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# FACTORS INFLUENCING UMBILICAL CORD CARE PRACTICES AMONG MOTHERS OF NEWBORN BABIES PRESENTING TO A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To determine the factors influencing umbilical cord (UC) unhealthy practices among mothers of newborns babies

**Methodology:** A total of 264 infants who were all new born babies presenting to neonatal unit, both genders and Pakistani nationals were included. Mentally retarded parents and infant with severe deformities like syndromes were excluded. The recorded data were age, gender of infants, parent's education and socioeconomic status, place and mode of delivery, mother's awareness of UC care, omphalitis sign and umbilical cord care (healthy and non healthy). Chi square test was run to compare healthy and unhealthy practice among various factors. Binary logistic regression was run using cord care practice as dependent variable and significant factors as independent variables to calculate odds ratios with 95% Confidence Interval (CI).

**Results:** The mean of the participants were  $5.66 \pm 4.72$  days. The females were 107 (40.53%). Unhealthy UC practice was present in 107 (58.15%). Significant association was found of unhealthy UC practice with parent's education ( $p < 0.001$ ) and socioeconomic level ( $p < 0.001$ ), place of delivery ( $p < 0.001$ ), and mother awareness ( $p < 0.001$ ). Less educated parents, low socioeconomic families, less aware mothers, infants born at home and influence of grandmother had more unhealthy UC practice.

**Conclusions:** Non-healthy practices of UC are quiet higher in our set up. The significant risk factors for this are delivery at non health care facility, presence of omphalitis sign and awareness of mother.

**Keywords:** Infant; Myths; Umbilical Cord; Umbilical Care Practice

## INTRODUCTION

The umbilical cord serves as a conduit linking the fetus to the mother during pregnancy. It has three blood vessels: one vein that transport food and oxygen from the placenta to the baby and two arteries that carry waste from the infant back to the placenta.<sup>1</sup>

Umbilicus is an important source of infection in the first few days of neonatal life.<sup>2</sup> Newborn cord care practices can have an instantaneous effect on contamination, accounting for a big portion of the four million baby deaths worldwide each year.<sup>3</sup> A enough knowledge of the conventional practice of cord care in lower and middle income nations can reduce the fetal risk of septicemia in neonates.<sup>4</sup>

Various studies were carried out on home based care practices via parents and conventional caregivers in south Asia, with some recent studies from sub-Saharan Africa, consisting of studies focused on treat-

ments and cord care.<sup>5</sup> Research from diverse international locations display that use of substances like cow dung, ash, dust, rat droppings, turmeric, oil and butter are frequently used for the cord care, which are related to an multiplied hazard of omphalitis with extended mortality.<sup>6,7</sup> The healthy cord care practice including hand washing, the use of new blade for cord cutting and hygienic tying of the cord is broadly advocated. The world health organization also recommends dry care and the usage of topical antiseptics in high-risk population.<sup>8</sup> Research from Nepal, Bangladesh and Pakistan shows the effect of chlorhexidine for cleaning of umbilical cord to reduce the incidence of omphalitis and child mortality. Neonatal mortality associated with bacterial contamination inside the navel is therefore likely to be some of the great public health possibilities in the 21<sup>st</sup> century.<sup>3,9,10</sup>

In industrialized countries, the occurrence of omphalitis is now uncommon, in low-earnings societies, omphalitis happens in up to 8% and 22% in children

born in hospital and in those who born at home respectively.<sup>11</sup> For the prevention of omphalitis delivery should be clean and cord care have to be smooth. The cord must be cut with sterile metallic or scissors, ideally using sterile gloves, to reduce the risk of omphalitis or infant tetanus.<sup>11</sup> There is no proof that injecting sprays, creams, or powders is better than preserving the child's cord clean and dry at birth. The stump of the cord will dry, shrivel and darken before falling five to fifteen days after delivery. Without proper care, the child can become infected with the stump.<sup>8</sup> It is recommended to educate the mothers and to reduce the communication gap among the health workers and parents regarding the healthy cord care practices.

