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Research Article

Effectiveness of different cord care interventions on omphalitis prevention among neonates in Nakuru County Hospital, Kenya

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Abstract

Background: Sepsis among newborns is common and a major cause of neonatal deaths in developing countries. Annually, about 4 million neonatal deaths occur around the world. Of these, more than 30% are caused by infections majority of which start as umbilical cord infections. Topical umbilical cord care can reduce omphalitis (umbilical cord infection) and neonatal mortality among newborns.

Objective: This study aimed to compare the incidence of omphalitis in different cord care interventions (Dry, Chlorhexidine, and Alcohol) in Nakuru County, Kenya.

Methodology: A randomized controlled trial was carried out between July 2018 and June 2019. A total of 540 newborns were randomly assigned to receive 1 of 3 cord care regimens; twice cord cleansing with 4% chlorhexidine (Group 1), twice cord cleansing with 70% alcohol (Group 2), and dry cord care (Group 3) as control.

Results: The risk of omphalitis was significantly reduced in the chlorhexidine group than in dry and alcohol cord care groups. The incidence of omphalitis was 1.95 times more likely to occur among the dry cord care group [AOR = 1.95; 95% CI = 1.13-3.38; p = 0.017] compared to the chlorhexidine group. Similarly, babies in the alcohol group were nearly 2 times more likely to develop omphalitis [AOR = 1.98; 95% CI = 1.15-33.40; p = 0.014] compared to those in the chlorhexidine group.

Conclusion and recommendation: Chlorhexidine topical cord care significantly reduces the risk of umbilical infection in neonates when compared to both topical alcohol application and dry cord care approach. It should be recommended to be used topically for the prevention of omphalitis in our setup.

More Information

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Keywords: Alcohol; Chlorhexidine; Dry care; Omphalitis; Topical umbilical cord care

Background

Neonatal sepsis is a major public health issue worldwide. More than 40% of under-five deaths globally occur in the neonatal period, resulting in 3.1 million newborn deaths each year [1]. In Kenya, despite all early childhood mortality rates declining between 2003 and 2014, neonatal mortality has exhibited a slower rate of decline standing at 33%. According to Kenya Demographic Health Survey [2], 56% of infant deaths occur during the first month of life with a third of all neonatal deaths being due to severe infections, of which omphalitis is a major contributor [2]. Contrary to the encouraging trend in the older child, neonatal morbidity and mortality remain unacceptably high with infections contributing up to 28% [3]. The umbilicus is the key entry point for invasive pathogens through the patent vessels of the newly cut cord even in absence of overt signs of cord infection. This greatly increases neonatal morbidity and mortality due to systemic sepsis [4].

There has been a wide range of inconsistent practices related to umbilical cord care that are based on historic practices and traditions rather than scientific investigation

and justification. Umbilical cord care plays a pivotal role in preventing it from being a culture medium for pathogenic microorganisms [5]. While there have been efforts to improve umbilical cord hygiene by advocating "dry cord care," these efforts have not always had the intended effect because, without specifically recommended products, mothers globally resort to a variety of application substances like cooking oils, ash, breast milk, saliva, and even cow dung [5]. Despite Chlorhexidine 4% being included by WHO in the list of essential antiseptics of umbilical cord care following studies from Pakistan [6], we are unaware of any study from Kenya on the effectiveness of different cord care methods in the prevention of omphalitis. Although clinical guidelines recommend dry cord care in hospital setups, anecdotal evidence and experience suggest that health care providers vary in their practice, some, use alcohol, methylated spirit, or povidone-iodine to clean the cord [7]. WHO [4] indicated that most infections with hospital-acquired bacteria occur after discharge from the hospital, and recommended evaluation of regimens for umbilical disinfection be done prospectively following up the infants after discharge, which this study undertook.

