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UMBILICAL CORD CARE AND MANAGEMENT OUTCOME AMONG MOTHERS IN CALABAR SOUTH LOCAL GOVERNMENT AREA OF CROSS RIVER STATE - NIGERIA

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ABSTRACT: *In developing countries umbilical cord infections constitute a major cause of neonatal morbidity and pose significant risk for mortality Methods of caring for the umbilical cord vary greatly between communities depending on their cultural and religious beliefs, level of education and resources. The risk of cord infection is increased by unhygienic cutting of the cord and application of unclean substances. This study examined the cord management practices and management outcome among mothers in Calabar South Local Government Area of Cross River State, Nigeria. Methods: A cross sectional community-based study was conducted in Calabar South Local Government Area of Cross River State, Nigeria. Calabar South is one of the two Local Government Areas that make up Calabar Metropolis with 11 wards. Women of child bearing age were used as population of the study. A sample size of 451 mothers was selected using the snowball method. A structured pre-tested interviewer administered questionnaire was used to collect data. Data were analyzed descriptively using frequencies, percentages, means and standard deviation. All analyses were performed using SPSS version 18.0 at 95% confidence interval. Results: Whereas most of the respondents 224(49.8%) used methylated spirit in cleaning the cord, others used dettol 88(19.6%), saliva and salt 44(9.8%), herbal preparations 44(9.8%). Most of the respondents 314 (69.8%) applied unhygienic substances at the base of the stump after cleaning the cord. Main reason for choice of materials includes to wade off evil spirits and hasten cord separation 270(55.9%). The outcome of cord management showed that majority of the umbilical cords were infected 338 (75.1 %.). Conclusion: Majority of the respondents applied harmful and contaminated materials/ substances to the umbilical cord. Good umbilical cord care practices can lead to improved newborn care while poor umbilical cord care practices may result in neonatal morbidity and mortality. Improving the standard of umbilical cord care among mothers can largely be achieved through health education and follow up visits by nurses after discharge from the health facility.*

KEYWORDS: Umbilical cord care, Management outcome, mothers, Calabar, Nigeria

INTRODUCTION

Umbilical cord infections constitute a major cause of neonatal morbidity and pose significant risk for mortality in developing countries (WHO, 2009 [1]). Globally, about 130 million babies are delivered annually,4 million (3.1%) die within the first 4 weeks of life (Peter & Johnson, 2010 [2]). Twenty- five percent (25%) of these deaths are as a result of umbilical infection (Peter & Johnson, 2010 [2]). In developing countries, most of the cord care is home based since two third of births take place at home (WHO, 2009 [1]). Each year some 600,000

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infants die of neonatal tetanus in Africa; in untreated cases, case fatality rate approach 100% and a further 460,000 die as a consequence of other severe bacterial infections (Peter & Johnson, 2010 [2]).

The umbilical cord is a unique tissue consisting of two arteries and one vein which at term is about 56cm in length and extends normally from the centre of the placenta to the umbilicus of the unborn baby (Abba, 2008 [3]). During pregnancy, the umbilical cord connects the fetus to the mother through the placenta. The blood flowing through the cord brings nutrients and oxygen from the mother to the fetus and carries away carbon dioxide and other metabolites from the fetus (WHO, 2009; Bello & Omotara, 2010 1,4]). After the delivery of the baby, the cord is clamped firmly and cut with sterile instrument to separate the baby from the placenta attached to the mother's uterus leaving about 6cm with the baby. Thus the umbilical cord which is wet with an open surface wound and patent blood vessels provide a nutritive culture medium for bacterial growth. This scenario strengthens the need for standard cord management practice among mothers (Bemor & Uta, 2011 [5]) as a means of reducing exposure of the cord to infectious pathogen.

Methods of caring for the umbilical cord vary greatly between communities depending on their cultural and religious beliefs, level of education and resources. In developing countries most deliveries occur at home where health care services may not be available. Sometimes materials used to cut and tie the cord include strings, thread and strips of cloth, scissors and sharp stone (Obuekwe & Obuekwe, 2008 [6]). The risk of cord infection is increased by unhygienic cutting of the cord and application of unclean substances such substances include sand from door post mixed with saliva, herbal preparations and lantern wax. Even babies delivered in hospitals may be affected by traditional practices after discharge which most times lead to umbilical cord infection and death among the neonates (Sreeramaraddy, Josh, Sreekumaran & Giri, 2006 [7]).

