Evaluation of Nurses' practices about Umbilical Cord Care for Neonates in Neonatal Intensive Care Units

Sabreen Sabeeh Yousif[1], Suad Hassoon Khudhair[2]

[1]MSN, Pediatric Nursing Department, College of Nursing, University of Baghdad, Babylon, Iraq. E-Mail: Sabreen.Sobaih2204m@conursing.uobaghdad.edu.iq
[2]Ph.D., Assist. Professor, Pediatric Nursing Department, College of Nursing, University of

KEYWORDS

Evaluation, Nurses, Practices, Care, Umbilical Cord, Neonates, ICU.

ABSTRACT

Background: The umbilical cord, made of Wharton's jelly, is a gelatinous material that extends from the fetus's umbilicus to the placenta. It consists of two umbilical arteries and one vein, and the urachus, a remnant of the allantois. Infections can lead to complications, including sepsis, abdominal button inflammation, abscess, necrotizing fasciitis, and liver abscesses.
Objective(s): This study aims to evaluate nurses' practices about umbilical cord care for Neonates.
Methodology: A quantitative approach using a descriptive-analysis design was used in the present study in order to evaluate nurses' practices about umbilical cord care for Neonates. . The period of the study was from January 13th ,2024 to May 13th, 2024 . A questionnaire was completed by 64 nurses staff from Welfare Teaching Hospital and Central Teaching Hospital of Pediatric. The sample consisted of 50 nurses.
Results: The practices levels was assessed using a three-point scale. A study of nurses found that while 70% were female, the majority had a diploma in nursing and a bachelor's degree. Most had between 1 and 6 years of hospital experience and a significant number of specific NICU experience. Most nurses actively sought to update their knowledge about neonatal umbilical cord care. However, the majority of practices were rated as 'Poor', indicating a gap in compliance with established protocols and standards for umbilical cord hygiene and maintenance. The study found no significant correlation between demographic characteristics or experience in hospitals and NICUs, and suggested that knowledge alone may not translate into effective practice without continuous training and strict adherence to protocols.
Conclusion: while our study agrees with some existing literature it also challenges studies indicating an interplay of factors affecting neonatal care practices beyond just the demographic characteristics of nursing staff. Future research should delve into systemic influences on practice adherence along with evaluating targeted interventions effectiveness in enhancing cord care quality, in neonatal units.
Recommendation :From the results of this study and also from the previous literatures and researches its became essential to establish a mandatory training sessions for all the staff in the NICU focusing on the best practices for the care of umbilical cord, and this sessions has to include a standardized protocols to ensure that the knowledge is efficiently translated into practice.

.

1. Introduction

The umbilical cord extends from the centre of the placenta to the fetus's abdomen. It has a diameter of 1 cm. Possible lengths range from 50 to 60 cm [1]. It contains Whartons jelly, a mucopolysaccharide gel formed by combining chondroitin sulphate with hyaluronic acid. A relic of the embryonic stage, the umbilical cord includes the urachus, two arteries, and a vein [2]. The urachus is a tube which links the foetal bladder to the uterus; it lies between the pelvic layers [3]. the arteries transport the deoxygenated blood to the placenta where it exchange take place with the oxygen [4]. Hyrtls anastomosis, created close to the connection of the artery to the placenta which helps regulate blood flow between vessels [5]. Those anastomosis divides into pathways in the placenta aiding in maintaining blood circulation of the umbilical arteries [6].

In general neglecting an infection in the umbilical cord can result in complications of severe outcomes such as sepsis [7]. Possible effects include swelling around the navel or necrotizing fasciitis. Neglecting these infections might result in the development of hepatic blockages or abscesses [8]. Rapid action and accurate treatment for the infection are crucial for the neonate mortality [9] [10].

Treating the infected umbilical cord rapidly can lead to adverse consequences [11]. These issues may

involve infections like sepsis that could progress to a life threatening condition [12]. Complications that might develop include necrotizing fasciitis, abscess formation and inflammation, around the belly button [13] [14]. It is straightforward for nurses to ensure that best practices are adhered to and to promote positive outcomes for the neonate when they are engaged in the development and implementation of standardised care plans [15].