Methodology

Setting

The study was conducted in Nakuru County Hospital, a level 5 hospital situated in Nakuru town of Kenya. This is a teaching referral hospital whose labor ward has twelve beds for the first stage of labor and eight delivery couches. It averages one thousand spontaneous vertex deliveries (SVD) and three hundred cesarean sections monthly. KDHS [2] indicated it as having the highest sepsis-related early neonatal mortality rate of 36% in the country.

Study design and participants

This was a randomized controlled trial involving 540 healthy term SVD newborns (38-42 weeks gestation). The newborns were recruited within twelve hours of delivery, were free of congenital anomalies, weighed 2500 to 4000 grams, and had an Apgar score of at least 8 at the first minute. Additionally, they had nothing applied to the umbilical cord stump, were roomed in with their mothers, and had breastfed within one hour. Excluded were neonates requiring immediate transfer to the neonatal intensive care unit (NICU), those born outside the hospital, and those on any form of medication, born of mothers referred from other hospitals with labor complications or other medical conditions.

Randomization and sampling

Eligible babies were randomized into one of three groups subjected to either 4.0% chlorhexidine or 70% alcohol for test groups or into the dry cord care group serving as control. Block randomization was used to minimize imbalance in the differences inward staff shifts and also equalize numbers in the different care groups. All babies born from 6 pm to 6 am were thus entered into one block and vice versa, and their parents gave informed consent for participation. Mothers randomly picked shuffled color-coded cards (NBI (Chlorhexidine), MSA (Alcohol), and KSM (dry care) that allocated neonates into the three study groups.

Intervention

Chlorhexidine and alcohol solution was applied to the cord as soon as possible up to within 12 hours of birth and then repeat application twice daily for up to 7 days. Thus, groups 1 and 2 were assigned to twelve hourly applications of 4% Chlorhexidine and 70% alcohol respectively. In the control, the group cord was only cleaned and dried as recommended by WHO. In case of soiling, the cord was wiped with sterile cotton wool balls that had been soaked in boiled-cooled water. For test groups, after proper handwashing with soap and water, three sterile cotton balls soaked with either chlorhexidine or alcohol solution were used to gently cleanse the umbilical cord stump from the top down and up to a 5mm radius of the surrounding skin. The first application was demonstrated by the investigator in the hospital and was done twice daily by caretakers at home following discharge, up to the 7th day. Sufficient sterile cotton wool balls and chlorhexidine/ alcohol solution were freely supplied. Caregivers in all groups received educational messages as per their cluster and were advised on follow-up during the entire neonatal period.

Data collection procedure

Data on demographics, socio-economic factors, obstetric factors, and cord care practices were collected from the care-taker using a structured questionnaire in Kobo-Collect software.

Umbilical cord Swabs were taken by a trained laboratory technologist from the base of the umbilical cord within twelve hours of delivery and on the seventh day after intervention. The specimens were collected by a dry sterile swab soaked in Amies transport medium (Oxiod, England), labeled with the baby's code name and delivery date. Swabs were thereafter transported in Stuart's medium (Merck - Germany) and sent to the bacteriology laboratory within one hour of collection. All specimens were cultured in the blood agar and MacConkey agar plates (Merck Germany) and incubated for 24-48 hours at 37 ^{o}C. Baseline swabs, collected from each baby before the commencement of interventions, were monitored for bacterial growth in the first 24 hours after collection. Those showing infections were reviewed by a clinician, started on treatment, and excluded from the study.

New-borns of all 3 groups were followed up on days 3, 14, 21, and 28 for any signs of umbilical cord infection and features of sepsis during the total neonatal period. On day seven all the neonates were brought back to the facility for a follow-up umbilical cord swab. Mothers were oriented

about the signs of umbilical infection during their hospital stay and reported to the researcher if any of the signs were noticed. Researcher communicated with the parents or other family members over a shared mobile phone number on the assigned date. If any signs of cord infection were observed by the parents or other family members, parents were requested to return their babies immediately to the hospital for further investigations and/or treatment.