The use of alcohol daily and as often as each diaper is changed has been recommended by the World Health Organization (WHO, 2007 [8]) as standard care. With standard care the cord usually falls off between five to fifteen days after birth. Where clean cord care is not practiced, the cord is readily colonized and infected by pathogenic organisms (Bennet & Adetunde, 2010 [9]). Therefore, mothers who adopt clean cord management will by implication contribute to the survival of the neonates and prevent neonatal death from infections such as omphalitis, neonatal tetanus and septicaemia (Bemor & Uta, 2011; Bennet & Adetunde, 2010 [5, 9]).

Nigeria has one of the highest infant mortality rates of 94 deaths/1,000 live births (WHO, 2009 [1]). According to the report, 26% was due to umbilical infection (Peter & Johnson 2010; WHO, 2009 [2,1]). Several hospital-based studies have reported cases of umbilical cord infections. For instance, in Port Harcourt Rivers State, umbilical cord infection accounted for 10% of neonatal admissions and 30% of neonatal deaths (Antai & Effiong, 2009 [10]). A review of umbilical infection in Ibadan, Southwest Nigeria showed that it accounts for 18% of neonatal deaths (Bennet & Adetunde, 2010 [9]). In Calabar South Local Government of Cross River State, 49% of neonatal deaths were due to umbilical cord infection while the condition was responsible for 19% of all newborn admissions (Antai & Effiong, 2009 [10]). Many of the neonatal deaths occur at home and therefore unseen and unaccounted for in official statistics (Ambe, Bello, Yahaya & Omotara, 2010;, Green, Udoh & Peters ,2008; Garner, 2006; [11-13]). This study therefore addressed umbilical cord care and management outcome among mothers in Calabar South Local Government Area of Cross River State, Nigeria.

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MbETHODS

Study design, area and period

A cross sectional community based study was conducted in Calabar South Local Government Area of Cross River State, Nigeria. Calabar South is one of the two Local Government Areas that make up Calabar Metropolis with 11 wards. Women of child bearing age were used as population of the study.

Sampling

The sample was drawn from the population of Calabar South Local Government Area which is 191,630 (NPC,2006 [14]) and according to Federal Ministry of Health [15] 22% of the total population are women of childbearing age. Therefore, the target population was computed to be 42,159. The minimum sample size of 451 was calculated using the formula for estimating a single finite proportion. (Isangedihi et al, 2004 [16])

$$n = \frac{Z^2 P (1 - P)}{d^2}$$

The probability (P) of.12% found in a cord management survey among mothers in Nigeria was used (Ambe, et al, 2010 [11]). Since the population of the 22 Clans could not be traced individually an equal percentage allocation was done in selecting the number of respondents for each clan. These, in proportion to the total sample size for the study gave a sample of 21 to each clan. To reach each of the respondents, a snow ball (networking) method was used putting into consideration the inclusion criteria such that when the first respondent was correctly identified she helped to identify other respondents. The first contacts were made at Health Centers and in churches. The names, addresses and telephone numbers of the mothers who consented to participate in the study were obtained to enable the researchers link up with other respondents in their homes.

Data collection

The instrument for data collection was a pretested interviewer administered questionnaire developed by the researchers based on extensive literature search on the topic. The questionnaire was developed strictly based on extensive literature search on umbilical cord management and stated objectives. The questionnaire was divided into four sections. Section A was strictly on demographic information made up of ten questions. Section B comprised six questions on substances used for umbilical cord management. Section C comprised one question on reasons for choice of materials for cord management. Section D consisted of five questions on outcome of care. The questionnaire was made up of both close and open-ended questions. The close ended questions enabled the respondents to choose from available options while the open-ended questions allowed them to express their own ideas in their own words. The respondents were expected to choose and tick the options that best described their practice on the issue. A total of 22 items were generated.

To establish reliability of the instrument, it was pilot-tested on 50 mothers randomly selected from Quo Calabar Municipality who were not part of the study group using a test retest method. The data obtained were analyzed using Pearson Product Moment Correlation Coefficient. A

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reliability coefficient of.99 was obtained which indicated that the instrument (questionnaire) was reliable and appropriate for the study.