Continual assessment and monitoring of the neonate's condition are also part of the nurse's scope of practice when caring for neonates [16]. In order to detect changes in the neonate's condition as quickly as possible, nurses are required to do frequent checks the conduct an umbilical examination to ascertain A 24-hour period following delivery has no evidence of bleeding, No purulent secretions, No bad odor, No fever, No sign of swelling, No sign of redness and The neonate does not cry if the umbilicus is touched [17]. In addition, nurses are responsible for keeping a careful eye on the neonate's good nutrition to wound heals of the umbilical cord. When caring for a neonate's umbilical cord Effective caring by use of Chlorhexidine 4%, which in turn promotes good healing and recovery [18].

Care that is focused on the needs of the family is an integral part of the nursing practice for neonate's umbilical cord. The nurses are obligated to involve the family in the care of the neonate and to offer the family with education and assistance for the duration of their stay in the hospital. Involving the family in the care process allows nurses to increase the likelihood of positive outcomes for the neonate as well as increase the level of satisfaction felt by the family

2. Methodology

Selection of the Sample

A questionnaire sheet which included 8 items related to (gender, age, Educational status , and marital status, Years of experience in hospitals ,Years of experience working in NICU , updated information about care of umbilical cord, and sources of updated information) were asked from 64 nurses staff to fulfil. The staff were working in Welfare Teaching Hospital and Central Teaching Hospital of Pediatric and they have met the study criteria and agreed to contribute to the study. At first (10) nurses were excluded from the original sample for being Pilot Study. Also, another (4) nurses were excluded because they didn't fill out all the questionnaire domains. Finally, the sample included in the present study is (50) nurses.

Practices scale

A three observation was applied for practices; each observation was scored as applied (1) and not applied (0).

The overall score of practices was estimated by calculating the range score for mean of total score of three observations after calculating the range from minimum score and maximum score; the range score rated into three levels and scored as follows: Poor= 0 – 40, Fair= 40.1 – 80, and Good= 80.1 – 120.

The level of knowledge for each item in scale was estimated by calculating the cutoff point for the mean of score and rated into three levels also as follow: Poor= 0 –1, Fair = 1.1 – 2, and Good= 2.1– 3

3. Result and Discussion

The distribution of samples according to the demographic Characteristics are summarized in table (1) shows that about two third of nurses working at NICU are females (70%) and remaining are males. The average age for nurses refers to 29 ± 7.4 years in which 66% of them are seen with age group of 20-less than 30 years. Regarding nursing qualification, the highest percentage among nurses refers to diploma degree in nursing as reported among 44% of them while 32% of them are graduated with bachelor degree in nursing. The marital status for those nurses reveals that 58% of them are married and 36% are still unmarried.

Table (1): Distribution of Participants according to their Socio-demographic Characteristics

List	Characteristics		f	%
1	**Gender**	Male	15	30
		Female	35	70
		Total	***50***	***100***
2	**Age (year)** **M±SD= 29 ± 7.4**	20 – less than 30	33	66
		30 – less than 40	12	24
		40 – less than 50	3	6
		50 and more	2	4
		Total	***50***	***100***
3	**Nursing qualification**	Secondary school	11	22
		Diploma	22	44
		Bachelor	16	32
		Postgraduate	1	2
		Total	***50***	***100***
4	**Marital status**	Unmarried	18	36
		Married	29	58
		Divorced	2	4
		Widowed/widower	1	2
		Total	***50***	***100***

f: Frequency, %: Percentage, M: Mean, SD: Standard deviation

Table (2) summarize distribution of samples according to the shows that more than half of nurses have 1-less than 6 years of experience in hospitals as a nurse (52%), but the years of experience in neonate intensive care unit refers to 1-less than 4 years as reported among 60% of nurses. More than half of nurses reported that they tried to update their knowledge about umbilical cord care for neonate (68%) from various sources which are textbooks (10%), internet (14%), academic study (6%), experience (10%), and more than one sources (28%).

