

# The effectiveness of alcohol swab in umbilical cord care in Taif city, Saudi Arabia

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## Abstract

**Background:** Many neonatal deaths are caused by infections that may be caused by the newly cut umbilical cord stump.

**Objectives:** To assess the relationship between using alcohol swab cleaning of umbilical cord and the time of healing of the umbilicus till cord separation and associated complications.

**Methods:** A cross sectional study was done on 620 Saudi children from Taif city, Saudi Arabia. A checklist was used that included items to collect data about the children's gender, current age, place of delivery, umbilical cord status, catheter use, umbilical cord color, umbilical discharge, skin around cord, materials used for umbilical cord care, frequency of care, time of separation of the cord and source of information for mother about cord care.

**Results:** 91.9% of studied children had an intact umbilical cord, 9% of children had an umbilical discharge, and 69.2% had a cord separation within a week. A significant higher percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care, and a significant high percentage of those who had a cord discharge were treated with a medical powder. Umbilical cord care by alcohol had a significant higher percentage of time of separation, within days, compared to other modalities.

**Conclusion:** Further studies that include a larger sample of children is required, and health educational programs regarding umbilical cord directed to pregnant mothers during antenatal visits is needed.

**Key words:** Effectiveness, Alcohol swab, Umbilical, Care, Taif.

## Introduction

The umbilical cord (UC) is the tube that connects an unborn baby to its mother, through which it receives oxygen and food. The fully developed umbilical cord normally contains two umbilical arteries (1). After the birth of the fetus, the doctor cuts the umbilical cord during the third stage of labor, and makes sure to cut the umbilical cord carefully, while taking care not to tighten the rope (1). There will be residue of umbilical cord on the newborn, which is supposed to be separated after drying and healing in 5 to 15 days one month later, if the umbilical cord stump does not fall, it will cause several complications (1,2).

The care of umbilical cord is done through variable antiseptic powders and solutions. The most frequently used powders are zinc oxide, talcum, starch, alum, hexachlorophene, and chlorhexidine, while the most commonly used solutions are alcohol, triple sulfa, tincture of iodine, silver sulfadiazine, and chlorhexidine (3). However, there is no agreement over the most effective agent for cord care. The World Health Organization recommended dry cord care, while there are great disagreements about this method (2). Cleaning and drying the stump (UC) of the newborn by the antiseptic agent after birth has been abandoned by many neonatal units in support of dry cord care (1).

An Egyptian study done in 2005 showed that the incidence of cord infection was significantly lower in the natural drying group with no signs of systemic illness, while there was increase of bacterial colonization in the alcohol group (44%) (8). The mean time of cord separation was longer in the alcohol group (6.4 +/- 2.4 days), as compared with the natural drying group (4.7 +/- 1.9 days) and traditional methods group (3.4 +/- 0.7 days) (4). An Iranian study was done in 2009 to compare cord bacterial colonization and cord separation time among newborns whose cords were treated with alcohol 70% versus dry cord care. The study found no significant correlation between separation time of umbilical cord and the two methods of the care. Based on that study, bacterial colonization was higher in the dry cord care group (5).

Another study done in 2013 found that the use of human milk as topical therapy can decrease separation time in neonates compared with other methods (6). A study was performed in India in 2013 to see the impact of chlorhexidine cleansing of the umbilical cord on cord separation time and neonatal mortality in comparison to dry cord care (7). The study found that among the chlorhexidine group, 71.42% of the babies, against only 47.14% in the control group had their cord fallen by the 9th day of life. The mean time to cord separation was 8.92 days in the chlorhexidine group vs 10.31 days in the dry care group (7). A study was carried out in Italy in 2015 to compare the occurrence of adverse events and time to cord separation among newborns treated with dry cord care versus 70% alcohol. The study identified that the dry cord care is an easy, straight-forward, and safe method of handling the umbilical cord in healthy newborn infants born in a high-income hospital setting (1). In a systematic review done in 2016, Chlorhexidine

application to the cord was found to reduce the risk of neonatal mortality (8).

The only published study in the Kingdom of Saudi Arabia regarding this issue was a study done in 2006 in Abha city. The study found that infants in the alcohol group had a shorter time for cord separation compared to the Beniktol group and concluded that the use of alcohol is safe and cost-effective for cord care (9).