Outcome measurement

In this study, omphalitis was defined as the presence of Potentially Pathogenic Bacterial culture in the umbilical cord swab within 24 hours and /or on the follow up on the seventh day showing single isolates or predominantly single isolates with or without any physical signs on the skin-because there can never be physical signs on the skin WITHOUT the presence of the pathogenic bacteria. When omphalitis was present from the swab either at birth or follow-up, the caretaker was contacted by the researcher to bring the baby back for treatment in the hospital.

Quality control

To ensure data quality, research assistants were all qualified professionals though not working in the facility to prevent bias. The solutions used were all handled privately by the principal investigator and handed over to the research assistants bearing the cluster code to ensure double-blinding of both the clients and the research assistants.

Data analysis

Data in Kobo Collect of the 485 participants completing the study were entered into Microsoft Excel and transported into Statistical Package for Social Sciences (SPSS) version 22 for analysis. Descriptive statistics using frequency and proportions were computed to describe the basic attributes of the respondents as well as the occurrence of omphalitis. The Chi-square test was used to determine whether there was a difference among the different groups regarding the basic characteristics. The effectiveness of the regimens was determined using multiple logistic regression by considering the variables revealing significant differences at $p < 0.05$ during the descriptive comparison analysis.

Ethical considerations

The study was approved by the Institutional Review Board and permission was granted by both Nakuru county and the facility administration. Informed consent was obtained from the parents of the neonates. All participants who developed omphalitis or needed treatment were all referred to pediatricians stationed within the facility and treated.

Results

Socio-demographic characteristics of the mothers and new-born babies.

A total of 485 participants completed the trial thus: chlorhexidine (n = 165), alcohol (n = 157), and dry cord care (n = 163). Most mothers were aged 19-24 years (41.6%), were married (77.9%), had secondary education (55.1%), and were Christians (95.3%). Thirty-one percent (30.7%) of households had one child while 6.2% of households had five or more children. The distribution of the socio-demographic characteristics is given in Table 1 and all variables were statistically insignificant.

The neonates had a comparable Male (48.2%) to Female (51.8%) gender ratio (1:1). The highest proportion of neonates had birth weight ranging between 3.01 – 3.50 kgs (49.3%), had > 8 Apgar score in the first one minute (70.3%), and initiated breastfeeding in less than 1 hour (99.4%). There was no significant difference in the distribution of newborn characteristics in the various intervention groups ($p > 0.05$).

The distribution of the socio-economic factors among the mothers is presented in Table 2. Fifty-four percent (53.6%) of mothers had no formal education, 91% earned Kshs ≥ 15,000, 82.5% rented houses they lived in and 77.9% used piped water and 61.6% had pit latrines.

Obstetric characteristics of the mothers

Table 3 presents the obstetric characteristics of the mothers by intervention groups. Most mothers visited public facilities (86.4%), had ≥ four ANC visits (56.7%), had 37-38 gestational weeks (43.1%), labored for 11–14 hours (35.9%) with three hours duration of membrane rupture (43.5%) and clear liquor (99.6%). Almost all (99.8%) had SVD deliveries 88% were HIV negative. There was no significant difference in the distribution of obstetric factors in the various intervention groups ($p > 0.05$).

Umbilical cord care practices

The majority of the mothers washed their hands after visiting the toilet (89.5%) and changing the baby (96.3%). Mothers who washed their hands when eating were 30.9% and 40.6% did when cooking. Eighty-eight percent of mothers used a basin while washing hands whereas 56.6% cleaned the umbilical cord with antiseptics. The majority (86.6%) applied baby diapers folded backward and roomed in with the baby (93.2%). This is presented in Table 4.