After thorough searching of literature, no such study has been found in our province on cord care practice. So the current research determines the frequency of evidence based healthy cord care practices which can prevent the incidence of neonatal sepsis and omphalitis. This will help to educate the parents against harmful practices and reinforce beneficial practices.

Objective of the study was to determine the factors influencing umbilical cord care practices among mothers of newborn babies presenting to a tertiary care hospital

## ■ METHODOLOGY

This cross sectional descriptive study was conducted at Pediatrics department, Lady Reading Hospital, Peshawar Pakistan from on 264 infants by non probability consecutive sampling technique. The ethical approval was obtained from hospital ethical board (No.136/LRH/MTI) and informed consent was obtained from parents of the infants from 1<sup>st</sup> July 2021 to 30<sup>th</sup> May 2022. The sample size of 264 was calculated using the WHO sample size software with confidence interval of 95%, and anticipated population proportion 22%.<sup>11</sup>

The inclusion criteria were all new born babies presenting to OPD/neonatal unit, both genders and Pakistani nationals (awareness varies with nationality). Mentally retarded parents and infant with severe deformities like syndromes were excluded.

The history and interview of those subjects who fulfill the inclusion criteria of the study were recorded. The recorded data were age, gender of infants, parent's education and socioeconomic status, place and mode of delivery, mother's awareness, omphalitis sign and umbilical cord care. The umbilical cord care was defined as care of the remnants of a new born child's umbilical cord till it falls off, such as cleansing and precautions to prevent contamination. Cleansing protocols hold till the web site is completely healed. It was classified as healthy and unhealthy. Healthy practice was dry cord care without any application other agents, and application of chlorhexidine. Unhealthy practice were practices other than the healthy e.g. application of mud, dung, herbs, turmeric, hot compresses, powders, salt, saliva, tooth paste, oil, petroleum jelly, ash or any other. The term omphalitis sign referred to contamination of the umbilical cord stump, navel, or the surrounding abdominal wall. The presence of cellulitis is related to a high prevalence of bacteremia, and complicated omphalitis may additionally spread to the peritoneum, the umbilical or portal vessels, or the liver.

Participants were divided on the basis of their monthly income into four socioeconomic classes, high (>12535 USD [US dollar]/year), upper middle (4046-12535 USD/year), lower middle class (1036-4045 USD/year) and low income (< 1036 USD/year). This stratification was based on the criteria provided by the World Bank.<sup>12</sup> Conversion was done into Pakistani rupees at time of data collection. Data were entered into Microsoft excel sheet and import into R software. All data analyses were performed

with R programme version 4.1.2. Computation of continuous data were done as mean and SD and qualitative data as frequencies and percentages. Chi-square test was run to compare healthy and unhealthy practice among factors affecting it (gender, parent's education, Socio-economic, place and mode of delivery, mother awareness, influence and Omphalitis sign). Binary logistic regression was run using cord care practice (healthy and unhealthy) as dependent variable and significant factors as independent variables to calculate odds ratios with 95% CI under two tailed hypothesis. The level of significance was  $p < 0.05$ .

## ■ RESULTS

In the study, the mean age of the participants was 5.66 days, with a standard deviation of 4.72 days. Additionally, the mean age of the mothers involved in the study was 26.54 years, with a standard deviation of 5.34 years.

The females were 107 (40.53%). Most of the mothers were illiterate ( $n=135$ , 51.14%) followed by primary level ( $n=53$ , 20.08%). Most of the fathers had high school level of education ( $n=51$ , 19.32%) followed by illiterate ( $n=98$ , 37.12%). Most of the participant's parents had low and middle socioeconomic level ( $n=118$ , 44.70% each). Most common unhealthy practice was turmeric application ( $n=67$ , 25.38%) followed by oil application ( $n=35$ , 13.26%) as shown in Table 1. Details about umbilical cord practices are shown in Figure 1.

