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Prevention of omphalitis with a single application of chlorhexidine in newborns

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***Abstract*---**Background: Out of the estimated 6.3 million global childhood deaths in 2013, 44% (2•761 million) occurred in the first month of life. Worldwide, seventy-five percent of all neonatal fatalities occur during the first week of life. Neonatal mortality is almost entirely a problem of low- and middle-income nations. These newborn mortality may be reduced significantly if proper health precautions are followed throughout labour and delivery, with an emphasis on cleanliness. Objective: The goal of this study is to assess whether or not a single treatment of chlorhexidine may reduce the risk of omphalitis in newborns. Methodology: The Paediatrics department at Hayatabad Medical Complex in Peshawar, Pakistan, played host to this randomised control trial between January 2019, December 2020. Sixty-four participants were studied in all, with 32 participants observing each group. Two groups, Group-A and Group-B, of newborns were each given a different plan for handling the umbilical cord. Those in Group A had their umbilical cords cleaned with a 4% chlorhexidine solution, whereas those in Group B were told to let theirs dry naturally. Researchers checked up with participants in the trial on days 7, 14, 21, and 28 in either the hospital or at their homes

to see whether or not omphalitis developed. Proformas were used to keep track of the outcomes. Results: The mean age of participants in Group A was 7 days (SD = 2.77). Group B had an average age of 7 days (SD = 3.12), in contrast. Males accounted for 56 percent of the infants in group A, while females made for 44 percent of the infants in this group. In Group B, however, the gender breakdown was somewhat different, with 53% of the newborns being male and 47% being female. Additionally, 94% of patients who were treated with chlorhexidine solution did not show any signs of improvement among those 6% of patients who have it. Group B dry cord was successful in preventing omphalitis in newborns in 78% of cases and failed in 22% of cases. Conclusion: Our research shows that the use of chlorhexidine, even if applied just once, is superior than dry cord for preventing omphalitis in newborns.

***Keywords*---**efficacy, solitary chlorhexidine treatment, omphalitis, neonates.

Introduction

The number of newborn deaths in 2013 was over half (2.761 million), accounting for 44% of the 6.3 million under-5 deaths worldwide. In the first week of life, infant mortality rates rise dramatically. 2,3. Most infant mortality occurs in low- and middle-income countries, where 99 out of every 100 fatalities occur. Initiating programmes to improve maternal and neonatal hygiene may help reduce the number of infant deaths4. Umbilical cord and tissue infection is known as ophtalmia. In developing nations, omphalitis is a leading cause of infant mortality. Babies are vulnerable to infection because of the umbilical cord. Bacteria from the mother's vagina and the delivery attendant's hands may enter the circulation via the cord's patent blood arteries, which were just severed5. To reduce the risk of omphalitis and maternal mortality, it is important to practise good cleanliness after giving birth. In developing nations, newborn mortality and omphalitis may be decreased by applying 4% chlorhexidine to the umbilical cord. Chlorhexidine, a popular antiseptic, kills both aerobic and anaerobic bacteria. The World Health Organization recommends dry cord care, but cautions that antiseptics may be helpful for newborns in low-income countries. Recent evidence suggests, however, that WHO's recommendations for dry cord care are not supported by enough evidence to be effective in regions with a high incidence of omphalitis. Cochrane research revealed inadequate data to support any antiseptic (6,7). Zupen et al.21-trial. Only one study conducted in Thailand was excluded from this analysis because of its low per capita income. A study conducted in Nepal found that the World Health Organization's dry cord care standards are insufficient in low-resource settings where infections are widespread, leading to a reduction in omphalitis and infant death rate8. Nepal was the first country to mass-produce chlorhexidine for umbilical cord care, and its use as a topical antiseptic has had a significant impact on public health. Chlorhexidine is now legal in Nepal for use on infants. Infection and death rates were found to be 20% lower in babies whose umbilical cords were cleaned with chlorhexidine. The use of chlorhexidine on the umbilical cord has been shown to decrease omphalitis by

27-56% in Nepal, Bangladesh, and Pakistan10,11. This has led to its widespread use in sub-Saharan Africa. dependent on the degree of impact12. The purpose of this study is to determine whether or not chlorhexidine prevents neonatal omphalitis. Three studies published in 2013 found that 4% chlorhexidine reduced omphalitis, infant mortality, or both. Another study published in 2013 found that communal chlorhexidine skin or cord care led to 12% lower infant mortality and 50% lower omphalitis. Reducing infant mortality, enhancing life expectancy, and preventing this disease are all top priorities. Practitioners will benefit from this study since it will expand upon existing understanding.

