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Evaluation of home care management of umbilical cord stumps by mothers at Ilesa, Southwestern Nigeria

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Abstract: *Background:* Umbilical cord care is an integral part of neonatal care in all communities and cultures and appropriate cord care reduces the risk of infection in the newborn infant.

Objective: The present study assessed the home care management of the umbilical stump by the mothers at Ilesa, Southwestern Nigeria.

Subjects and methods: The subjects were newborn babies brought for routine immunization in health facilities at Ilesa, Nigeria. Informed consent was obtained from the mothers and permission sought from the nurses in charge of the immunization centres. Data collected were entered into a research proforma designed for the study. The babies had complete physical examination with special emphasis on the umbilical cord stump for any abnormality or complications resulting from care.

Results: Of 331 babies aged 0 to 28 days assessed, 194 (58.6%) were males and 137 (41.4%) females. The age range at dropping of the cord was 3 to 25 days with a mean and standard deviation of 8.64 ± 3.55 days. Common methods of

umbilical cord care are cleaning with methylated spirit, hot water fermentation and the application of shea butter. None of the mothers had appropriate cord care practice of hand-washing before and after cord care, washing the cord with clean water and soap, keeping the cord dry and exposed to air. However, 225 (68.0%) had fair cord care while 106 (32.0%) had poor cord care. Fifty six (16.9%) of the 331 babies had various localized complications of the umbilicus. These were purulent discharge/umbilical sepsis, bleeding, umbilical granuloma, periumbilical cellulitis and omphalitis. Associated factors to poor cord care and complications were no antenatal care and lower social class of the mothers. $p=0.000$.

Conclusions: It is concluded that improved antenatal care, improved social class and training on appropriate cord care during antenatal care visit will improve incidence of cord complications.

Key words: Evaluation, Home Care, Umbilical cord stump care, Nigeria

Introduction

Umbilical cord care is an integral part of neonatal care in all communities and cultures and appropriate cord care reduces the risk of infection in the newborn infant. The umbilical cord is an important bacterial colonization site, which may occasionally lead to fatal neonatal infection such as omphalitis. Appropriate umbilical cord care is important to prevent infections in newborn^{1,2}.

Appropriate cord care in the postnatal period includes hand-washing before and after cord care, washing the cord with clean water and soap, keeping the cord dry and exposed to air. The napkin/diaper should also be folded below the umbilicus. Keeping the stump clean

and dry is therefore very important if infection is to be prevented. In many cultures, some substances are applied to the cord stump. Some of such substances are ashes, oil, butter, spice pastes, herbs and mud^{2,3}. These substances are often contaminated with bacteria and bacterial spores and thus increase the frequency of complications like cord sepsis, septicaemia, umbilical cord granuloma, excessive bleeding, omphalitis and tetanus. These conditions contribute significantly to neonatal morbidity and mortality⁴. Appropriate cord care therefore, contributes largely to the well being of the newborn.

Joel Medewase et al⁵ in 2006 reported poor cord care

practices in 17.1% of 193 mothers of babies seen in State hospital Osogbo (about 40 kilometers from Ilesa). However, none of the babies who had poor cord care experienced any medical complication - a finding explained on the basis of the cross sectional design of the study. Nevertheless, anecdotal comments and clinical experience suggest that the frequency of complications especially infections may be profound. Therefore, in view of the complications and deaths which may be associated with poor cord care, there is a need to review the present status of mothers' current practice and the associated complications so that this aspect of child survival and child health can be improved.

The aim of the present study therefore, was to assess the home management of the umbilical cord stump by the mothers at Ilesa, Southwestern Nigeria.