The frequency of unhealthy practice was 107 (58.15%) and healthy practice was 28 (35%) among illiterate mothers. Similarly unhealthy ( $n=39$ , 21.20%) practice was higher than healthy ( $n=14$ , 17.50%) among mother with primary school level of education. These results were highly statistically significant ( $p < 0.001$ ). Similarly unhealthy practice were more in infants whose father

Table 1: Frequency of gender, parent’s education, socioeconomic status, place and mode of delivery

| Variable              | Characteristics       | n (%)       |
|-----------------------|-----------------------|-------------|
| Gender                | Female                | 107 (40.53) |
|                       | Male                  | 157 (59.47) |
| Mother education      | No education          | 135 (51.14) |
|                       | Primary school        | 53 (20.08)  |
|                       | Middle school         | 30 (11.36)  |
|                       | High school           | 20 (7.58)   |
|                       | Higher education      | 26 (9.85)   |
| Father education      | No education          | 51 (19.32)  |
|                       | Primary school        | 40 (15.15)  |
|                       | Middle school         | 29 (10.98)  |
|                       | Intermediate          | 39 (14.77)  |
|                       | High school           | 98 (37.12)  |
| Socio-economic status | Low                   | 118 (44.70) |
|                       | Lower middle          | 118 (44.70) |
|                       | Upper middle          | 28 (10.61)  |
| Delivery place        | Home delivery         | 47 (17.80)  |
|                       | Non-teaching hospital | 61 (23.11)  |
|                       | Private hospital      | 43 (16.29)  |
|                       | Teaching hospital     | 113 (42.80) |
| Delivery mode         | Assisted delivery     | 12 (4.55)   |
|                       | C section             | 67 (25.38)  |
|                       | Normal vaginal        | 185 (70.08) |

