015/815938.
25. Afolaranmi TO, Hassan ZI, Akinyemi OO, Sule SS, Malete MU, Chioji CP et al. Cord Care Practices: A Perspective of Contemporary African Setting. Front Public Health. 2018;6:10.

Published 2018 Jan 31.
DOI:10.3389/fpubh.2018.00010

26. 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.
27. 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.
28. 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.
29. Whitmore, Janeen Marie, Newborn Umbilical Cord Care: An Evidence Based Quality Improvement Project. Doctor of Nursing Practice (DNP) Projects. 2010:13. Available:https://repository.usfca.edu/dnp/1

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/81457