Data quality control and collection

A one-day-training was conducted for five research assistants (registered nurses) on the purpose of the study and selection of respondents. The training involved 40 minutes discussion on the objectives of the study, contents of the instrument and how to interview the respondents using the instrument. Objectivity and confidentiality on information gathered were emphasized. Data collectors were requested to adhere strictly to contents of the instrument for data collection and entering. The interviewer administered questionnaires were administered to the first contacts who met the inclusion criteria in their homes. These first contacts helped in identifying the other respondents in their homes until the sample size was completed in each clan. Literate respondents were given copies of the questionnaire to fill. Respondents who could neither read nor write were helped to complete the questionnaire. The distribution and retrieval of the questionnaire from the respondents in the 22 clans lasted for five months.

Data analysis

Relevant descriptive statistics were used to summarize the findings. Descriptive statistics involving frequency, percentages, mean and standard deviation were used to present the data. All analyses were performed using the computer software programme statistical package for social sciences (SPSS) version 18 computer software programme (SPSS inc., IL: Chicago, USA).

Ethical consideration

Ethical approval to carry out the study was obtained from Cross River State Ministry of Health Research Ethics Committee (Ref. No. MOH/ADM/744. vol.1). All participants were fully informed of the objective and design of the study and a written consent was obtained for each participant before participating in the study. Respondents were assured that confidentiality and anonymity will be maintained in all information given.

RESULTS

Results

Socio-demographic characteristics (Table 1)

Out of 451 questionnaires distributed, 450 were correctly filled and returned for analysis giving a response rate of 99.7%. About 238 (52.9%) respondents were between the age bracket of 26-36 years with a mean age of 26 (12.0) years. A greater proportion of the respondents 390 (86.7%) were married, 444 (98.7%) Christians, 188 (41.8%) had secondary education while 156 (34.7%) were engaged in petty trading (Table 1)

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Table 1 Socio-demographic Characteristics of Respondents
n = 450

Variables	Category	Frequency	Percent
Age (in years)	15-25	196	43.6
	26-36 x = 26, SD =12	238	52.9
	37-47	16	3.6
	Total	**450**	**100.0**
Marital status	Married	390	86.7
	Single	60	13.3
	Divorced	0	0
	Separated	0	0
	Widowed	0	0
	Total	**450**	**100.0**
Religion	Christianity	444	98.7
	Moslem	6	1.3
	Traditionalist	0	0
	Total	**450**	**100.0**
Educational attainment	None formal education	14	3.1
	Primary	70	15.6
	Secondary	188	41.8
	Tertiary	178	39.6
	Total	**450**	**100.0**
Occupation	Petty Trading	156	34.7
	Civil servant	92	20.4
	Student	80	17.8
	Applicant	76	16.9
	Housewife	30	6.7
	Farming	12	2.7
	Hair dressing	4	0.9
	Total	**450**	**100**
Income per month	N18,000	316	70.2
	N19,000-30,000	87	19.3
	N31,000 and above	4	10.4
	Total	**450**	**100**

The study assessed the materials used for umbilical cord management. The result shows that 279 (62 %) used cord clamp to tie the umbilical cord, 187 (41.6%) indicated that sterile scissors/surgical blades were used to separate the cord while 224 (49.8%) respondents said methylated spirit was used to clean the cord. However, a large percentage of the respondents 314 (69.8%) applied substances to the stump after cleaning.. With regards to various materials added, "*Ndodop''* was commonly used by the respondents accounting for 105 (23.3%), saliva

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mixed with salt and sand 79(17.6%), herbal preparations 40(8.9%) including Tooth paste *"Close Up"* was used by 16 (3.6%) of the respondents (Table 2).