Incidence and common bacterial infections for omphalitis in the different cord care interventions

The overall incidence of omphalitis was 23.1% and this varied significantly in the different intervention groups (p = 0.023). Incidence was higher among the dry cord care group (27.0%) and alcohol group (26.8%) compared to the chlorhexidine group (15.8%). Among infected neonates, the common bacteria were *Escherichia Coli* (36.6%) and Staphylococcus Aureus (32.1%). The prevalent bacterial infection in the chlorhexidine group was *Escherichia Coli* (46.2%) followed by Staphylococcus Aureus (26.9%). A similar

Table 1: Socio-demographic characteristics of the mothers and new-born babies.

Variables	Total, (N = 485)		Chlorhexidine group (165)		Alcohol group, (157)		Dry cord care group, (163)	
	n	%	N	%	*n*	%	N	%
Age in years								
19-24	202	41.6	67	40.6	72	45.9	63	38.7
25-29	141	29.1	59	35.8	41	26.1	41	25.2
30-34	97	20	27	16.4	31	19.7	39	23.9
35 and above	45	9.3	12	7.3	13	8.3	20	12.3
Marital Status								
Married	378	77.9	127	77	124	79	127	77.9
Single/divorced	107	22.1	38	23	33	21	36	22.1
Level of Education								
Primary	142	29.3	47	28.5	50	31.8	45	27.6
Secondary	267	55.1	94	57	82	52.2	91	55.8
College	76	15.7	24	14.5	25	15.9	27	16.6
Religion								
Christian	462	95.3	156	94.5	151	96.2	155	95.1
Muslim	23	4.7	9	5.5	6	3.8	8	4.9
Number of children								
One	149	30.7	44	26.7	54	34.4	51	31.3
Two	130	26.8	45	27.3	31	19.7	54	33.1
Three	138	28.5	58	35.2	48	30.6	32	19.6
Four	38	7.8	7	4.2	14	8.9	17	10.4
Five and above	30	6.2	11	6.7	10	6.4	9	5.5
Gender								
Male	234	48.2	80	48.5	76	48.4	78	47.9
Female	251	51.8	85	51.5	81	51.6	85	52.1
Birth weight								
2.50-3.00 Kgs	130	26.8	41	24.8	33	21	56	34.4
3.01-3.50 Kgs	239	49.3	84	50.9	83	52.9	72	44.2
3.51-4.00 Kgs	116	23.9	40	24.2	41	26.1	35	21.5
APGAR score in the first one minute								
8	138	28.5	38	20	46	29.3	54	33.1
9	341	70.3	125	80	109	69.4	107	65.6
10	6	1.2	2	1.2	2	1.2	2	1.2
Initiation of breastfeeding								
< 1 hour	482	99.4	163	98.8	156	99.4	163	100
> 1 hour	3	0.6	2	1.2	1	0.6	0	0

*Significant at $p < 0.05$ bolded

Table 2: Socio-economic characteristics of the mothers.

Variables	Total, (N = 485)		chlorhexidine group (165)		Alcohol group, (157)		Dry cord care group, (163)		χ^2 vale	df	*p* - value*
	n	%	N	%	*n*	%	*n*	%			
Occupation											
Permanent employment	37	7.6	13	7.9	11	7.0	13	8.0	3.61	4	0.462
Self/causal employment	188	38.8	55	33.3	68	43.3	65	39.9			
Not employed	260	53.6	97	58.8	78	49.7	85	52.1			
Monthly income in Ksh.											
15,000 and less	439	90.5	152	92.1	144	91.7	143	87.7	3.78	4	0.437
20,000	13	2.7	4	2.4	2	1.3	7	4.3			
30,000 and above	33	6.8	9	5.5	11	7.0	13	8.0			
Nature of the house											
Permanent	322	66.4	104	63.0	108	68.8	110	67.5	1.61	4	0.808
Semi-permanent	112	23.1	43	26.1	34	21.7	35	21.5			
Temporary	51	10.5	18	10.9	15	9.6	18	11.0			
House ownership											
Self-owned	85	17.5	30	18.2	27	17.2	28	17.2	0.07	2	0.963
Rented	400	82.5	135	81.8	130	82.8	135	82.8			
Source of water											
Piped	378	77.9	133	80.6	121	77.1	124	76.1	1.16	4	0.885
Buying	48	9.9	15	9.1	16	10.2	17	10.4			
Others (rain water and bore hole)	59	12.2	17	10.3	20	12.7	22	13.5			
Type of toilet											
Flash	186	38.4	70	42.4	53	33.8	63	38.7	2.57	2	0.277
Pit	299	61.6	95	57.6	104	66.2	100	61.3			

*Significant at $p < 0.05$ bolded

Table 3: Obstetric characteristics of the mothers.