As studies dealing with umbilical cord care in KSA are limited, the aim of this study was to assess the relationship between using alcohol swab cleaning of umbilical stamp and the time of healing of the umbilicus till cord separation and complications related to it.

## Methods

A cross sectional study was done from January to April 2020. The study settings were King Abdulaziz Specialist Hospital in Children's Hospital, and King Faisal Medical Complex in Taif. city, KSA. The inclusion criteria were Saudi new-born in nursery and NICU of the study settings, and the exclusion criteria were non-Saudi children.

Mothers of children in the study settings during the study period were included. The study sample was 620 children. The study instrument was a checklist that was prepared which included items to collect data about the children' gender, and age, place of delivery, UC status, catheter use, UC color, umbilical discharge, skin around cord, materials used for UC care, frequency of care, time of separation of the cord and source of information for mother about cord care.

**Data analysis:** Data analysis was performed by using SPSS version 24. Qualitative data was expressed as numbers and percentages and chi-squared test was used to determine the association between variables. Quantitative data was expressed as mean and standard deviation (Mean ± SD).

## Results

Table 1 shows that 50.8% of the studied children were females, 79.5% had an age less than one year, and for 96.9% of their mothers the place of delivery was the hospital.

Table 2 shows that most of the studied children (91.9%) had an intact UC, 5.3% had a swollen one and 2.7% had omphalocele. Of them 97.4% had a UAC catheter. About half of children (50.5%) had a white cord color, 30.2% had a yellow/green one and 19.4% had a red one. Only 9% of children had an umbilical discharge, of those 42.9% had a yellow discharge and 33.9% had a red one. Most children (91.5%) had normal skin around cord and 34.7% of mothers reported that the frequency of the cords care daily is three times with a mean frequency of 2.81±0.96 times. According to the time of separation of the cord, most studied children (69.2%) had a cord separation within a week.

Figure 1 shows that most mothers (45.3%) reported their use of Chlorhexidine for cord care. And the source of information for mother about cord care was the family members among most of the participants (37.4%), followed by a physician (26.5%), and daily practice of cord care (18.9%) (Figure 2).

Table 3 shows that a significant difference was found between the type of umbilical cord care and status of the cord, as a high percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care ( $p=0.02$ ).

Table 4 shows that a significant high percentage of those who had a cord discharge used a medical powder for cord care (23.1%), while only 11.4% of those cared by Chlorhexidine had a cord discharge ( $p=0.004$ ).

Table 5 shows that umbilical cord care by alcohol had a significantly higher percentage of time to cord separation, within days (13.9%) compared to other modalities of care ( $p< 0.05$ ).

Table 1. Distribution of the studied participants according to place of delivery and their children's gender and age

Variable	No. (%)
<b>Gender</b>	
Male	305 (49.2)
female	315 (50.8)
<b>Age</b>	
Less than 1 year	493 (79.5)
1- ≤ 2 years	55 (8.9)
> 2 years	72 (11.6)
<b>Place of delivery</b>	
Hospital	601 (96.9)
home	19 (3.1)

Figure 1. Distribution of the studied children according to the type of umbilical cord care