Table 2: Materials Used for umbilical Cord management **n = 450**

Variables	Options	Frequency	Percent
Materials used in tying the umbilical cord	Cord clamp	279	62.0
	Hair thread	13	31.8
	twine	12	2.7
	String of cloth	8	1.8
	Bandage	8	1.8
	Total	**450**	**100.0**
Instrument(s) used to separate baby from mother	Knife	187	41.6
	Razor blade	165	36.7
	Sterile Scissors/Surgical	94	20.9
	blade	4	0.8
	Farm instrument	4	0.8
	No idea		
	Total	**450**	**100.0**
Material(s) used in cleaning the umbilical cord stump	Alcohol (methylated	224	49.8
	spirit)	88	19.6
	Dettol solution	44	9.8
	Saliva and salt	44	9.8
	Herbal preparation	42	9.3
	Hot water	4	0.9
	Saliva only	4	0.9
	Salt solution		
	Total	**450**	**100.0**
Applied substance(s) to the stump after cleaning	Yes	314	69.8
	No	136	30.2
	Total	**450**	**100.0**
Substances applied to the stump	Nothing else was applied	136	30.2
	"Ndodop''	105	23.3
	Saliva mixed with salt and	79	17.6
	sand	40	8.9
	Herbal preparation	36	8.0
	Breast milk	21	4.5
	Palm Kernel oil	16	3.6
	Tooth paste ' Close up'	6	1.3
	Penicillin ointment	3	0.6
	Dusting powder	6	1.3
	Rub/menthol	2	0.4
	Gentian violet	**450**	**100.0**
	Total		

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The main reason for the choice of materials used for umbilical cord management was to wade off evil spirits and hasten cord separation as reported by 270 (55.9%) respondents. Other reasons given were to prevent "*Ibio okop"* by 185 (38.3%) of the respondents, 80 (16.6%) to prevent neonatal tetanus "*odon*", 61 (12.6%) to prevent infection, while 56 (11.6%) used the various substances due to pressure from family members (Table 3).

Table 3: Reason for Choice of Materials used for Umbilical Cord Management n= 450

Variables	Options	Frequency	Percent
Reasons for choice of materials used for umbilical care	To wade off evil spirits and hasten cord separation	270	55.9
	Prevent "Ibio okop"	185	38.3
	Prevents neonatal tetanus "Odon"	80	16.6
	Prevents infection	61	12.6
	Pressure from family members	56	11.6
	Prevents failure to thrive "Akpa"	6	1.2
	Stop " after birth pains''	6	1.2
	Very effective and hasten cord separation	4	0.8
	Total	**450**	**100**

For the outcome of umbilical cord care management, result shows that, 338 (75.1%) observed abnormal changes which were regarded as signs of infection in their babies while 112 (24.9%) did not. On how the problems were resolved 133 (39.3%) gave home based care while 122 (36%) reported to health facilities. With reference to the duration before medical attention, only 5 (4%) reported within 24hours of onset of the problem. With regards to home neonatal deaths, 115 (25.6%) out of the 450 respondents said they lost their babies at some point during the neonatal period (first 6 weeks of life). On the causes of death, 84 (73%) was related to umbilical infections (Table 4).

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Table 4: Management outcome of umbilical cord care **n=450**

Variables	Options	Frequency	Percent
Observed abnormal changes while treating the cord stump	Yes	338	75.1
	No	112	24.9
	Total	**450**	**100.0**
Approach to resolving the problem	Child taken to patent medicine dealer	16	5.0
	Child taken to health facility	122	36.0
	Child taken to TBA/traditional healer	62	18.3
	Child taken to church	5	1.4
	Cared for at home	133	39.3
	Total	**338**	**100.0**
Duration of problem before reporting to health facility	Within 24hours	5	4.1
	2 – 3 days	37	30.3
	4 – 6 days	65	63.3
	7 days and above	15	12.2
	Total	**122**	**100.0**
Other things observed on the baby	Persistent fever	146	43.2
	Twitching of whole body, unable to open mouth/suck	40	11.8
	Difficulty in breathing	20	6.0
	Nothing else	132	39.0
	Total	**338**	**100.0**
Did any baby die within first 6 weeks of life	Yes	115	25.6
	No	335	74.4
	Total	**450**	**100.0**
Causes of neonatal death	Did not cry immediately after birth	29	25.2
	Cried excessively, unable to open mouth/suck.	52	45.2
	Purulent discharge from cord stump	32	27.8
	Congenital malformation	2	1.7
		115	**100**

DISCUSSION OF FINDINGS

Findings from the current study showed that cord clamps and surgical blades/scissors were used in cord management which indicate good cord care practice. Methylated spirit was also widely used by respondents in umbilical cord care. These findings may be linked to the fact that the majority of the mothers delivered their babies in hospitals, where clean cord care is practiced. This percentage of hospital delivery as reported from this study may have been influenced by the free maternal and child health services introduced by the Cross River State Government since 2009. The result however, indicated that the majority of the respondents also applied other substances to the umbilical cord after being discharged from the hospital.

