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Awareness, Attitude and Use of Chlorhexidine Gel for Cord Care in a Well-Baby Clinic in Port Harcourt, Nigeria

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ABSTRACT

Introduction: Neonatal mortality rate in Nigeria is high and sepsis is a significant contributor. The World Health Organization recommends the use of 7.1% chlorhexidine gel for cord care to prevent neonatal sepsis and mortality.
Aim: The study aimed to assess the awareness, attitude and use of chlorhexidine gel for cord care among mothers in Port Harcourt.
Methods: A cross sectional study was carried out in the well-baby clinic in Rivers State University Teaching Hospital for 3 months. A research proforma with questions to assess awareness, attitude and use of chlorhexidine gel for cord care practices among the participants was used to collect data and analyzed with SPSS version 23. A score of 70% or more was taken as benchmark for good awareness, attitude and use.
Result: A total of 199 mothers participated in the study, 126(63.3%) had heard of chlorhexidine gel, mostly from antenatal clinics. Thirty (23.8%) knew that it prevents neonatal infections, 74(58.7%) perceived it was effective, but only 19(9.6%) used it. About a third of the mothers had good awareness and attitude towards the use of chlorhexidine gel but only 18(9%) used it correctly. Mothers with tertiary level of education significantly had good attitude towards its use and poor knowledge correlated significantly with poor use, $P < 0.05$.
Conclusion: The level of awareness, attitude and use of CHX in cord care practices in Port Harcourt is poor. There is an urgent need to educate mothers on the proper use and benefits of chlorhexidine gel in cord care practices.

Keywords: Chlorhexidine gel, Cord Care, Awareness, Attitude, Use, Port Harcourt.

INTRODUCTION

Neonatal mortality (NNM) rates in developing countries especially in sub - Saharan Africa where Nigeria is located is high.[1] The neonatal mortality rate in Nigeria as at 2019 still remains high at 39/1000 live births NDHS with preterm deliveries, perinatal asphyxia and neonatal sepsis as leading causes.[2]

Neonates are at risk of developing sepsis when microorganisms gain entrance to their blood by colonizing their bodies and the umbilical cord stump, causing omphalitis. The common pathogenic microbes implicated in this infection include Staphylococcus aureus, group A Streptococcus, Escherichia coli, Klebsiella pneumoniae and Proteus mirabilis.[3]

In order to reduce the risk of neonatal sepsis (NNS) occurring from infected umbilical cord stump, appropriate cord care practices are advocated. These practices as advocated by the World Health Organization (WHO) include the use of sterile instrument in ligating the cord at birth, in addition to air drying of the

umbilical stump as appropriate, provided that the delivery of the child took place under hygienic conditions.[4,5] This is however not the case in sub-Saharan Africa, where a great number of deliveries are still taking place at home under unhygienic conditions, in addition to the application of harmful contaminated substances like soil, cow dung and toothpaste to the umbilical stump.[6-10]

In a bid to eliminate these unhealthy cord care practices, the WHO approved the use of an antiseptic and antimicrobial agent; 7.1% chlorhexidine for cord care especially in countries with neonatal mortality rates above 30 per 1000 live births as seen in Nigeria.[2,4,11] This should be applied to the umbilical stump and base of the cord immediately after cutting the cord and application continued in the first week of life. Caregivers are expected to wash their hands before and after the application of chlorhexidine gel.[4,11,12] Studies have shown that the application of 7.1% chlorhexidine gel within the first 24hours of life reduces the risk of omphalitis, neonatal sepsis and neonatal mortality.[13,14,15]

In 2012, the Federal Ministry of Health in Nigeria in partnership with the United States Agency for International Development (USAID) implemented the use of 7.1% chlorhexidine gel in the country and the pilot scheme was commenced in Bauchi and Sokoto States,[16] with a program put in place to scale up its use nationally. The strategies adopted included creating awareness and demand for chlorhexidine gel use among others. Unfortunately, one of the key hindrances identified in the scale up program nationally was low awareness level of this new product among mothers and caregivers and the competitiveness of available alternative harmful products used for cord care in the communities. These challenges were expected to be overcome by educating health care workers and caregivers in the appropriate use of chlorhexidine gel.[16]