Variables	Total, (N = 485)		chlorhexidine group (165)		Alcohol group, (157)		Dry cord care group, (163)		χ^2 value	df	*p* - value*
	n	%	*n*	%	N	%	*n*	%			
Place of ANC attendance											
Public facility	419	86.4	144	87.3	134	85.4	141	86.5	0.26	2	0.880
Private facility	66	13.6	21	12.7	23	14.6	22	13.5			
Number of ANC visits											
Once	15	3.1	3	1.8	5	3.2	7	4.3	9.88	6	0.130
Twice	55	11.3	20	12.1	24	15.3	11	6.7			
Thrice	140	28.9	55	33.3	39	24.8	46	28.2			
Four times and above	275	56.7	87	52.7	89	56.7	99	60.7			
Gestation during delivery											
37 to 38 weeks	209	43.1	66	40.0	67	42.7	76	46.6	2.91	4	0.574
39 to 40 weeks	206	42.5	72	43.6	65	41.4	69	42.3			
41 to 42 weeks	70	14.4	27	16.4	25	15.9	18	11.0			
Duration of labor in hours											
< 8	44	9.1	15	9.1	15	9.6	14	8.6	1.51	6	0.959
8-10	117	24.1	36	21.8	42	26.8	39	23.9			
11-14	174	35.9	62	37.6	55	35.0	57	35.0			
15 and above	150	30.9	52	31.5	45	28.7	53	32.5			
Duration of membrane rupture											
One hour	79	16.3	23	13.9	35	22.3	21	12.9	10.87	6	0.093
Two hours	171	35.3	59	35.8	46	29.3	66	40.5			
Three hours	211	43.5	75	45.5	65	41.4	71	43.6			
Four hours	24	4.9	8	4.8	11	7.0	5	3.1			
Nature of liquor											
Clear	483	99.6	164	99.4	157	100.0	162	99.4	0.96	2	0.618
Meconium	2	0.4	1	0.6	0	0.0	1	0.6			
Mode of delivery											
SVD	484	99.8	164	99.4	157	100.0	163	100.0	1.94	2	0.378
Caesarian	1	0.2	1	0.6	0	0.0	0	0.0			
Maternal HIV status											
Negative	427	88.0	151	91.5	137	87.3	139	85.3	3.17	2	0.205
Positive	58	12.0	14	8.5	20	12.7	24	14.7			

*Significant at $p < 0.05$.

Table 4: Umbilical cord care practices.