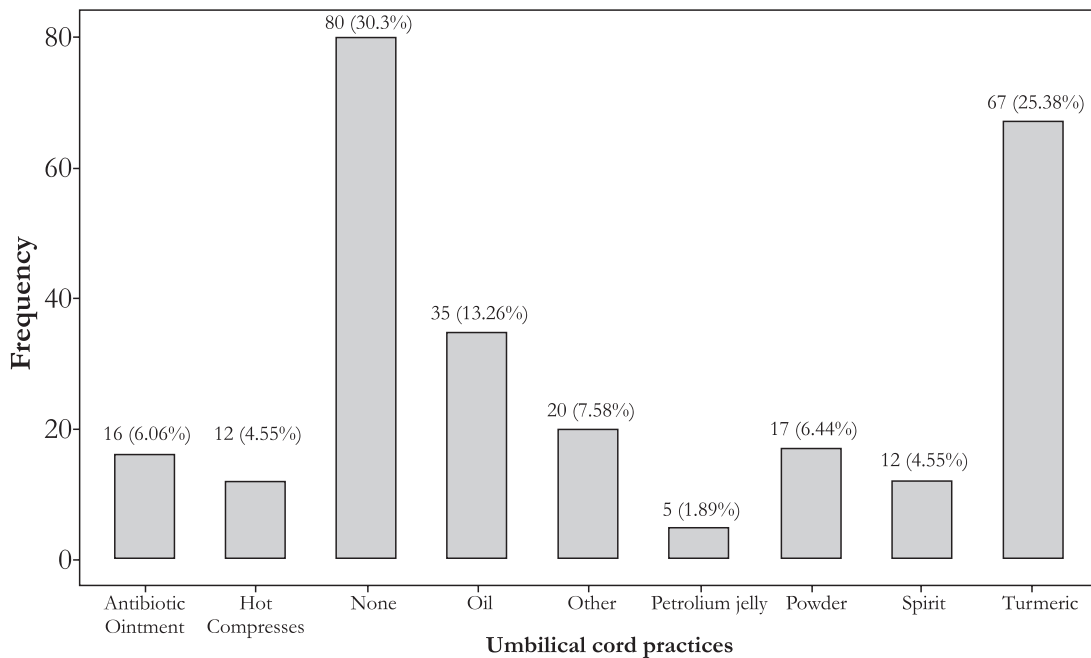


Figure 1: Umbilical cord practices

Table 2: Comparison of factors for healthy and non healthy practice

| Variable         | Characteristic        | Healthy practice, N = 80 | Unhealthy practice, N = 184 | p-value* |
|------------------|-----------------------|--------------------------|-----------------------------|----------|
| Gender           | Female                | 37 (46.25)               | 70 (38.04)                  | 0.266    |
|                  | Male                  | 43 (53.75)               | 114 (61.96)                 |          |
| Mother education | No education          | 28 (35.00)               | 107 (58.15)                 | <0.001   |
|                  | Primary school        | 14 (17.50)               | 39 (21.20)                  |          |
|                  | Middle school         | 14 (17.50)               | 16 (8.70)                   |          |
|                  | Higher education      | 14 (17.50)               | 12 (6.52)                   |          |
|                  | High school           | 10 (12.50)               | 10 (5.43)                   |          |
| Father education | High school           | 37 (46.25)               | 61 (33.15)                  | 0.001    |
|                  | Primary school        | 8 (10.00)                | 32 (17.39)                  |          |
|                  | No education          | 12 (15.00)               | 39 (21.20)                  |          |
|                  | Middle school         | 4 (5.00)                 | 25 (13.59)                  |          |
|                  | Intermediate          | 13 (16.25)               | 26 (14.13)                  |          |
|                  | Higher education      | 6 (7.50)                 | 1 (0.54)                    |          |
| Socio-economic   | Lower middle          | 37 (46.25)               | 81 (44.02)                  | <0.001   |
|                  | Low                   | 25 (31.25)               | 93 (50.54)                  |          |
|                  | Upper middle          | 18 (22.50)               | 10 (5.43)                   |          |
| Delivery place   | Teaching hospital     | 51 (63.75)               | 62 (33.70)                  | <0.001   |
|                  | Non-teaching hospital | 11 (13.75)               | 50 (27.17)                  |          |
|                  | Private hospital      | 10 (12.50)               | 33 (17.93)                  |          |
|                  | Home delivery         | 8 (10.00)                | 39 (21.20)                  |          |
| Delivery Mode    | Normal vaginal        | 51 (63.75)               | 134 (72.83)                 | 0.087    |
|                  | C section             | 27 (33.75)               | 40 (21.74)                  |          |
|                  | Assisted delivery     | 2 (2.50)                 | 10 (5.43)                   |          |
| Mother awareness | Present               | 51 (63.75)               | 5 (2.72)                    | <0.001   |
|                  | Absent                | 29 (36.25)               | 179 (97.28)                 |          |
| Influence        | Mother/ grandmother   | 5 (6.25)                 | 77 (41.85)                  | <0.001   |
|                  | Doctor                | 30 (37.50)               | 18 (9.78)                   |          |
|                  | Relative              | 7 (8.75)                 | 66 (35.87)                  |          |
|                  | Nurses                | 5 (6.25)                 | 11 (5.98)                   |          |
|                  | None                  | 30 (37.50)               | 10 (5.43)                   |          |
|                  | Mass media            | 3 (3.75)                 | 2 (1.09)                    |          |
| Omphalitis sign  | Absent                | 77 (96.25)               | 153 (83.15)                 | 0.007    |
|                  | Present               | 3 (3.75)                 | 31 (16.85)                  |          |

\*Chi-square test

were illiterate or low level of education statistically than healthy practice ( $p=0.001$ ). The unhealthy practice ( $n=93, 50.54\%$ ) was more than healthy ( $n=25, 31.25\%$ ) in low socioeconomic class. Similarly the frequency of the unhealthy practice ( $n=81, 44.02\%$ ) was more than healthy ( $n=37, 46.25\%$ ) in lower middle socioeconomic class. These results for socioeconomic status were significant ( $p<0.001$ ). The unhealthy practice was more than healthy practice in infants

delivered by normal vaginal (72.83% vs 63.75%) and assisted delivery (2.50% vs 5.43%). These results were statistically significant ( $p<0.001$ ). The mother's awareness had statistically significant association with healthy practice ( $p<0.001$ ). The unhealthy practice was more common than healthy influenced by grandmother (41.85% vs 6.25%), relatives (35.87% vs 8.75%) while the opposite results were found for those influenced by doctor, nurses and mass media

statistically ( $p<0.001$ ). Omphalitis sign has statistical association with unhealthy practice ( $p=0.007$ ), (Table 2).