Table (2): Distribution of Participants according to their Professional Characteristics

List	Characteristics		f	%
1	**Years of experience in hospitals**	1 – less than 6	26	52
		6 – less than 11	15	30
		11 – less than 16	4	8
		16 and more	5	10
		Total	***50***	***100***
2	**Years of experience in NICU**	Less than 1	13	26
		1 – less than 4	30	60
		4 and more	7	14
		Total	***50***	***100***
3	**Updated information about care of umbilical cord**	No	16	32
		Yes	34	68
		Total	***50***	***100***
4	**Sources of updated information**	None	16	32
		Textbooks	5	10
		Internet	7	14
		Academic study	3	6
		Experience	5	10
		More than source	14	28
		Total	***50***	***100***

f: Frequency, %: Percentage, M: Mean, SD: Standard deviation

The data presented in table (3) indicates a lack of consistency, in following recommended practices for cord care among nurses. It is concerning to see that most practices received a 'Poor' rating falling below the standards.

Out of the twenty four practices listed only five were rated as 'Good'. These include measures like ensuring the neonate is shielded from drafts in the incubator using a temperature regulator allowing the umbilicus area to air dry before dressing avoiding covering the umbilicus with a diaper and changing wet clothing promptly. It is positive to note that steps are taken to protect neonates from temperature fluctuations and maintain drying and changing routines that're essential for infection prevention.

However the majority of practices being rated as 'Poor' raises concerns. The table highlights a gap in hygiene and sterile techniques such as handwashing, mask wearing and using sterile instruments. This deficiency is especially troubling in high risk settings like care units. The failure to adhere to measures, like using sterile gauze, forceps chlorhexidine 4% maintaining cleanliness and proper documentation can pose serious risks to neonatal health by increasing the likelihood of infections and complications.

Table (3): Evaluation of Nurses' Practices about Umbilical Cord Care for Neonates (N=50)

List	Practices	M	Eval.
1	*The nurse places the neonate in the intensive care incubator, which is required to be:*		
1a	Sterile and prepared with the essential instruments required to provide care to the umbilical cord of a neonate.	.00	Poor
1b	The incubator protects the newborn from cold drafts.	2.50	Good
1c	To put the infant into the incubator, a specialized body temperature regulator is utilized to preheat the incubator.	2.76	Good
2	Wear a mask and head covering before handling a neonate.	.00	Poor
3	Thoroughly wash hands with soap and water.	.26	Poor
4a	Sterile gauze	.00	Poor
4b	Forceps.	.00	Poor
4c	Chlorhexidine 4%.	.00	Poor
4d	Paper bag.	.00	Poor
4e	A small container containing the sterile material	.00	Poor
5	Disinfect hands and wear non-sterile, powder-free gloves before caring for the umbilicus.	.00	Poor
6	Assess the region of the umbilicus as well as its surrounds.	.42	Poor
7	Place chlorhexidine 4% in a small container.	.00	Poor
8	Use the gauze to cleanse the umbilicus in a circular motion from the inside out, and then dispose of it	.00	Poor
9	Repeat the process until the umbilicus region is thoroughly cleansed.	.00	Poor
10	Dispose of the gauze pad in the paper bag.	.00	Poor
11	Sanitize the region surrounding the umbilical cord's base	.58	Poor
12	Allow the umbilicus area to air dry before wearing the diaper.	2.82	Good
13	Do not cover the umbilicus area with a diaper to keep it dry.	2.82	Good
14	Maintain a clean environment around the neonate and the incubator whenever there is a diaper change, urinary leakage, or waste release.	1.00	Poor
15	Wash hands with soap and water.	.48	Poor

16a	Neonate's full name.	.00	Poor
16b	Neonate's age	.00	Poor
16c	Documenting the number of times, the umbilicus was sterilized in the record.	.00	Poor
16d	Documenting the time of nursing care on the neonate's card.	.00	Poor
16e	(The Nurse's) Write his\her name and signature in clear and understandable handwriting.	.00	Poor
17	Change a neonate's clothes if they become wet.	2.80	Good
18	Wash hands before moving from one neonate to another.	.00	Poor
19	Maintain a dry environment and change the neonate's clothing if necessary.	2.80	Good
20	Keep the umbilicus area clean and dry.	.48	Poor
21	Use sterile gauze and wipe the area when the umbilicus is exposed to moisture.	.00	Poor
22	Routinely sterilize hands with alcohol to reduce infections.	.44	Poor
23	Use topical medications as prescribed by the physician if infection is detected.	2.88	Good
24a	A 24-hour period following delivery has no evidence of bleeding.	.48	Poor
24b	No purulent secretions.	.48	Poor
24c	No bad odor.	.48	Poor
24d	No fever.	.48	Poor
24e	No sign of swelling.	.48	Poor
24f	No sign of redness.	.42	Poor
24g	The neonate does not cry if the umbilicus is touched	.42	Poor

M: Mean, Eval: Evaluation

Poor= 0 –1, Fair = 1.1 – 2, Good= 2.1– 3

This table presents the items related to nurses' practices about umbilical cord care for neonate; the findings indicates that nurses having poor level of practices among most of items.