Subjects and Methods

Newborn babies brought by their mothers for routine immunization in one secondary and ten primary health facilities at Ilesa, Osun State, Southwestern Nigeria were studied. Informed consent was obtained from the mothers and permission was sought from the nurses in charge of the immunization centres. The babies were recruited consecutively over a period of three months (March to May 2013). Data collected were entered into a research proforma designed for the study. Structured questionnaires were administered and additional oral questioning of the mothers on the care of their babies was done. Also, places of antenatal care, whether information about umbilical cord care during antenatal care was given, birth and educational status of the mothers were recorded. The socio-economic classes of the mothers were derived from the educational attainments and occupations of the parents as described by Oyedeji.⁶

The babies had complete physical examination with special emphasis on the umbilical cord stump; noting the position of the stump in relation to the diaper, oils/creams, powder or any agent on the cord and examined for any abnormality or complications resulting from the care including odour, discharges, bleeding, differential skin colour or granuloma. Appropriate cord care is taken as hand wash before and after cord care, cord stump air-dry and above the napkin/diaper. Cord stump stocked into the napkin/diaper or with use of methylated spirit and expose to air-dry is taken as fair care while formenations, application/detection of oils, creams, powder and any other agent is taken as poor cord care. Mothers were counseled when inappropriate methods of care were detected and babies who had problems were referred to the hospital for appropriate medical treatment.

The data generated were entered into HP personal computer and analyzed with the Statistical Package for the Social Sciences (SSPS version 15). Simple frequencies and chi-square test of significance were calculated. The level of significance was taken as $p < 0.05$.

Results

Gender, places of antenatal care and birth of the babies

Three hundred and thirty one babies aged 0 to 28 days were studied. They consisted of 194 (58.6%) males and 137 (41.4%) females (Male: Female ratio of 1.4:1) as shown in Table 1. Two hundred and ninety seven (89.7%) were term and 34(10.3%) preterm babies.

Two hundred and seventy five (83.1%) of the mothers had antenatal care while 56 (16.9%) had no antenatal care. Of the 275 mothers who had antenatal care, 109 (39.6%) were told about umbilical cord care during the antenatal period. This was mainly instruction to wash hand before cord care, clean the cord with methylated spirit and expose to air-dry.

One hundred and two (30.8%) of the babies were delivered at government maternity /health centres, 72 (21.7%) at state hospitals, 48 (14.5%) at private hospitals, 47 (14.2%) at teaching hospitals, 35 (10.6%) at mission houses, and 27 (8.2%) home/traditional birth attendants.'

Table 1: Age and sex distribution of 331 study subjects

Age (days)	Male	Female	Total
0 – 7	103	76	179 (54.1)
8-14	46	38	84 (25.4)
15 -21	26	15	41 (12.4)
22 – 28	19	8	27 (8.2)
Total	194(58.6)	137 (41.4)	331 (100)

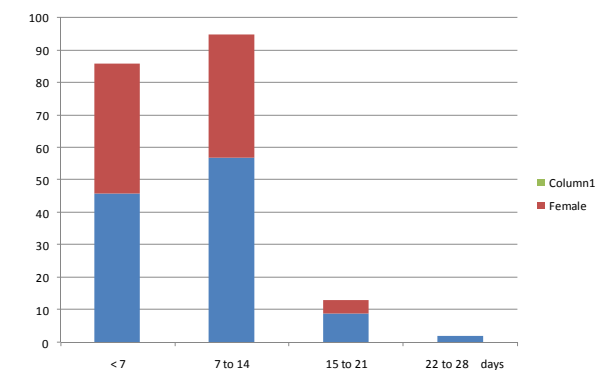
$$\chi^2 = 1.41, p = 0.23$$

Separation of umbilical cord

The umbilical stumps of 135 (40.8%) of the 331 babies were still present whilst 196 (59.2%) stumps had dropped off. Figure I shows the gender and the age of separation of umbilical cord stumps among 196 babies whose stump had fallen off

The age range at dropping of the cord was 3 to 25 days (Mean \pm SD = 8.64 ± 3.55 days). 181(93.3%) of the babies had their cords separated in the first two weeks of life.