Univariate analysis showed that as compared to home delivery the odds of unhealthy practice was less in teaching hospital delivery statistically (OR=0.25, 95%CI=0.10-0.56,  $p=0.001$ ). The odds of unhealthy practice was statistically higher in those influenced by grandmother (OR=25.67, 95%CI=9.42-

Table 3: Multivariate analysis for practice of umbilical cord

| Parameter        | Characteristics       | healthy practice | unhealthy practice | coefficient | SE     | chi-square | P-value | Multivariate                   |
|------------------|-----------------------|------------------|--------------------|-------------|--------|------------|---------|--------------------------------|
|                  |                       |                  |                    |             |        |            |         | OR(95%CI, P-value)             |
| Delivery place   | Home delivery         | 8 (17.0)         | 39 (83.0)          | -           | -      | -          | -       | -                              |
|                  | Non-teaching hospital | 11 (18.0)        | 50 (82.0)          | 1.266       | 0.913  | 1.39       | 0.166   | 3.545 (0.61-22.51, p=0.166)    |
|                  | Private hospital      | 10 (23.3)        | 33 (76.7)          | 0.605       | 1.080  | 0.56       | 0.575   | 1.83 (0.23-16.34, p=0.575)     |
|                  | Teaching hospital     | 51 (45.1)        | 62 (54.9)          | -0.152      | 0.74   | -0.2       | 0.839   | 0.85 (0.19-3.72, p=0.839)      |
| Influence        | Doctor                | 30 (62.5)        | 18 (37.5)          | -           | -      | -          | -       | -                              |
|                  | Mass media            | 3 (60.0)         | 2 (40.0)           | 2.215       | -0.669 | -0.3       | 0.762   | 0.512 (0.01-18.26, p=0.762)    |
|                  | Mother/ grandmother   | 5 (6.1)          | 77 (93.9)          | 0.236       | 1.031  | 0.23       | 0.819   | 1.266 (1.15-9.27, p=0.819)     |
|                  | None                  | 30 (75.0)        | 10 (25.0)          | -4.337      | 0.987  | -4.4       | 0.000   | 0.13 (0.00-0.08, p=0.000)      |
|                  | Nurses                | 5 (31.2)         | 11 (68.8)          | -0.557      | 1.150  | -0.48      | 0.628   | 0.573 (0.06-5.40, p=0.628)     |
|                  | Relative              | 7 (9.6)          | 66 (90.4)          | -0.417      | 0.960  | -0.43      | 0.664   | 0.659 (0.09-4.05, p=0.664)     |
| Socioeconomic    | Low income class      | 25 (21.2)        | 93 (78.8)          | -           | -      | -          | -       | -                              |
|                  | Lower middle class    | 37 (31.4)        | 81 (68.6)          | -0.151      | 0.588  | -0.26      | 0.797   | 0.859 (0.27-2.74, p=0.797)     |
|                  | Upper middle class    | 18 (64.3)        | 10 (35.7)          | -1.309      | 1.054  | -1.24      | 0.214   | 0.270 (0.03-2.06, p=0.214)     |
| Omphalitis sign  | Absent                | 77 (33.5)        | 153 (66.5)         | -           | -      | -          | --      | -                              |
|                  | Present               | 3 (8.8)          | 31 (91.2)          | 1.077       | 1.018  | 1.06       | 0.290   | 2.935 (0.44-24.78, p=0.290)    |
| Mother awareness | Aware                 | 51 (91.1)        | 5 (8.9)            | -           | -      | -          | -       | -                              |
|                  | Not aware             | 29 (13.9)        | 179 (86.1)         | 5.245       | 0.772  | -6.79      | 0.000   | 189.63 (48.34-1065.14, p=0.00) |