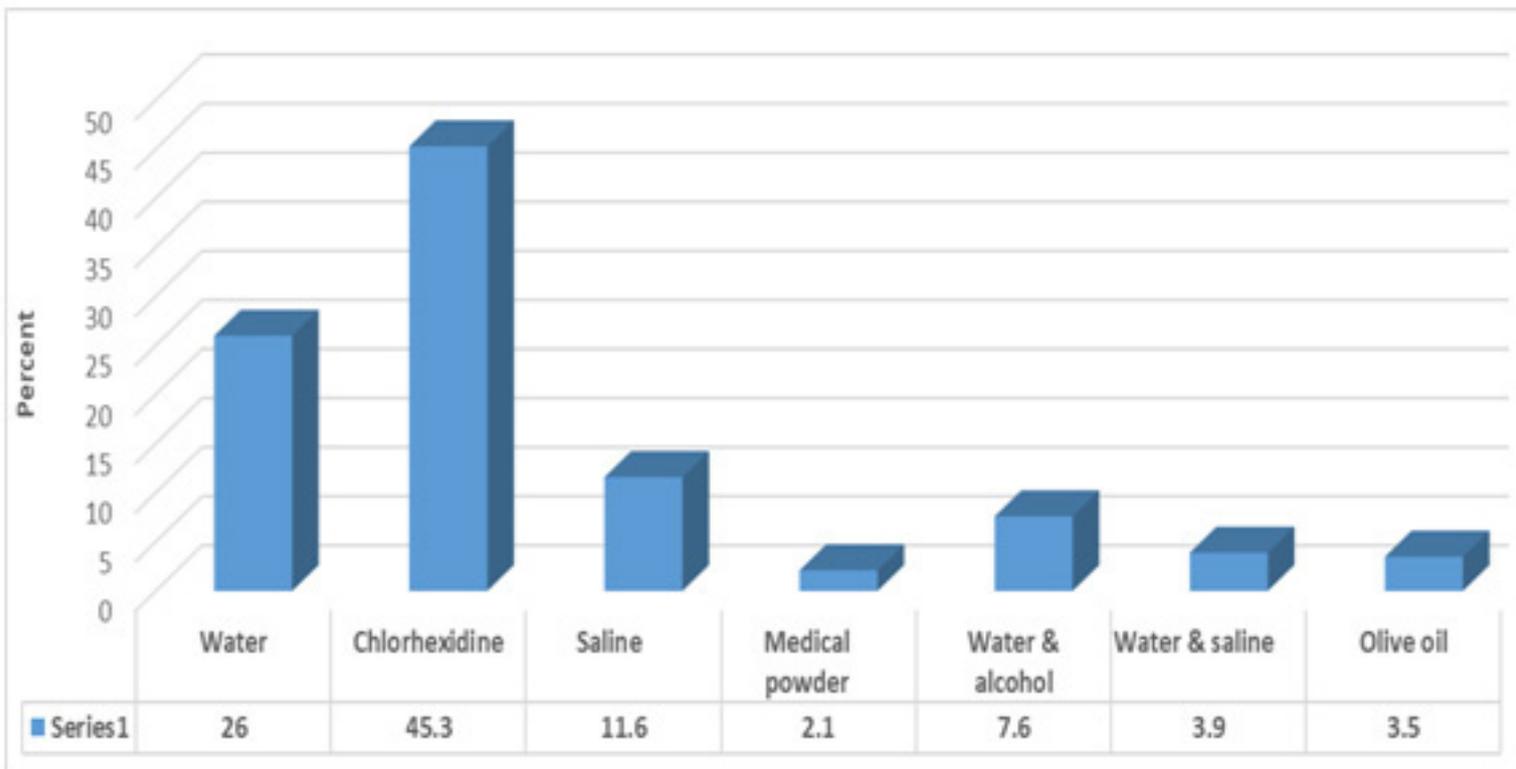


Table 2. Distribution of the studied participants according to conditions related the umbilical cord

Variable	No. (%)
<b>Umbilical cord status</b>	
Intact	570 (91.9)
Swollen	33 (5.3)
Visible intestine (omphalocele)	17(2.7)
<b>Catheter inserted</b>	
UVC	16 (2.6)
UAC	604 (97.4)
<b>Cord color</b>	
White	313 (50.5)
Yellow/Green	187 (30.2)
Red (hematoma)	120(19.4)
<b>Presence of umbilical discharge</b>	
Yes	56 (9)
No	564 (91)
<b>Discharge color (No.: 56)</b>	
Yellow	24 (42.9)
Red	19 (33.9)
White	6 (10.7)
Brown	7 (12.5)
<b>Status of the cord</b>	
Normal	567 (91.5)
Red (inflamed)	36 (5.8)
Indurated (swollen)	17(2.7)
<b>Frequency of care</b>	
Once daily	64 (10.3)
Twice	163 (26.3)
Three times	215 (34.7)
Four times	178(28.7)
<b>Frequency of care (mean ±SD)</b>	2.81±0.96
<b>Time of separation of the cord</b>	
Within days	72 (11.6)
Within a week	433 (69.2)
Within 2 weeks	79 (12.7)
Within month	36 (5.8)

Figure 2. Distribution of the studied children according to the source of information about umbilical cord care