Fig 1: Age at dropping of the umbilical stump among 196 babies



Care of umbilical cord stump by the mothers

The frequency of different umbilical cord care practices by mothers is shown in Table 2. None of the mothers

had appropriate cord care practice of hand-washing before and after cord care, washing the cord with clean water and soap, keeping the cord dry and exposed to air. However, 225 (68.0%) had fair cord care while 106 (32.0%) had poor cord care. Common methods of umbilical cord care were cleaning with methylated spirit, hot water formentation, hot/warm cloth formentation, shea butter application, mentholatum application, olive oil and dusting powder application. Two hundred and thirty six (71.3%) mothers used a single method of cleaning or applied a single cleaning agent, 52 (15.7%) used two methods while 43(13.0%) used more than two methods in cord care. Therefore, 95 (28.7%) of the mothers used multiple methods at the same time and sometimes on different days. Also, 219 (79.6%) of the 275 mothers who had antenatal care had fair cord care and used single agent.

Table 2: Methods of cord care employed by mothers

Method of umbilical cord care	Frequency of usage (n = 331)		
	Always ⁺ n (%)	Sometimes ⁺ n (%)	Never n (%)
Hot water fomentation	84 (25.4)	81(24.5)	166(50.2)
Hot/warm cloth fomentation	67(20.2)	98 (29.6)	166 (50.2)
Methylated spirit	248 (74.9)	53 (16.0)	30 (9.1)
Shea butter	45 (13.6)	76 (23.0)	210 (63.4)
Engine oil	11 (3.3)	35 (10.6)	285 (86.1)
Olive oil	22 (6.6)	67 (20.2)	242 (73.1)
Mentholatum/Rob	35 (10.6)	39 ((11.8)	257(77.6)
Dusting powder	56 (16.9)	45 (13.6)	230 (69.5)
Breast milk	15 (4.5)	23(6.9)	293(88.5)
Toothpaste	04(1.2)	08(2.4)	319(96.4)
Camphor water	5 (1.5)	21 (6.3)	305 (92.1)
Cord Bandaging on abdomen	17 (5.1)	24 (7.3)	290 (87.6)
Local herb preparation	31 (9.4)	56 (16.9)	244 (73.7)
Distilled water only	0 (0)	0 (0)	0 (0)
Ordinary water only	0 (0)	0 (0)	0 (0)
Animal dung	0 (0)	0 (0)	0 (0)

+ Multiple agents were used by mothers at same time and at different days.

Umbilical disorders observed

There was no umbilical abnormality seen among 285 (86.1%) babies. However, 56 (16.9%) of the 331 babies had various localized complications in and around the umbilical stump. These were purulent discharge/ umbilical sepsis in 19 (5.7%) babies, bleeding in 20 (6.0%) umbilical granuloma in 9 (2.7%), periumbilical cellulitis in 7 (2.1%) and omphalitis in 1 (0.3%) baby. Table 3 shows the relationship between assessment of umbilical cord care and complications in the babies. Significant higher proportions of mothers with poor cord care had complications. For example, while 14 (6.2%) of the 225 mothers with fair cord care had various complications, 41 (38.7%) of the 106 mothers with poor cord care had complications $\chi^2 = 54.9, p = 0.000$.

Maternal Social class and umbilical cord care

Table 4 shows the relationship between maternal social class and assessment of umbilical cord care in their babies. Significantly, higher proportion of the mothers in social classes I to III had fair cord care compared to

social class IV and V. For example, 134 (80.2%) of the 167 mothers compared to 91(55.5%) of the 164 mothers had fair cord care $\chi^2 = 23.3, p = 0.000$. Also, significant proportion of mothers in lower social class has more babies with umbilical cord complications: 11 (6.6%) of 167 mothers compare to 45 (27.4%) of 164 mothers $\chi^2 = 25.6, p = 0.000$ as in Table 5.