A review of the scheme over a 3-year period in the pilot states showed a gradual increase in the use of CHX in both states from 0.7% in 2012 to 21.5% in 2015 in Bauchi State and from 0.8% to 17.1% between 2012 and 2015 in Sokoto State, Nigeria.[17] These increases were however mostly derived from deliveries that took place in health facilities and not from the majority of the deliveries which took place in maternities and at home.[17,18]

Studies to assess the awareness level and use of chlorhexidine gel for cord care in Nigeria are very few. However, in a study conducted in Jos metropolis, Nigeria, the use of chlorhexidine gel in cord care was very poor at 6.9%, 5 years after its introduction in Nigeria.[19] No study has been carried out in Port Harcourt, Nigeria, [7] years after the introduction of this policy. Hence the need to carry out this study in Port Harcourt in order to determine the awareness, attitude and the practice of using chlorhexidine gel for cord care in Port Harcourt.

MATERIALS AND METHODS

Study Design

This study was a cross-sectional study carried out in the well-baby clinic over 3 months from 1st October, 2020 to 31st December, 2020.

Study Site

Rivers State University Teaching Hospital is a state-owned tertiary hospital located in the capital city of Port Harcourt. It is a 375 bedded hospital consisting of clinical and non- clinical departments. The clinical departments comprise of the departments of Paediatrics, Obstetrics and Gynaecology, Surgery, Internal medicine, Community medicine, Family medicine, Pharmacy, Nursing among others. It serves as a referral centre for all the government owned Primary Health Care facilities, general hospitals and private health facilities in the state as well as neighbouring states.

The well-baby clinic also known as the immunization clinic which sees an average of 25 babies daily, is run by the Community medicine department of the

hospital and operates on Mondays to Fridays, from 8am to 2pm.

Study population

The study population was made of all mothers attending the well-baby clinic.

Sampling Size

A convenient sampling size of 199 mother-baby pair was recruited into the study.

Inclusion Criteria

Mothers who gave informed consent and whose babies were 28days to 24months were consecutively recruited into the study.

Exclusion Criteria

Mothers who did not give informed consent and whose babies were either less than 28days old or greater than 24months were excluded from the study.

Study Procedure

A research team was constituted prior to commencement of the study, made up of the researchers and research assistants (house officers). Training was carried out by the lead researcher on proper administration of the pre-tested and validated questionnaire. COVID-19 safety protocols were strictly adhered to with research assistants and participants wearing face mask, regular use of hand sanitizers, maintenance of physical distancing and the provision of individual writing pens which were not retrieved thereafter.

The research Proforma was administered to each mother that was recruited. The socio-demographic characteristics obtained were age of mothers, mothers' level of education, mother's occupation, fathers' level of education, fathers' occupation and age of index child. Questions to assess mother's awareness, attitude and use of chlorhexidine gel were also asked and scores allotted to each response. A correct answer was assigned 1 point while an incorrect or 'I don't know' was assigned zero. Eight points were allocated to the section on mother's awareness. Mothers were determined to have good awareness of chlorhexidine gel if they had at least 70% and above (5-8) correct responses to the questions in the section on awareness. Awareness was said to be poor if the correct responses were less than 70% (<5 correct responses). Three points were allocated to the section on attitude. Mothers were said to have good attitude if they had at least 70% and above (2-3) positive responses to the questions, and poor attitude if the positive responses were less than 70% (<2) in this section. Eight points were allocated to the section on the use of chlorhexidine gel. The use of CHX was said to be good if the mothers had 70% or more (5-8) positive responses and poor if the positive responses to questions in this section were less than 70% (<5).

Ethical Clearance

Ethical clearance was obtained from the Rivers State University Teaching Hospital Ethics Committee (REC number: RSUTH/REC/2021047). The proposed study was explicitly explained to the mothers attending the well-baby clinic and informed consent was obtained before the questionnaire was administered.