Materials and Methods

The Paediatrics Department at Hayatabad Medical Complex conducted a 6-month randomised control study from January 2019, December 2020. There were 64 people total, with 32 in each group for this study. Babies were split into two groups, Group A and Group B, based on who would be handling their umbilical cords. The umbilical cords of the infants in Group A were cleansed with a 4% chlorhexidine solution once, whereas those in Group B were instructed to be left alone. The occurrence of omphalitis served as the study's primary outcome measure, with patients being followed up on in either the hospital or at home on days 7, 14, 21, and 28. Forecasted results based on historical data. SPSS 22 was used to analyse the data. If the data was continuous, like a newborn's age or weight, a mean and standard deviation might be calculated. There was also information supplied in terms of frequency and % for each gender and level of effectiveness. Chi-square analysis was used to compare the results. A p-value of 0.05 is statistically significant. All results were shown in tables and graphs. Age, body mass index, and gender were taken into account as stratification factors. Test for statistical significance using the Chi-square distribution after stratification. The significance level was set at 0.05.

Results

Twenty infants aged 1-7 days (62% of the total) and twelve infants aged 8-15 days (38%) made up Group A. SD ± 2.77. Nineteen infants aged 1-7 days made up 59% of Group B, while 13 kids aged 8-15 days made up 41%. In terms of time, the standard deviation is 3.12 less than 7 days. Group A consisted of 18 newborns, 14 of which were female and 14 of which were male (56% male, 44% female). Babies in Group B were split evenly between males and females, with 17 boys (53% of the total) and 15 girls (47%). A total of 19 infants (59%) in the 2.5-3.0 kg range and 13 (41%) in the 3.1-3.5 kg range made up Group A. Weights averaged 3 kilogrammes (with a standard deviation of 1.03 kilogrammes). Np's in Group B ranged from 3.1-3.5kg for 17 (53%) and 2.5-3.0kg for 15 (47%). SD ± 1.05. There were 30 (94% success) and 2 (6%) failures in Group A (chlorhexidine solution). Twenty-five out of thirty-five (78%), or those in Group B (dry cord), were successful. (1)Age, sex, and weight-based efficacy tables are included in tables 2–4.

Table No-1: Group a and Group b Efficacy (N=64)

EFFICACY	2.GROUP A	3.GROUP B
Effective	30(94%)	25(78%)
Not effective	2(6%)	7(22%)
Total	32(100%)	32(100%)

Group A: Cleaned with chlorhexidine solution
Group B: Dry cord
Chi Square test was applied in which P value was 0.0721

Table No-2. Effectiveness Strategy Considering the age breakdown (n=64)

AGE	EFFICACY	GROUP A	GROUP B	P value
1-7 days	Effective	19	15	0.1339
	Not effective	1	4	
Total		20	19	
8-15 days	Effective	11	10	0.3150
	Not effective	1	3	
Total		12	13	

Group A: Cleaned with chlorhexidine solution
Group B: Dry cord

Table No-3. Effectiveness Strategy In terms of Gender Split (n=64)

GENDER	EFFICACY	GROUP A	GROUP B	P value
Male	Effective	17	14	0.2611
	Not effective	1	3	
Total		18	17	
Female	Effective	13	11	0.1642
	Not effective	1	4	
Total		14	15	

Group A: Cleaned with chlorhexidine solution
Group B: Dry cord

Table No-4. Effectiveness Strategy Concerning The Distribution Of Weight (N=64)

GENDER	EFFICACY	GROUP A	GROUP B	P value
2.5 - 3 Kgs	Effective	18	13	0.1136
	Not effective	1	4	
Total		19	17	
3.1 - 3.5 Kgs	Effective	12	12	0.3533
	Not effective	1	3	
Total		13	15	

Group A: Cleaned with chlorhexidine solution
Group B: Dry cord

Discussion

It is estimated that 2,761,000,000 infants died before their fifth birthday in 2013. 1. In the first week of life, 75 percent of infants worldwide perish. There was a 99% newborn death rate in low and middle-income nations. Secondly, efforts promoting healthy birthing conditions may help lower the number of infant deaths. 4) Omphalitis is an infection of the umbilical cord and surrounding tissues. Omphalitis is fatal to premature infants.