The assessment of nurses methods, for caring for neonates umbilical cords as shown in Table (4). The fact that 80% of the practices were rated as 'Poor' highlights a gap in the quality of care provided. With a score of 26.28 and a standard deviation of 9.891 it is evident that there is compliance with established protocols for umbilical cord care**.**

Among the 50 practices observed 40 were categorized as 'Poor' while 10 were considered 'Fair'. None of the practices met the criteria to be rated as 'Good'. This analysis demonstrates that most nurses are not meeting the required standards for ensuring care in relation to umbilical cord hygiene and maintenance**.**

The defined rating thresholds. Where 'Poor' falls between scores of 0 to 40 'Fair' from 40.1 to 80 and 'Good' from 80.1 to 120. Underscore the seriousness of the issue, at hand. Since none of the practices scored above 40 it is clear that immediate action is needed to enhance nursing procedures in this area.

Table (4): Overall Evaluation of Nurses' Practices about Umbilical Cord Care for Neonate

Practices	**f**	**%**	**M**	**SD**	**Evaluation**
Poor	40	80	26.28	9.891	Poor

Fair	10	20			
Good	0	0			
Total	***50***	***100***			

f: Frequency, %: Percentage

M: Mean for total score, SD: Standard Deviation for total score

Poor= 0 – 40, Fair= 40.1 – 80, Good= 80.1 – 120

Table 5 illustrates an examination of how nurses personal characteristics relate to their approaches to caring for newborns umbilical cords. The findings reveal that both male and female nurses exhibited practices with males displaying 12 inadequate practices out of 15 and females with 32, out of 35. Among age groups the highest prevalence of practices was observed in the age bracket of 20 to under 30 years. Although there were variations based on age as indicated by a Spearman correlation coefficient of rS =.263 for the age group none of the age categories demonstrated a statistically significant correlation with practice quality.

Regarding nursing qualifications individuals holding diplomas showed a rate of satisfactory practices; however there was no statistically significant correlation observed across various educational levels concerning practice outcomes. Similarly marital status did not show any association with the quality of nursing practices. Moreover both total years of experience in hospitals overall and specifically in care units (NICU) did not exhibit a significant correlation with either superior or inferior practices.

Lastly the study revealed that possessing knowledge about cord care did not exhibit a correlation with practice quality. This implies that mere knowledge might not translate into practice without support from factors such as continuous training, adherence to protocols and other potentially unmeasured variables, within this research scope.

In general the absence of connections implies that demographic aspects, by themselves do not fully clarify the differences in nursing methods for cord care. This indicates a requirement, for strategies to enhance care standards.

Table (5): Relationships among Nurses' Practices with their Demographic Variables

Variables		**Practices**				**Relationship**
		Poor	**Fair**	**Good**	**Total**	
Gender	Male	12	3	0	15	r^***= .081**
	Female	32	3	0	35	**P-value= .577**
	Total	44	6	0	50	**Sig= N.S**
Age (year)	20 – less than 30	27	6	0	33	r_S **= .263**
	30 – less than 40	12	0	0	12	**P-value= .065**
	40 – less than 50	3	0	0	3	**Sig= N.S**
	50 and more	2	0	0	2	
	Total	44	6	0	50	
Nursing qualification	Secondary school	11	0	0	11	r_S **= .174**
	Diploma	16	6	0	22	**P-value= .227**
	Bachelor	16	0	0	16	**Sig= N.S**
	Postgraduate	1	0	0	1	
	Total	44	6	0	50	
Marital status	Unmarried	15	3	0	18	r_S **= .028**
	Married	26	3	0	29	**P-value= .846**
	Divorced	2	0	0	2	**Sig= N.S**