Statistical Analysis

All the information obtained were entered into an excel spreadsheet and data analyzed using SPSS version 23. Data was presented as frequency and percentages for categorical variables. Assessment of awareness, attitude and use of CHX gel was carried out by scoring each item selected, summation of the selected items, converting the summed scores to percentages and graded into good or poor, depending on the score of the participants.

Fishers' exact test was used to test for statistical significance in the associations between awareness, attitude and use, respectively and with socio-demographic features of participants. Statistical significance was set at P value < 0.05.

Logistic regression was introduced to test the strength of association between awareness, attitude and with use of CHX gel. Odd ratio was reported alongside its 95% confidence interval.

RESULT

Awareness of Chlorhexidine gel

Of 199 mothers recruited, majority 126(63.3%) had heard of chlorhexidine gel with the antenatal clinic 103(81.7%) being the commonest source of information. All 126(100%) mothers who had heard of CHX, knew it was used for cord care and should be applied on the cord. Forty-two (33.3%) mothers knew chlorhexidine gel was applied once while the commonest benefit of chlorhexidine gel identified by the mothers was prevention of infection, 30(23.8%). The commonest disadvantage of chlorhexidine gel recalled was delayed cord detachment, 23(18.3%), Table I

Sixty-eight (34.2%) respondents were assessed to have good awareness level with 70% or more scores while 131(65.8%) had poor awareness with less than 70% of the total awareness scores.

Table I: Mother's Awareness of Chlorhexidine gel

Variables	Frequency (%)
Have you heard of chlorhexidine gel? n=199	
Yes	126 (63.3)
No	73 (36.7)
Source of information of chlorhexidine gel? n=126	
Antenatal clinic	103 (81.7)
Other health workers	15 (11.9)
Relatives	5 (4.0)
Neighbours/friends	3 (2.4)
Is chlorhexidine gel used alone? n=126	
Yes	42 (33.3)
No	54 (42.9)
I don't know	30 (23.8)
What are the benefits of chlorhexidine gel? n=126	
Prevents infection	30 (23.8)
Heals cord fast	24 (19.1)
Keeps cord clean	15 (11.9)
I don't know	57 (45.2)
What are the disadvantages of chlorhexidine gel? n=126	
Delayed cord detachment	23 (18.2)
Expensive	2 (1.6)
Cause rash/bleeding	7 (5.6)
I don't know	94 (74.6)

Attitude of mothers towards the use of chlorhexidine gel

Of 126 respondents who have heard of chlorhexidine gel, 74(58.7%) believed it is effective, 62(49.2%) would use it again and 75(59.5%) would recommend it.

Seventy-one (56.3%) mothers were assessed to have good attitude while 55(43.7%) had poor attitude, Table II.

Table II: Attitude of mothers towards the use of chlorhexidine gel

Variables	Frequency, n=126 (%)
Do you believe chlorhexidine gel is effective?	
Yes	74 (58.7)
No	52 (41.3)
Would you use it again?	
Yes	62 (49.2)
No	64 (50.8)
Would you recommend chlorhexidine gel?	
Yes	75 (59.5)
No	51 (40.5)

The use of chlorhexidine gel

Most mothers, 191(96.0%) took care of the umbilical cord of the index baby and methylated spirit 113(56.8%) was the commonest cord care agent used. Only 19(9.5%) mothers used CHX for cord care with their index baby. Majority of mothers began cord care within the 1st 24hours of birth, 128(64.3%). The choice of agent used for cord care was majorly influenced by information received from the antenatal clinic as seen in 120(60.3%) of mothers.

Chlorhexidine gel had been used in the past by only 67(33.7%) mothers. Of these 67 mothers, 16(23.9%) applied the gel once daily and application over the cord and surrounding skin was done by 36(53.7%) mothers. Forty-nine (73.1%) mothers washed their hands always before application while 40(59.7%) kept cord dry after application. Fifteen (22.4%) mothers stopped application of the gel after cord detachment. Most 45(67.2%) of their baby's cords were detached between 7-14 days of application of chlorhexidine gel. Only 16 mothers experienced side-effects with the use of chlorhexidine gel, with most 10(62.5%) attributing delayed cord detachment to the use of chlorhexidine gel, Table III.

