

A PROSPECTIVE STUDY OF FACTORS INFLUENCING THE TIME OF SEPARATION OF UMBILICAL CORDLoksha R¹, Anil Shetty²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: The umbilical cord usually shrivels and falls off at around 5 to 15 days of life. It is important to know timing of separation, so that parents may be advised on proper cord care and allay any misconceptions about the cord separation; early discharge has increased the need for women to receive accurate, relevant information on how to care for themselves and their newborns when discharged from the hospital. Delay in separation of the umbilical cord, umbilical discharge, odor, or granuloma causes concern and source of immense anxiety for parents, the interval between delivery and umbilical cord separation varies worldwide, this study is undertaken to determine time of separation and factors influencing the separation. **OBJECTIVES:** To determine time of separation of umbilical cord and factors influencing it. **METHODS: SETTINGS:** Babies admitted at a tertiary hospital, selected by purposive sampling technique. For each recruited baby, data is obtained about mother's parity, mode of delivery, gestational age, birth weight, and gender of baby, method of resuscitation, phototherapy, IV antibiotics, and cord blood TSH values, time of umbilical cord separation after birth. Newborns whose umbilical cord shriveled off during the stay in the hospital information were obtained directly, and a self-addressed postcard was given to parents of newborns whose umbilical cord was intact at time of discharge. Parents would be advised to note and write the date of fall of umbilical cord on post card and mail it. **RESULTS:** Cord separation time ranges from 3 to 11 days, with mean separation of 5.62 ± 2.37 days, it is one to two days earlier as compared to previous studies, seventy nine (79) of hundred and ten (110) separated between 5-7 days (71%), one baby had separation at 11 days, babies who received antibiotics had statistically significant delay in separation time of umbilical, neonates received antibiotics had mean separation time (6 ± 2.4 days) as compared to those neonates not received antibiotics (5.53 ± 2.33 days), with p value of 0.017, none of the other parameters were found significant. **CONCLUSION:** In an era of early discharges, there is an increased need for women to receive accurate, relevant information on, how to care for themselves, and their newborns when discharged from the hospital. Our study revealed that umbilical cord separation can be expected mostly within one week, there may a slight delay in babies with antibiotics.

KEYWORDS: Umbilical cord separation time, phototherapy, IV antibiotics.

INTRODUCTION: Delay in separation of the umbilical cord, umbilical discharge, odor, or granuloma causes concern and source of immense anxiety for parents. The normal process of cord separation is by inflammation of its junction with the abdominal skin, resulting in collection of small amounts of cloudy mucoid material at the junction. This is often misinterpreted as pus.^{1,2} Variable times for cord separation have been reported, with the commonly reported periods being between 5-15 days after birth,^{3,4} Factors that may alter this process of cord separation include delivery by caesarean section, antibiotic use, application of antiseptics to the cord, defective neutrophil mobility, and infection in the neonate. Antiseptics have also been associated with delayed cord separation.^{2,5}

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A study done by Noar, and his colleagues,⁶ showed that the umbilical cord is a “subject very close to the parents hearts” and can be a source of immense anxiety for parents, with any delay in separation, discharge, odor, or granuloma causing a concern for parents.

The Oxford Midwives Research Group,⁷ addressed the issue of maternal anxiety about care of the umbilical cord by altering the cord separation times. The group proposed that maternal anxiety may be alleviated by decreasing the length of time the cord is attached, this study was undertaken to evaluate effect of mode of delivery and gestational age on time of separation of umbilical cord, however, they found no significant difference in separation times between early and late clamping. Delayed separation of the cord, after more than 1 month, has been associated with neutrophil chemotactic defects and overwhelming bacterial infection.³

A study by Mugford,⁸ indicated that in countries where mothers are visited by midwives during the postnatal period, problems with the cord often determine the number of visits.

Data on the pattern of umbilical cord stump care, separation time and the effect of different cord care regimens are useful for many reasons. They will guide health care provider's in differentiating between normal and abnormal cord separation time in order to avoid necessary interventions, which may lead to neonatal morbidity and mortality especially in developing countries where the level of hygiene is low. It is also important in designing neonatal care programs for mothers and other caregivers. This study is undertaken to determine mean separation time and effect of maternal, infant and medical interventions on separation time.