The average for A was calculated over a 7-day period, while the standard deviation was calculated over a 2.77-day period. For Group B, 7 days was the norm (SD 3.12). Babies in group A were almost evenly split between males and females, with 56% males and 44% females. There were more men (53%) in Group B than females (47%). Six percent of people did not improve after using chlorhexidine solution. While 78% of infants in Group B who were given a dry cord avoided omphalitis, just 22% did not. Another study indicated that omphalitis cases were decreased by 27-56% when chlorhexidine was applied to the umbilical cord of newborns (Mullany LC et al.15). In this case, the control group. Imdad A et al.16 observed that 90% of newborns were protected against omphalitis and 82% were protected from a dry cord by using a chlorhexidine solution. Chlorhexidine skin or cord care leads were also discovered in a separate investigation by Goldenberg RL et al.17. morbidity and death rates in infants 14. There were a total of 36 911 newborns split evenly between the chlorhexidine (n=18015) and dry cord care (n=18 896) groups, according to a study by Sazawal S et al.18. Out of a total of 18 015 newborns, 17 468 (96%) were followed up with after 28 days; this number increased to 18 384 (97%) for the group who received dry cord care. Chlorhexidine alleviated symptoms of omphalitis. There was a decrease in infection rates of between 24 and 39 percent. Similar findings19 were found in experiments conducted in Nepal, Pakistan, and Bangladesh. The risk of an umbilical hernia is consistent with our findings. In Nepal, a chlorhexidine wash decreased cord infection by 32.75%, whereas in Bangladesh, it decreased it by 1 day. Stump at the navel. According to the study conducted in Pakistan, the incidence of omphalitis of any severity was lower in the chlorhexidine treatment group compared to the dry cord care group. Umbilical stumps provide a breeding ground for bacteria. Otitis omphalitis, or inflammation of the stump, is a dangerous condition. Children under the age of one year old cannot survive a systemic sickness. integrity of the arteries Without enough omphalitis20,21,22, pathogens may reach the circulatory system during the first several days. Chlorhexidine's beneficial benefits and death rates may be explained by sepsis without omphalitis. If the host's immune system is unable to clear the infection from the umbilical stump, sepsis may develop without the presence of omphalitis. When applied to the cord stump, chlorhexidine helps prevent localised infections, but patent umbilical capillaries let bacteria and other pathogens into the bloodstream, where they may cause life-threatening infections including sepsis and even death23,24. Separation of the umbilical cord is significantly slowed by chlorhexidine. The delay in cord separation that increases bacterial contamination of the arteries25 may explain why our investigation found a correlation between omphalitis and death while the Bangladesh study found none. Consider the risks associated with a delayed cord separation. Neonatal mortality rates in Pakistan and Bangladesh are lower than those in Sub-Saharan

Africa (31 per 1,000). (29). 24 per 1,000 live births Twenty-three out of every 1,000 newborns in Nepal (23 per 1,000 births) 24. In recent decades, there has been a tremendous shift in Africa's mortality rate. Surgery-related mortality was lower than predicted in the chlorhexidine and dry cord care groups (10.5% and 11.7% per 1000 live newborns, respectively). Both of these figures are much higher than the very low rates in Bangladesh (22.5 and 28.3 fatalities per 1000 births) and Nepal (14.6 and 19.3 deaths per 1000 births), respectively. The mortality rate increased from 31.1 per 1000 live births in 2010 to 25.9 in 2015, an overall decrease from the 31.1 in 2010. 15 This mystery may be solved by looking at temporal patterns. Over the course of the experiment, mothers and other family members were educated on proper cord care hygiene, and the fact that this facility followed a full set of cord care practises may have affected mortality rates here by 25 percent. According to pilot study results, dry cord care is well-liked in Pemba. It's possible that the dry cord care offered in this environment was better than that offered in Asian societies. Neonate mortality was not reduced and cord care did not prevent infection of the cord stump in Pemba. Although the optimal time and length of chlorhexidine for cord care are unclear, three trials demonstrate that it reduces newborn illness and mortality. Inconclusive results were found for chlorhexidine after 1 and 7 days of use. More study is required for Bangladesh to grasp Asia and Sub-Saharan Africa. In contrast to trials24 conducted in South Asia, cluster randomised studies with high birth rates (>90%) relied on the community to find participants. Differences in starting points and approaches to design bolster our results. randomised Both children born in the community and those born in hospitals participated in a large (53%), randomised, controlled trial. Large samples were used in controlled research. Babies in both groups were in touch with their caregivers more often during the first 24 hours of life than infants in Bangladesh (86-88%) and Nepal (64-64%). 93%. We expected that our research would result in an enhanced form of chlorhexidine. Most infants (95%) There is less of a chance of unfair selection when using qualified reviewers27. Our data is poor because of declining mortality rates. The similar trial in Zambia. 27, We provide evidence that chlorhexidine is efficacious in low-resource areas of Africa south of the Sahara Desert. Incidence of death at the umbilical cord site is unchanged. Chlorhexidine had zero impact on either fatality.

Conclusion

As a result of our investigation, we have determined that a single application of chlorhexidine is more effective than dry cord in preventing omphalitis in newborns.

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