The assessment of the proper use of CHX was said to be good in 18(9.0%) mothers and poor among 181(91.0%) mothers.

Table III: The use of chlorhexidine gel by mothers

Variables	Frequency, n=199 (%)
Did you take care of last baby's cord?	
Yes	191 (96.0)
No	8 (4.0)
What agent did you use for cord care in the index baby?	
Methylated spirit only	113 (56.8)
Chlorhexidine gel only	19 (9.6)
Methylated spirit and chlorhexidine gel	33 (16.6)
Others	34 (17.0)
How soon after birth was cord care started?	
< I hour	33 (16.6)
1-23 hours	95 (47.7)
1 day-7days	71 (35.7)
Who informed the choice of cord care?	
Antenatal clinic	120 (60.3)
Other health care workers	27 (13.6)
Relatives	42 (21.1)
Neighbours/friends	2 (1.0)
Social media	1 (0.5)
Others	7 (3.5)
Have you ever used chlorhexidine gel?	
Yes	67 (33.7)
No	132 (66.3)
How many times did you apply chlorhexidine gel? n=67	
Once	16 (23.9)
More than once	51 (76.1)
Did you wash your hands always before use of chlorhexidine gel? n=67	
Yes	49 (73.1)
No	18 (26.9)
Where did you apply chlorhexidine gel?	
Stump only	15 (22.4)
Surrounding skin only	16 (23.9)
Both	36 (53.7)
Did you use a finger to spread chlorhexidine gel?	
Yes	50 (74.6)
No	17 (25.4)
What did you do after applying chlorhexidine gel?	
Keep cord dry	40 (59.7)
Apply other agents	27 (40.3)
What did you do after cord detaches?	
Stop chlorhexidine gel application	15 (22.4)
Continue for more one week	2 (3.0)
Apply other agents	50 (74.6)
How long did you apply chlorhexidine gel before the cord detached?	
< 7 days	18 (26.9)
7-14 days	45 (67.2)
> 14 days	4 (5.9)
What side effects of chlorhexidine gel did you experience? n=16	
Delayed cord detachment	10 (62.5)
Heals poorly	3 (18.8)
Bleeding	3 (18.8)

Association of Awareness, Attitude and the use of Chlorhexidine Gel

Good awareness was significantly associated with good use of CHX and vice versa, P value < 0.05, Table IV.

Table IV: Association of Awareness, Attitude and the use of Chlorhexidine Gel

Variables	Practice Grades		Test of Association	
	Good N(%)	Poor N(%)	P value	Odds Ratio (95% CI)
Knowledge Grade				
Good ≥ 70%	13(72.2)	55(30.4)	0.001*	5.0(1.86, 13.47)
Poor < 70%	5(27.8)	126(69.6)		
Attitude Grade				
Good ≥ 70%	14(77.8)	57(52.8)	0.071	2.7(0.95, 7.78)
Poor < 70%	4(22.2)	51(47.2)		

**= Statistically significant*

Association of Socio-demographic characteristics with Awareness, Attitude and the use of Chlorhexidine Gel among Mothers attending the Well-Baby Clinic

There was no statistical significance in the association of socio-demographic characteristics in respect to awareness and use scores, P value > 0.05. Mother's level of

education was significantly associated with their attitude towards the use of chlorhexidine gel, P value = 0.004, Table V.

Table V: Association of Socio-demographic characteristics with Awareness, Attitude and the use of Chlorhexidine Gel among mothers attending the well-baby clinic