\*OR, odds ratio; logistic regression

83.94, p<0.001), relative (OR=15.71, 95% CI= 6.23-44.54, p<0.001) and nurses (OR=3.67, 95%CI=1.14-13.27, p=0.035). Similarly, the odds of unhealthy practice was higher with those having ompahlitis sign (OR= 5.20, 95% CI=1.78-22.14, p=0.008) and whose mothers were not aware (OR = 62.96, 95%CI =25.25-192.98, p<0.001). In multivariate analysis only significant associated factors for unhealthy practice were influence of grandmother (OR=1.27, 95% CI=1.15-9.27, p=0.019) and unaware mothers (OR=189.63, 95% CI= 48.34-1065.14, p<0.001), (Table 3).

## DISCUSSION

The purpose of this study was to examine the factors that affect umbilical cord care practices among mothers of newborn babies attending a tertiary care hospital. Our findings revealed that the prevalence of unhealthy practices was lower among mothers who delivered at teaching hospitals and higher among those influenced by grandmothers, relatives, and nurses, as well as those with omphalitis signs and mothers who lacked awareness about umbilical cord care.

Our results showed that 69.69% parents do unhealthy umbilical cord care practices. Most common unhealthy practice was turmeric application (25.38%) followed oil application (13.26%). In our study in 20(7.58%) applied other substance including dung of animal. Previous studies also reported such unhealthy umbilical cord care practices.<sup>2, 13, 14</sup> A systematic review was conducted for all studies conducted in the English language in major databases. They finally selected 65 full-text articles assessing the description of substances applied to the umbilical cord stump in the days following birth. They found that in low-income countries, a variety of substances is being applied to the umbilical

cord, and most of them are unhealthy.<sup>15</sup>

Various types of products applied to newly cut cord of infants shown by studies from Haiti, and Karachi, Pakistan.<sup>13,16</sup> Due to less developed immune system at birth, the infants are more prone to infection than adults leading to neonatal sepsis from various bacterial strains like streptococcus, E. coli, and L. monocytogenes.<sup>17</sup> The unhygienic agents application to the umbilical cord can cause tetanus in infants.<sup>6,7</sup> Clostridium tetani which is etiology of tetanus, survive in dust, soil, animal dung, saliva, and other sources.<sup>18</sup>

Our study showed that the mothers who were less aware had more practice of unhealthy cord management. Similar findings were reported by previous study.<sup>19</sup> Another study, which used an interviewer-administered structured questionnaire and included 315 randomly selected young mothers aged 15 to 25 years, reported that awareness was lower.<sup>20</sup>

In this study the most common and significant influenced for non-healthy practice of umbilical cord was grandmother. In our countries the younger followed the elder in traditional way. The mothers and grandmothers guide the infant's mother how to carry out the care of baby. Due to lack to education the care of infants including umbilical cord care practice are based on myths and believes. In our study the unhealthy cord care was more for infants who delivered at home than who born in teaching hospitals and nursing care centers. At teaching hospitals and nursing care centers mothers are taught how to take care of infant including umbilical cord management. Previous studies by Medewase et al.<sup>21</sup> and Ambe et al.<sup>22</sup> also reported that the more unhealthy practices among mothers of babies who delivered at non-health facilities.

In Volta Region of Ghana a study was conducted on neonatal cord care practices

among mothers and reported that significant risk factors for malpractice of cord care were lack of mother's education, place of delivery, and influence of others.<sup>23</sup> These results are in consistent with our study.

This study has some limitations; this is hospital based descriptive study and participants come to this tertiary care from whole province of Khyber Pakhtunkhwa. A community based and large sample study can better explore this subject.

## CONCLUSION

There is a relatively high prevalence of non-healthy practices in umbilical cord care. Several important factors contribute significantly to these non-healthy practices, including delivering at non-healthcare facilities, the presence of omphalitis signs, and the level of awareness among mothers.

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### Author's Contribution

AM conceived the idea, helped in data collection, and write up of the manuscript. KKW and ZUH helped in analysis and write up of the manuscript. Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

### Conflict of Interest

Authors declared no conflict of interest

### Grant Support and Financial Disclosure

None

### Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.