A study by Oudesluys-Murphy, et al,⁴ included 911 neonates. The mean time of separation was 7.4 days. Cord separation was delayed when antibiotics needed to be administered. The cord separated slightly earlier in female than in male infants.

A study done Narindersingh, et al,⁵ in Punjab, on 250 newborns concluded that age of cord separation in an average newborn was 7.74 days. They did not document any difference in time of fall of umbilical cord in babies born preterm and at term in both vaginal and Caesarean deliveries. The study demonstrated that the babies delivered by Caesarean section had separation of cord at a later time (mean 8.98 days) as compared to babies delivered by vaginal route.

A study conducted by Sarwono E, et al,⁶ at Indonesia, included 98 healthy Indonesian newborn's to determine the normal time of separation and evaluated factors which may influence it. The authors looked for a relationship between cord separation and sex, birth weight, gestational age, parity of the mother and nutrition of the new born. Mean separation time was 10.9 days (S.D. 3: range 5-23 days). None of the factors analysed had a statistically significant influence. Cord care consisted of triple dye; no umbilical infections were found.

RHL The WHO Reproductive Health,⁷ Library says, Topical umbilical cord care at birth showed no differences in umbilical cord infection rates when use of a topical antiseptic was compared with dry cord care or placebo and Topical triple dye and antibiotics seemed to be associated with longer cord separation times.

MATERIALS AND METHODS: The study was conducted at a tertiary hospital, the study was conducted over a period of three months (February -April) in 2014. Newborns of 28 weeks and above admitted during this period were eligible. Newborns < 28 weeks, with severe congenital malformations, exchange transfusion, umbilical sepsis, abdominal wall defects, umbilical vein catheterization were excluded. Sampling was done using purposive sampling technique. At the time of enrolment, an informed written consent was obtained from the parents.

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Information was obtained on the age and sex of the infant, gestational age at delivery, mother's parity, and mode of delivery, birth weight, and resuscitation method, use of antibiotics, phototherapy, cord blood TSH values obtained from laboratory and cord separation time was noted. Newborn whose umbilical cord shrivels off during the stay in the hospital, data was collected directly and noted, and a self-addressed postcard will be given to parents of newborns whose umbilical cord was intact at time of discharge. Parents were advised to note and write the date of fall of umbilical cord on post card and mail it.

DATA ANALYSIS: The data was cleaned validated and analyzed using SPSS version 13. Quantitative variables were summarized using range, mean and standard deviation. Categorical variables were tabulated using frequencies. The level of significance calculated using Fisher's Exact Test, Chi square tests, for all tests was set at $P < 0.05$ considered statistically significant.

RESULTS: Out of the 128 neonates requested to participate in the study, 120 (94%) accepted. Ten neonates excluded, were because of umbilical vein catheterization (8), exomphalus major (1), and exchange transfusion (1), among 110, males were 54 (49.0%) and 56(51.0%) females. The time interval between birth and separation of the umbilical cord ranged from 3 to 11 days with a mean of 5.62 ± 2.37 days, the umbilical cord separated within the early neonatal period (1 week of life) in 95.8% of all infants, and in the rest the cords separated after one week but within two weeks.

| Separation time (Days) | Male | Female | Total |
|------------------------|-----------|-----------|------------|
| 2-4 | 10 | 12 | 22 |
| 5-7 | 36 | 43 | 79 |
| >8 | 6 | 3 | 9 |
| Total | 54 | 56 | 110 |

Table 1: time of cord separation and neonate's gender

Table 1 reveals that there was no statistically significant difference in separation time between males and female newborns. Males- 5.72 ± 2.39 days, Females- 5.53 ± 2.35 days, $P=0.435$.

| Gestational age | Separation time | | | |
|-----------------|-----------------|-----------|----------|------------|
| | 2-4 days | 5-7 days | 8 days | Total |
| Term | 18 | 56 | 7 | 81 |
| Preterm | 4 | 23 | 2 | 29 |
| Total | 22 | 79 | 9 | 110 |

Table 2: Umbilical cord separation and gestational age

Table 2 reveals that there was no statistically significant difference in separation time between preterm. Mean time of separation in term - 5.56 ± 2.1 days, mean separation time pre term- 5.72 ± 2.0 days, P value -0.673.