Variables	Total, (N = 485)		Chlorhexidine group (165)		Alcohol group, (157)		Dry cordcare group, (163)		χ^2 value	df	*p* value*
	n	%	*n*	%	N	%	*n*	%			
Washing hands after visiting the toilet											
No	51	10.5	17	10.3	20	12.7	14	8.6	1.48	2	0.478
Yes	434	89.5	148	89.7	137	87.3	149	91.4			
Washing hands after changing the baby											
No	18	3.7	6	3.6	9	5.7	3	1.8	3.39	2	0.183
Yes	467	96.3	159	96.4	148	94.3	160	98.2			
Washing hands when eating											
No	335	69.1	115	69.7	107	68.2	113	69.3	0.10	2	0.953
Yes	150	30.9	50	30.3	50	31.8	50	30.7			
Washing hands when cooking											
No	288	59.4	102	61.8	88	56.1	98	60.1	1.17	2	0.558
Yes	197	40.6	63	38.2	69	43.9	65	39.9			
Methods/ways of washing hands											
On a basin	428	88.2	148	89.7	134	85.4	146	89.6	8.60	4	0.072
On basin and tap	35	7.2	14	8.5	10	6.4	11	6.7			
Tap	22	4.5	3	1.8	13	8.3	6	3.7			
How to clean the umbilical cord											
Clean with antiseptic	274	56.6	136	82.4	126	80.8	12	7.4	247.62	6	< 0.001
Clean with boiled water	63	13.0	4	2.4	11	7.1	48	29.4			
Clean with wet/dry cloth	147	30.3	25	15.2	19	12.1	93	57.1			
Application of diaper folded backward on the baby (observe)											
Yes	420	86.6	143	86.7	143	91.1	134	82.2	5.43	2	0.066
No	65	13.4	22	13.3	14	8.9	29	17.8			
Always staying the in the same room											
Yes	452	93.2	149	90.3	149	94.9	154	94.5	3.32	2	0.190
No	33	6.8	16	9.7	8	5.1	9	5.5			

*Significant at $p < 0.05$ bolded.

trend was observed in the dry cord care group; *Escherichia Coli* (43.2%) followed by Staphylococcus Aureus (38.6%). The prevalence of all the bacteria was relatively comparable in the Alcohol group, ranging from 23.8% to 28.6% as indicated in Table 5.

Effectiveness of chlorhexidine topical cord application on omphalitis prevention among neonates

Babies in the dry cord care and alcohol group had a higher risk of omphalitis when compared to the chlorhexidine group. The incidence of omphalitis was 1.95 times more likely to occur among the dry cord care group [AOR = 1.95; 95% CI = 1.13-3.38; p = 0.017] compared to the chlorhexidine group. Similarly, babies in the alcohol group were nearly 2 times more at risk of developing omphalitis [AOR = 1.98; 95% CI = 1.15-33.40; p = 0.014] than those babies in the chlorhexidine group. This is typified in Table 6.

Discussion

Current study findings show that the socio-demographic, socio-economic, or obstetric characteristics of the mothers of studied neonates do not influence the effectiveness of the cord care practices care-takers to apply. There were no demonstrable differences in the outcomes based on the different socio and obstetric classes of mothers belonged to. This further shows that the randomization and blinding employed eliminated potential bias of the results from this study.

In this study, babies in the dry cord care had a higher risk of omphalitis. The incidence of omphalitis was almost twice more likely to occur among the dry cord care group compared to the chlorhexidine group. Several studies from both community and facility settings have similar findings. We demonstrate that Chlorhexidine is superior to the use of alcohol or dry cord care in the management of the cord among neonates. Gelano, et al. [8] in a pooled result of meta-analysis in a low-resource community setting with a high burden of Neonatal Mortality Rates (NMR) equally showed that chlorhexidine cord application reduces neonatal sepsis by 32% as compared to dry cord care and even stressed the importance of including it in the essential newborn care package in developing countries. This is in line with our current findings. Similarly, Roba, et al. [9] in their comparison and harmonization of findings from South Asia, Europe, and Sub-Saharan Africa found that there was a 21% reduction in Omphalitis and neonatal mortality among neonates whose cords were managed on 4% chlorhexidine application.

Other studies have also shown chlorhexidine as superior to other approaches to neonatal cord care in different setups. Mullany, et al. [10], studying babies born in low-level public facilities in Bangladesh, identified chlorhexidine intervention as useful in the reduction of omphalitis and mortality. This was also consistent with [11,12] findings which were in agreement with the effectiveness of chlorhexidine in the prevention of infection in community-based studies in Bangladesh. Our

Table 5: Incidence and common bacterial infections for omphalitis in the different cord care interventions.