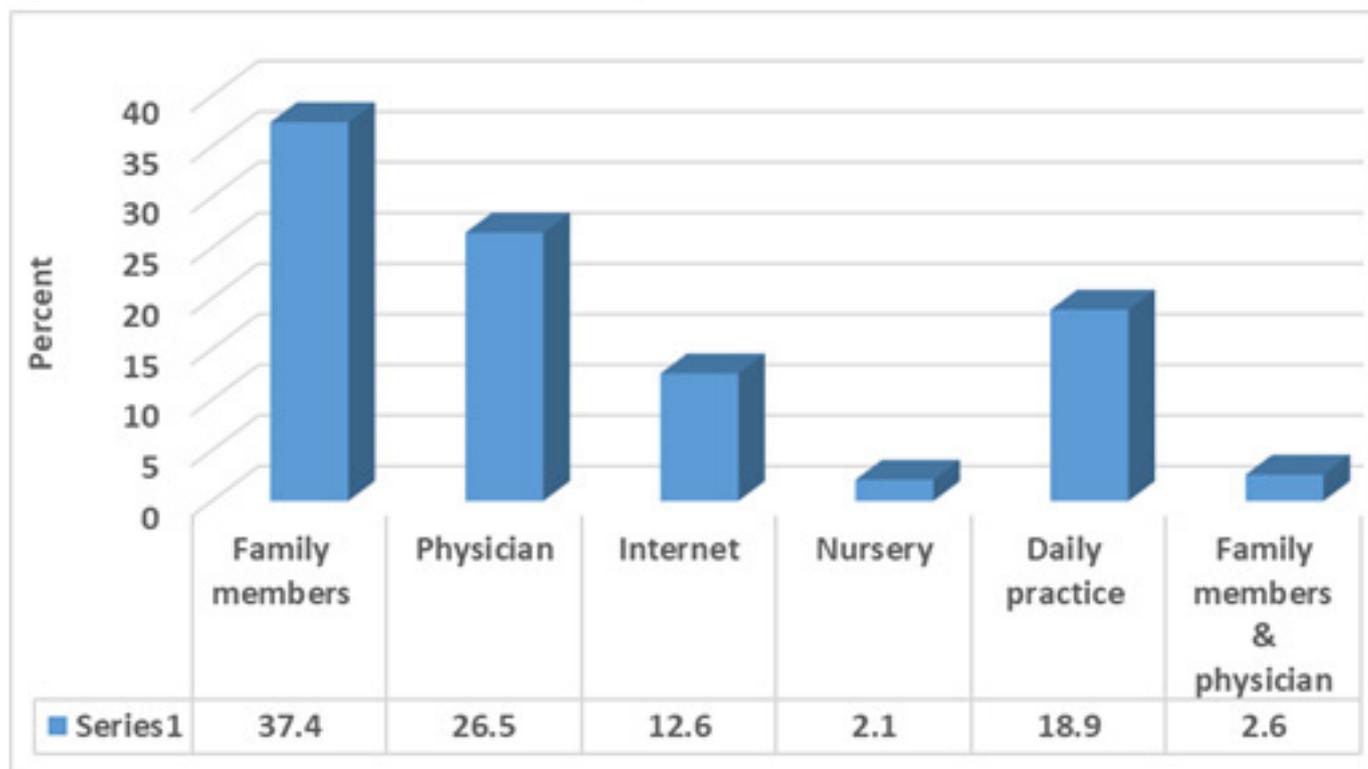


Table 3. Relationship between the type of the umbilical cord care and status of the cord

Variable	Intact	Swollen	Visible intestine	Chi-squared test	P-value
	No. (%)	No. (%)	No. (%)		
Type of the umbilical cord care					
Water	146 (90.7)	9 (5.6)	6 (3.7)	25.8	0.02
Alcohol	266 (94.7)	11 (3.9)	4 (1.4)		
Saline	62 (86.1)	6 (8.3)	4 (5.6)		
Medical powder	9 (69.2)	2 (15.4)	2 (15.4)		
Alcohol & saline	17 (94.4)	1 (5.6)	0 (0.0)		
Water & alcohol	43 (91.5)	4 (8.5)	0 (0.0)		
Water & saline	21 (87.5)	3 (12.5)	0 (0.0)		
Olive oil	20 (90.9)	1 (4.5)	1 (4.5)		

**Table 4. Relationship between the type of the umbilical cord care and the presence of umbilical discharge**

Variable	Discharge present	Discharge absent	Chi-squared test	P-value
	No. (%)	No. (%)		
<b>Type of the umbilical cord care</b>				
Water	6 (3.7)	55 (96.3)	20.77	0.004
Alcohol	32 (11.4)	249 (88.6)		
Saline	12 (16.7)	60 (83.3)		
Medical powder	3 (23.1)	10 (76.9)		
Water & alcohol	2 (4.3)	45 (95.7)		
Water & saline	0 (0.0)	24 (100)		
Olive oil	1 (14.5)	21 (95.5)		