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| Birth Weight | Separation time | | | |
|--------------|-----------------|-----------|----------|------------|
| | 2- 4 days | 5-7 days | 8 days | Total |
| < 1.5 kg | 3 | 18 | 3 | 24 |
| 1.5 – 2.5 kg | 9 | 40 | 3 | 52 |
| 2.5 – 4 kg | 10 | 20 | 3 | 33 |
| >4kg | 0 | 1 | 0 | 1 |
| Total | 22 | 79 | 9 | 110 |

Table 3: Name umbilical cord separation and birth weight

Table 3 reveals that there was no statistically significant difference in separation time between weight groups, P value- 0.495

| Antibiotics | Separation time | | | |
|--------------|-----------------|-----------|----------|------------|
| | 2- 4 days | 5-7 days | 8 days | Total |
| Not received | 22 | 60 | 8 | 90 |
| Received | 0 | 19 | 1 | 20 |
| Total | 22 | 79 | 9 | 110 |

Table 4: Cord separation and antibiotics

Table 4 reveals that there was statistically significant delay in separation time between neonates who received antibiotics (6 ± 2.4 days), as compared to neonates who not received, (5.53 ± 2.33 days). P value 0.017

| TSH (μ IU/ml) | Separation time | | | |
|--------------------|-----------------|-----------|----------|------------|
| | 2- 4 days | 5-7 days | 8 days | Total |
| <20 | 21 | 73 | 9 | 103 |
| >20 | 1 | 6 | 0 | 7 |
| Total | 22 | 79 | 9 | 110 |

Table 5: Cord separation and TSH value

Table 5 reveals that there was no statistically significant difference in separation time between child with high TSH and normal TSH values. P value – 1

DISCUSSION: The interval between birth and umbilical cord separation among newborns in our study ranged from 3 to 11 days with a mean 5.62 ± 2.37 days. This is shorter than the mean separation time found in different studies, study done at Indones revealed mean separation time 7.4 days,⁴ study done at Punjab revealed mean separation time of 7.74 days,⁵ study done in Nigeria revealed mean separation time of 8.73 days,⁹ In keeping with most previous studies, we did not observe significant differences in the mean cord Separation time by gender,^{2,4} however, this finding contrasts with the report from Ibadan,⁹ male infants had shorter duration of separation.

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In our study there was no difference in mode of delivery on separation time but previous studies did noted delay in Separation time in those babies born by caesarian section delivery compared to those who had spontaneous vaginal or assisted delivery, which suggested that it could be a reflection of decreased bacterial contamination of the umbilical cord in those delivered by caesarean section with consequent decreased leukocyte migration to the cord,² in our study there was a significant delay in separation in babies who received antibiotics, mostly intravenously, few topical application of Neosporin powder, this was also observed in previous studies,⁵ This was also reported by earlier studies,^{2,4} This tends to be supported by reports indicating that umbilical cord separation is mediated through leukocyte infiltration and digestion, in our study we looked into the effect of phototherapy and hypothyroidism effects on separation of the cord, there was no statistically significant difference.

There seems to be no consensus on the best cord care practice. The Cochrane data base of systematic reviews concluded that “we are unable to be sure what is the best practice for cord care in institutions in developed countries,⁵ but there is no evidence that doing anything better than keeping the cord clean is helpful,¹⁰ However, the following have been recommended: hand Washing before and after contact with the umbilical area, use of sterile instruments to cut the cord, keeping the cord clean and dry, exposing cord to air, folding the diaper below the level of the umbilicus and encouraging breast feeding and skin -skin contact with the mother to promote colonization with nonpathogenic bacteria from the mother's skin flora.

Limitations of study; this is hospital based study, small sample size; cord care practices at home vary. Hence, our findings may not reflect all varieties of cord care practices in the community.

CONCLUSION: Early discharge has increased the need for women to receive accurate, relevant information on how to care for themselves and their newborns when discharged from the hospital. These findings help health care provider's doctors and nurses to provide consistent, accurate information to women that would enable them to confidently assess and treat their newborns, and also when to expect cord separation.

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