Variables	Total, (N = 485)		Chlorhexidine group (165)		Alcohol group, (157)		Dry cord care group, (163)		χ^2 value	df	p - value*
	n	%	N	%	N	%	N	%			
Umbilical cord status											
Infected	112	23.1	26	15.8	42	26.8	44	27.0	7.579	2	0.023
Not infected	373	76.9	139	84.2	115	73.2	119	73.0			
Type of bacteria											
Staphylococcus Aureus	36	32.1	7	26.9	12	28.6	17	38.6	12.206	6	0.058
Escherichia Coli	41	36.6	12	46.2	10	23.8	19	43.2			
Proteus Species	21	18.8	5	19.2	10	23.8	6	13.6			
Klebsiella species	14	12.5	2	7.7	10	23.8	2	4.5			

*Significant at $p < 0.05$ bolded.

Table 6: Effectiveness of chlorhexidine topical cord application on omphalitis prevention among neonates.

Variables	AOR$^{\Psi}$	95% CI $^{\varphi}$		p - value*
		Lower	Upper	
Full model				
Intervention model				
Dry cord care	2.08	1.19	3.62	0.010
Alcohol group	2.24	1.08	4.67	0.031
Chlorohexidine group	Ref			
Application in case the umbilical cord is soiled				
Clean with antiseptic	1.09	0.56	2.11	0.800
Clean with boiled water	1.09	0.55	2.15	0.801
Clean with wet/dry cloth	Ref			
Reduced model				
Intervention mode				
Dry cord care	1.95	1.13	3.38	0.017
Alcohol group	1.98	1.15	3.40	0.014
Chlorohexidine group	Ref			

*Significance at $p < 0.05$ bolded; $^{\Psi}$Adjusted odds ratio; $^{\varphi}$95% Confidence Interval

present study presents similar findings. However, [13] in Tanzania and [14] in Zambia, both in substantially lower NMR risk settings (NMR < 11/1000 and < 15/1000, respectively) found no evidence that chlorhexidine topical application to the umbilical cord offers any prevention from omphalitis and consequential mortality. Probably there were factors beyond the scope of their study that yielded results that differ from our present study.

Chlorhexidine is a biocide with broad-spectrum effects; is effective against all bacteria both Gram-positive and negative, fungi together with enveloped viruses Alexander, (1990). It is a strong base with cationic properties that attaches itself to the sites which are negatively charged on the cell wall, disorganizing and interfering with the cellular osmosis McDonnel, [15]. Its ability to attach itself to the human tissue proteins on the mucous membranes and the skin releasing its effects slowly for a prolonged duration makes it effective up to 48 hours after application McDonnel, [15]. This substantivity ability of chlorhexidine in our thinking could explain its superiority over alcohol solutions which have an almost similar mode of action and effect but dries out very fast from the skin.

The effectiveness of Chlorhexidine over other cord care management approaches cannot be overemphasized. That babies in the alcohol group were nearly 2 times more at risk of developing omphalitis than those in the chlorhexidine group. Although these two groups were tested against dry cord care with a hypothesis, they would be superior, a comparison between them portrays chlorhexidine as the choice approach in mitigation of omphalitis in neonates. We are unaware of any study that has compared chlorhexidine and alcohol application in the prevention of omphalitis, and this is what this study adds. From our findings, there was no significant difference in the occurrence of omphalitis whether mothers used alcohol preparations or a dry cord care approach in managing the cord, highlighting the superior importance of chlorhexidine use over the other approaches to cord care among neonates in our setup.

Considering the prolonged effective time of Chlorhexidine, cost implication which could be a barrier to use could be reduced by alternate day application. There is a need however of educating the caretakers on its importance and superiority over the other methods in the prevention of omphalitis and consequential mortalities.

Conclusion and recommendation

Application of 4% chlorhexidine to the umbilical cord of neonates born in health facility significantly decrease the risk of omphalitis when compared to applications such as alcohol or dry cord care. We recommend Chlorhexidine Digluconate be considered for topical umbilical cord care in the prevention of omphalitis in our setup.

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