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These practices are more often very harmful as they are contaminated with bacteria and spores thus increasing the risk of umbilical cord infection particularly neonatal tetanus which accounts for more than 52% of neonatal deaths in developing countries (Jeol-Madewase et, al, 2008 [17]). These findings are in agreement with Sneeramaraddy et, al. (2006 [7]]) who documented that babies delivered in hospitals may be affected by traditional practices after discharge as care of the cord during neonatal period is provided by the mother and mother in-law. The findings from this study is also in line with the report of Bang and Andem (2011 [18]) and Ambe et, al (2010 [11]) who reported the use of native and various forms of herbal preparations in cord care.

It is worthy to note that some of the respondents used 'close up" tooth paste as one of the substances in their cord management. Although the percentage is low, there is no literature related to this, thus making it very significant in neonatal health. It is pertinent therefore, to assess the active ingredients in close up tooth paste in relation to neonatal umbilical care and neonatal health in general to prevent any adverse effect and poor neonatal outcome.

Reasons for choice of materials used for cord management revealed that majority of the respondents used it to wade off evil spirit and hasten cord separation. This could be linked to their cultural orientation and belief system. Traditional beliefs about child birth, misconception, myths and fear of neonatal death could have largely influenced mothers' decision to use various materials in cord management to hasten cord separation. This is in consonance with Waise and Kaikoba (2008 [19]) who reported that the use of various materials are believed to help the cord dry and separate faster within 3 days and save the neonate from evil spirit which they believe causes neonatal death. This is similar to the report of Okedo, Nelson and Lawal (2010 [20]) where the influence of cultural beliefs and traditional practices were implicated in cord management and separation time. Whatever the reasons, unhygienic cord care is a risk behavior which can lead to neonatal infection and death as the umbilical vessels are still patent for a few days after birth, thus making umbilical cord a common route of entry for systemic infection in the newborn.

On management outcome, majority of respondents reported that there were cord infections which were evidenced by fever, red skin around base of cord, yellowish discharge from cord, foul smell from cord, pain when skin around the cord was touched. These findings are consistent with the findings of Benson and White (2006 [21]) who reported that a high proportion of cord infection was recorded among neonates who had topical application of native and herbal preparation on umbilical cord. It is also similar to the findings of Meberg and Brown (2007 [22]) that majority of omphalitis was observed in babies with unhygienic cord care. Alam and Murray (2008[23]) also reported umbilical infection among neonates whose umbilical cords were dressed with unhygienic materials.

However, only few respondents reported the infection to the health facilities within 24 hours of the onset.. Majority of the respondents managed the cord infection at home with culturally recommended therapies. This finding is consistent with the findings of Muella and Johnson (2009 [25]) where only 2% of mothers reported umbilical cord infection to the clinic within 24 hours and more than 68% managed the cord infection at home. This finding explained the high neonatal morbidity and mortality rates in the study area. Thus, the proportion of neonates with severe umbilical infections and deaths could be reduced if appropriate education is given to mothers on cord management and separation time to prevent anxiety.

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Majority of the umbilical cord fell off within 3-4 days contrary to WHO (2006 [24]) report of between 5 and 15 days. The study also revealed that only few of the navels healed within the recommended interval of one month and six weeks. It could be that the infection interfered with the healing process, providing direct access to systemic infection (Benor & Uta, 2011 [5]).

CONCLUSION

Majority of the respondents applied harmful and contaminated materials/ substances to the umbilical cord. Major reason for choice of materials was to wade off evil spirit which the respondents believed caused neonatal death. Management outcome was poor as majority of the umbilical cords were infected. Good umbilical cord care practices can lead to improved newborn care while poor umbilical cord care practices could result in neonatal morbidity and mortality. Improving the standard of umbilical cord care among mothers can largely be achieved through health education and follow up visit by nurses after discharge from the health facility.

Competing Interests

The authors declare that they have no competing interests

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