Sociodemographic characteristics	Awareness assessment			Perception assessment			Use Assessment		
	Good (%)	Poor (%)	P value	Good (%)	Poor (%)	P value	Good (%)	Poor (%)	P value
Mother's age(years)									
≤ 30	45.6	42.0	0.625	43.7	40.0	0.719	38.9	43.6	0.698
> 30	54.4	58.0		56.3	60.0		61.1	56.4	
Mother's LOE									
Secondary	27.9	26.7	0.854	35.2	12.7	0.004*	27.8	27.1	1.000
Tertiary	72.1	73.3		64.8	87.3		72.2	72.9	
Mother's occupation									
Business/Trader	33.8	35.1		35.2	30.9		33.3	34.8	
Civil/Public servant	29.4	27.5	0.546	23.9	36.4	0.359	33.3	27.6	0.565
Prof/Health workers	19.1	13.0		19.7	10.9		22.2	14.4	
Unemployed/Artisan	17.6	24.4		21.1	21.8		11.1	23.2	
Father's LOE									
Secondary	20.6	26.7	0.341	23.9	14.5	0.260	11.1	26.0	0.251
Tertiary	79.4	73.3		76.1	85.5		88.9	74.0	
Father's occupation									
Business/Trader	32.4	38.9		31.0	40.0		27.8	37.6	
Civil/Public servant	33.8	22.9	0.361	31.0	29.1	0.568	44.4	24.9	0.175
Prof/Health workers	25.0	25.2		29.6	20.6		27.8	24.9	
Unemployed/Artisan	8.8	13.0		8.5	10.9		0.0	12.7	

**=Statistically significant*

DISCUSSION

This present study shows that although most of the mothers attending ANC at RSUTH (63.3%) had heard of chlorhexidine gel, and 100% of those who had heard knew what it was used for, only 34.4% had good knowledge of its' use. This is in contrast to the finding by Berhe et al [20] where 87.3% of the study participants had good knowledge about cord care after birth. Similarly, a study done in Abeokuta [22] also showed that 69% of the study subjects had good knowledge of the Use of CHX gel. This difference is probably due to the difference in the study participants. Whereas our study subjects were mothers attending ANC, health care workers were used in the other studies.

Our study showed that only 9.5% of mothers used CHX gel alone for cord care. This abysmally low proportion is similar to findings in Abeokuta [22] and Ethiopia. [20] In both studies, although the participants which were health care workers and as such expected to have had adequate knowledge about the recommendations for the use of CHX gel, only a few of them actually used it. This reflects the fact that many healthcare workers are yet to come to terms with the recommendations of WHO on the use of CHX gel [22]. And as shown by the findings of our study, majority of mothers' source of information about CHX gel was from the ANC and other healthcare workers (81.7% and 11.9% respectively). Most of the mothers also made decisions about choice of cord care agents based on information they receive during ANC and from contact with other health care workers (60.3% and 13.6% respectively). We can therefore infer that there is inadequate communication to mothers attending ANC about information on current trends of cord care practice as recommended by the WHO.

Our study showed that only 23.9% of the mothers who used CHX gel applied it once daily as recommended by WHO. The other mothers applied CHX gel as many as 2-10 times a day. This finding is similar to the studies done in Ethiopia [20] and Jos [21] which showed that most mothers applied CHX gel every 2 hours-similar to the way methylated spirit is applied. In the study done in Jos by Schwe et al [21] CHX gel was applied at least twice daily, to the cord and stump base as directed by the researchers. This was an experimental study where the participants were trained at the beginning of the study on how to apply the CHX gel; and the instruction according to their study

design/protocol was to apply the CHX gel twice a day and any other time the cord appears wet. In contrast, the mothers in a study done in Kenya [23], applied the CHX gel correctly-once daily. The Kenyan study involved both non-health workers and health workers as participants. Majority of the non-health worker group (16 out of 19-84%) were mothers instructed by the researchers to apply CHX gel correctly-once daily. The other participants in that study were 24 health care workers and were thus more informed. The sample size was small and thus it was easier for the researchers to pass across information about proper cord care using CHX gel more effectively to a small group.

Our study showed that only 16.6% of the mothers who used CHX gel for cord care used it within 24 hours of child's birth. In a study done in Nepal, Mullany [24] reported about 25% reduction in mortality among newborns treated with CHX gel than in the comparison group. More so, mortality was one-third lower amongst those who received the first application within 24 hours of birth. Thus, there is a need to further emphasize early application of CHX gel (within 24 hours of birth) to the cord as recommended by WHO in order to reduce neonatal sepsis and mortality. [13,14,15,24,25,26]