**Table 5. Relationship between the type of umbilical cord care and the time of separation of the cord**

Variable	A	B	C	D	Chi-squared test	P-value
	No. (%)	No. (%)	No. (%)	No. (%)		
<b>Cord care</b>						
Water	20 (12.4)	101 (62.7)	16 (9.9)	24 (14.9)	33.41	0.01
Alcohol	39 (13.9)	207 (73.7)	9 (3.2)	26 (9.3)		
Saline	6 (8.3)	52 (72.2)	5 (6.9)	9 (12.5)		
Medical powder	1 (7.7)	10 (76.9)	0 (0.0)	2 (15.4)		
Water & alcohol	2 (4.3)	35 (74.5)	2 (4.3)	8 (17)		
Water & saline	1 (4.2)	12 (50)	4 (16.7)	7 (29.2)		
Olive oil	3 (13.6)	16 (72.7)	0 (0.0)	3 (13.6)		

N.B.: "A= within days, B= within a week, C= within 2 weeks, D= within a month"

## Discussion

The umbilical cord is the tube that connects an unborn baby to its mother, through which it receives oxygen and food (1). A previous study was done in Egypt and demonstrated that dry cord care technique was very effective in healing of the umbilical cord stump, decreasing risk of cord infection and decreasing the time of cord separation compared with 70% by alcohol technique (10).

Dry cord care is an easy, straightforward, and safe method of handling the UC in healthy newborn infants born in a high-income hospital setting (1). In this study 9% of children had an umbilical discharge which is higher than that reported from a previous Saudi study where discharge from the UC was present in 2.6% and 5.3% in the alcohol and Beniktol group respectively (9).

In our study we found that umbilical cord care by alcohol had a significantly higher percentage of time of separation within days (13.9%) compared to other modalities of care. The same was present in a study done in Abha city which demonstrated that care with alcohol swab resulted in a significantly shorter time of umbilical cord separation than with Beniktol spray (9). In contrast with this result

an Egyptian study where topical application of mother's milk on umbilical cord care lead to rapid cord separation time and diminished umbilical cord infection as it can be used as an easy, cheap and non-invasive way for cord care (11).

This study revealed that a high percentage of children who had an intact umbilical cord were using Chlorhexidine for cord care and a significantly high percentage of those who had a cord discharge were cared for by a medical powder compared to those cared for by Chlorhexidine. Similar results were observed in previous studies (9,12). In addition, a systematic review found that Chlorhexidine application to the cord reduces the risk of neonatal mortality and omphalitis in infants. This review recommended routine chlorhexidine application daily for 7 - 10 days after birth (8).

The time of separation of the cord, in the present study for 69.2% of children was within a week and UC cared for by alcohol had a significantly higher percentage of time of separation within days compared to other modalities. The mean UC separation time ranged from 4 - 16 days (13,14,15,16,17) and in studies that reported using nothing for cord care had mean separation times of about 9 days (18,19). The significantly shorter UC separation

time reported in the present study was observed in previous studies (7,8,9, 16,17). These studies found that Chlorhexidine cleansing of infants' UC can save lives and reduces the risk of omphalitis and neonatal mortality. On the other hand, this result disagrees with other previous studies (4,5). One of these studies was a meta-analysis which found that cord separation is prolonged in the alcohol group but there was no significant difference (20). Families prefer rapid UC separation as a delay in the separation is associated with making mothers anxious, and increases the number of home domiciliary midwife visits (21.22).

**Limitations:** Being a cross-sectional study prevents the detection of the cause-effect relationship. In addition, the included participants were only of Saudi nationality, so results cannot be generalized to other cultures.

## Conclusion

Most of the studied children (91.9%) had an intact UC, only 9% of children had an umbilical discharge, 69.2% had a cord separation within a week, and 45.3% of mothers used Chlorhexidine for cord care. A significant higher percentage of mothers who reported that their children had an intact umbilical cord were using Chlorhexidine for cord care, and a significantly high percentage of those who had a cord discharge were cared for by a medical powder. UC cared for by alcohol had a significantly higher percentage of time to separation within days compared to other modalities. Further studies including a larger sample of children is required, and health educational programs regarding UC directed to pregnant mothers during antenatal visits is needed.

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