Table 3: Relationship between maternal social class and assessment of umbilical cord care of their babies

Maternal Social class group	Assessment of maternal cord care in their babies			Total N (%) ⁺
	Good	Fair n = 225 (%)*	Poor n = 106 (%)*	
I	0	15 (83.3)	3 (16.7)	18(5.4)
II	0	50(80.6)	12 (19.4)	62 (18.7)
III	0	69 (79.3)	18(20.7)	87 (26.3)
IV	0	65 (58.0)	47 (42.0)	112 (33.8)
V	0	26 (50.0)	26 (50.0)	52 (15.7)
Total	0	225	106	331 (100.0)

* Figures in parenthesis are percentages of total in the row

+ Figures in parenthesis are percentages of total in the column

Table 4: Relationship between assessment of umbilical cord care and complications in the babies

Complication	Good	Fair n = 225 (%)	Poor n = 106 (%)	Total N = 331
Granuloma	0	4 (1.8)	5 (4.7)	9 (2.7)
Bleeding	0	6 (2.7)	14 (13.2)	20 (6.0)
Periumbilical cellulitis	0	1(0.4)	6 (5.7)	7(2.1)
Purulent discharge/ umbilical sepsis	0	3(1.3)	16 (15.1)	19 (5.7)
Total	0 (0)	14 (6.2)	41 (38.7)	56 (16.9)

$\chi^2 = 54.9, p = 0.000$

Table 5: Relationship between social class of mothers and development of umbilical complications

Maternal Social class group	n (%) of 331	No whose babies had umbilical complication n (%) of 56
I	18(5.4)	1(2.2)
II	62 (18.7)	4(8.7)
III	87 (26.3)	6(13.0)
IV	112 (33.8)	25(43.5)
V	52 (15.7)	20(32.6)
Total	331 (100.0)	56(100.0)

Comparing complications between maternal social class I-III with IV-V, $\chi^2 = 25.6, p = 0.000$

Discussion

The mean age of babies at umbilical cord dropping in the present study was 8.60 (SD 3.54) days and ranged from 3 to 25 days. This is similar to the findings of other workers^{7,8} For instance, Novack et al⁷ found separation

time to vary from 3 to 45 days with a mean of 13.9 days. Oudesluys-Murphy et al⁹ found range of 1 to 29 days with a mean of 7.4 (SD 3.3) among 911 babies in the Netherlands. Wilson et al⁸ reported a range of 5 to 15 days after birth.⁸ It could therefore be said that time of umbilical cord separation is similar among cultures.

Wilson et al⁸ defined delayed separation of cord as separation occurring after 15 days.⁸ In the present study, 181(93.3%) of the babies had the cord stump separated in the first two weeks of life. Thus by the definition of Wilson et al⁸ only 13 (6.7%) could be classified as delayed. Known factors that delay the process of umbilical separation are the application of antiseptics to the stump, infection, mode of delivery like caesarean section, and method of cord care. Delayed cord separation with antiseptics may be due to destruction of the normal flora around the umbilicus and a subsequent decrease in the number of leucocytes attracted to the cord.⁷ These were not fully evaluated in the present study.

The present study shows various methods of cord care practised in the area of study. Cord care is an integral part of newborn care in most cultures. It is interesting to find how varying agents are used by mothers to care for the cord of their babies. Many of the methods used are against the principle of having a dry cord which is more important in cord care. In fact, many of the methods could promote bacterial colonization and infection of the cord. Several mothers used hot water fomentation before cleaning with methylated spirit. Methylated spirit consists of 2% methanol, less than 6.2 percent water and over 90 percent of ethanol which is known to be irritant to the skin.¹⁰ Alcohol has been shown in many hospital studies to be ineffective in controlling umbilical colonization and skin infections.³ Alcohol also has been shown to delay cord separation when compared to other treatments.³ Isopropanol has consistently been shown to lengthen cord separation time.¹¹ Cases of acute alcohol toxicity in infants up to 21 days old have been reported after alcohol applications to the umbilical stump.⁴ Alcohol is also known to cause central nervous system depression, convulsions, ataxia and coma if absorbed in significant quantity. It may also cause pulmonary damage, alteration in gastric secretion, nausea, vomiting and other gastrointestinal changes.¹⁰ This is however rare and not observed in the present study probably because of small quantity used in cord care. Previous studies have recommended that physicians and nurse practitioners should limit or avoid the use of alcohol for cord care.¹² This however, is also not adhered to in the area of study where alcohol as methylated spirit is usually the main prescription by health workers to mothers for umbilical cord care.