Most mothers felt that delayed cord detachment was a side effect of CHX gel and over 40% were unwilling to use it again. In addition, about 60% would not recommend its use. This perception about its' inefficiency because of delay in cord detachment may explain why majority of the mothers in our study kept on applying other agents even after the cord stump fell off (74.6%). Cultural beliefs of communities influence a mother's perception of how long it should take for the cord to fall off. This explains why some of the mothers in our study applied other agents after some days of using CHX gel, to hasten drying of the cord. This is similar to the practice of some mothers reported in the study by Asiedu in Ghana. [10] The study by Ambale et al in Kenya [23] also reported that some mothers used other agents like spirit, warm water, normal saline and antiseptics to clean off the dry flakes left by the gel on the cord. Other side effects reported in our study included bleeding from the cord stump in 3 babies and poor stump healing in 3 other babies. Schwe et al [21] in Jos reported bullous eruptions on anterior abdominal wall in one-tenth (3 out of 30) of the study subjects in the group who used CHX gel for cord care.

Our study showed majority of mothers (73,4%) used spirit either alone (56.8%), or in combination with CHX gel (16.6%). Of the 9.5% of mothers who used only CHX gel for cord care, 58.7% believe it's effective but only 49.2% said they will use it again. Similarly, the study done in Kenya [23] among some mothers and health workers in Kangundo hospital showed both mothers and health workers felt that methylated spirit was more or equally effective as a cord care agent. Less than 25% of both groups in the study felt CHX gel was more effective. It seems therefore across both groups-health workers and mothers alike, the perception is that methylated spirit is more effective as the cord separation time reported was shorter with the use of methylated spirit. In contrast to our findings, the Jos study [21], reports shorter cord separation time with the use of CHX gel. This could be because of the design of the study as mothers were properly instructed on how to use CHX gel prior to commencement of the study. The mothers in our study received no prior instructions and applied the gel based on their own understanding.

Agents used for cord care by mothers recruited in our study included CHX gel, methylated spirit, hot water compress, toothpaste, salt, powder, mentholatum, petroleum jelly, antiseptics/disinfectant, penicillin and native herbs. Similarly, in Ghana, Asiedu et al [10] reported the use of agents such as toothpaste, salt, sand, petroleum jelly, shea butter, herbs, chalk, ground banana peels, antiseptics like Dettol, baby lotion, penicillin and amoxicillin. This similarity is

probably due to the fact that both studies were conducted in West African countries (Nigeria and Ghana) with similar cultures. Hodgins et al [26] reported the application of spices, butter, oil, ash and mud for cord care in rural India and Nepal. The various agents used vary from culture to culture.

Our study showed good awareness was significantly associated with good use of CHX gel. This is not surprising as studies have shown that with increased awareness following robust public health campaigns, the use of CHX gel was better with a resultant reduction in neonatal mortality/ morbidity.[16,17,20,26,27,30] Also the studies done in Jos [21] and Kenya [23] also showed better use/practice because the mothers received prior instructions in even smaller groups.

Similarly, our study showed that the mothers with tertiary level of education significantly had better attitude towards using CHX gel. Similarly, the study done by Asiedu et al [28] in Ghana also showed the mothers level of education was associated with the type of dressing used for cord care. Mothers with no formal education were found to use unapproved substances such as chalk, salt, toothpaste and sand. Similarly, Abhulimhen-Iyoha and Ibadin [29] in Benin city found that mothers who had attained at least primary level of education were more likely to use approved dressings such as methylated spirit whereas those with no formal education were more likely to use unapproved dressings for cord care. [28,29]

The recommendation by WHO for the use of CHX gel for newborn cord care in a country with high risk for NNS, such as ours, needs to be reemphasized as this will lead to a reduction in neonatal mortality rate. [26,27,30]

CONCLUSION

Our study shows awareness, attitude and the use of CHX gel for cord care by mothers in Port Harcourt is still relatively low. The need to increase awareness about CHX gel, it's proper use and benefits; by massive public health campaign strategies, training and retraining of health care workers especially midwives involved in health instruction during ANC, CHEWs, TBAs, religious and community leaders and the general public at large, cannot be over emphasized. Government policies should be strengthened to support the scale-up of its' use not just in some Northern states but rather all over the country.

Limitations

Our study was based on recall and therefore there could be recall bias.

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