The cloth used by mothers in the practice of hot fomentation may be dirty and promote infection. It was also observed that about 36% of the mothers used shea butter. Shea butter (fat from nut of shea tree: *Vitellaria paradoxa*) is used in the cosmetics industry as skin and hair moisturizer. By its quality of increasing wetness, it may promote cord sepsis.¹³ The devitalized tissue of the

cord stump can be an excellent medium for bacterial growth if the stump is kept moist and unclean substances are applied to it.³ However, shea butter if not refined, is known to contain Vitamin A and E. The vitamin increases micro-circulation to the skin and acts as anti-free radical agent; there is nevertheless no known study that has found it useful in early separation of the cord or in preventing cord colonization and sepsis

In the present study, complications occurred in 56 (16.9%) of the babies. This is high but is likely to be higher if not for the fact that the babies evaluated in the present study were apparently healthy babies brought for immunization. Very ill infants such as babies with septicaemia and tetanus or babies who had severe neonatal jaundice following exposure to menthol during cord care may not be known since many of them may have reported directly to the hospitals for treatment. The reason for the large number of babies with complications could be inferred from the methods of cord care. Significantly associated with complications in the present study were lack of antenatal care, low socioeconomic class of the mothers and poor cord care. Cord sepsis is a common finding in many prospective study and clinical reviews in developing countries.^{3,14-16} Previous study put the incidence of cord infections in newborns between 0.5% in term newborns and 2.08% in preterm babies among those who were routinely bathed with hexachlorophenel;³ 30/1000 among urban slums in India¹⁴ and sometimes can be as high as in 47% of infants hospitalized with sepsis. Similarly, a study found that 21% of infants admitted for other reasons had concurrent omphalitis.¹⁵ Though, incidence of cord sepsis may sometimes be bloated due to misdiagnosis because during the normal process of separation, small amounts of cloudy mucoid material may collect at the junction; which may be misinterpreted as pus, and the cord may appear moist, sticky or smelly³ however, babies may not have external signs of infection despite cord sepsis

According to the WHO, even though, there is still no complete answer to the question of what constitutes the best cord care; clean cord care in the postnatal period includes washing hands with clean water and soap before and after care, and keeping the cord dry and exposed to air.³ The cord should be washed when necessary with clean water and soap (cleaning with alcohol seems to delay healing), and the napkin should be folded below the umbilicus. Touching the cord, applying unclean substances to it and applying bandages should be discouraged. Practices that may also reduce the risk of cord infection is the use of 24-hour rooming-in instead of nurseries, and skin-to-skin contact with the mother at birth to promote colonization of the newborn and the cord with non-pathogenic bacteria from the mother's skin flora.¹⁷ Early and frequent breast-feeding will provide the newborn with antibodies especially against the commensals in the mothers' skin. There is need for the health workers and birth attendants to be very conversant on proper cord care so as to adequately educate the mothers and the need to teach mothers on appropriate cord care with practical demonstration. They need to

emphasize clean and dry cord than encouraging the use of alcohol as observed in the present study.

Conflict of Interest: None
Funding: None

Also, application of human milk to the cord stump which is one of the cultural cord care practices as practiced in Turkey, could be beneficial in view of the anti-bacterial factors present in the breast milk³ but its use in the care of umbilical cord may have its own challenges of cultural acceptability, it may make the cord messy and wet thereby negating the dry cord care that is being encouraged. The present study also showed that better antenatal care attendance and improved social status of the mothers will have better cord care practices and overall survival of the babies.

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