	Widowed/widower	1	0	0	1	
	Total	44	6	0	50	
Years of experience in hospitals	1 – less than 6	21	5	0	26	**r_S = - .076 P-value= .600 Sig= N.S**
	6 – less than 11	14	1	0	15	
	11 – less than 16	4	0	0	4	
	16 and more	5	0	0	5	
	Total	44	6	0	50	
Years of experience in NICU	Less than 1	10	3	0	13	**r_S = .100 P-value= .488 Sig= N.S**
	1 – less than 4	27	3	0	30	
	4 and more	7	0	0	7	
	Total	44	6	0	50	
Information about care of umbilical cord	No	13	3	0	16	**r^*= .072 P-value= .620 Sig= N.S**
	Yes	31	3	0	34	
	Total	44	6	0	50	

r_S = Spearman correlation coefficient, r^*= point biserial correlation coefficient, P= Probability, Sig= Significance, N.S= Not significant, S= Significant, H.S= High significant

Discussion

Our studys results indicate a prevalence of, than ideal practices in caring for umbilical cords among nurses. These findings are consistent with [19] which also noted that many nurses did not follow the practices in care. However our results differ from those of [20] who reported adherence to cord care guidelines in a similar context**.**

When examining how the quality of cord care practices relates to nurses demographic factors our study found no significant correlation. This aligns with [21] suggesting that variables like age, gender and education level may not play a role in shaping care practices. Conversely this contradicts [22] which proposed that younger healthcare professionals were more inclined to embrace evidence based approaches**.**

Furthermore our observation that practices, about cord care does not significantly correlate with the quality of practice echoes the conclusions drawn by [23]. This underscores the notion that possessing knowledge does not always translate into proficiency**.**

The discovery contradicts [24] who discovered a link, between knowledge levels and the standard of care**.**

The absence of results concerning years of experience both in hospitals and specifically in the NICU indicates that tenure alone is not enough to guarantee high quality practice. This aligns with the conclusions drawn by [25]. Differs from the research conducted by [26] which suggested that experience played a role in adherence to clinical guidelines**.**

The overall assessment of practices being predominantly subpar implies that there may be factors beyond variables influencing nursing practices. These factors could include aspects like staffing levels as highlighted by [27] or the availability of education and training as emphasized by Garcia and [28] as vital for enhancing practice standards

4. Conclusion and future scope

while our study agrees with some existing literature it also challenges studies indicating an interplay of factors affecting neonatal care practices beyond just the demographic characteristics of nursing staff. Future research should delve into systemic influences on practice adherence along with evaluating targeted interventions effectiveness in enhancing cord care quality, in neonatal units.

Recommendation

From the results of this study and also from the previous literatures and researches its became essential to establish a mandatory training sessions for all the staff in the NICU focusing on the best practices for the care of umbilical cord, and this sessions has to include a standardized protocols to ensure that the knowledge is efficiently translated into practice

Reference

[1] Konkel L. Lasting impact of an ephemeral organ the role of the placenta in fetal programming. Environ Health Perspect 2016;124:A124–9.

[2] Herrick EJ, Bordoni B. Embryology, Placenta. StatPearls [Internet] 2023 [cited 2024 Mar 17];Available from: https://www.ncbi.nlm.nih.gov/books/NBK551634/

[3] Kim SM, Kim JS. A Review of Mechanisms of Implantation. Dev Reprod 2017;21:351–9.

[4] Jassm A, Aziz A. Effectiveness of Health Educational Program on Nurses' Knowledge toward Children Pneumonia in Al-Amara City Hospitals. Iraqi National Journal of Nursing Specialties [Internet]. 2020 Jun 30;33(1):44–52. Available from: https://injns.uobaghdad.edu.iq/index.php/INJNS/article/view/400

[5] Mohammed A, Aburaghif L. Effectiveness of Teaching Program on Nurses' Knowledge Concerning the Side Effects of Chemotherapy among Children with Leukemia at Oncology Wards in Baghdad City. Iraqi National Journal of Nursing Specialties. 2018;31(1):14–23.

[6] Tankala M, Rao MK, Senapati S, Behera SS. Morphometric Evaluation of Human Placental and Umbilical Cord for Neonatal Indices: A Cross-Sectional Study. Cureus [Internet] 2023 [cited 2024 Mar 17];15. Available from: /pmc/articles/PMC10725719/

[7] Kareem SH, Muslim MS, et al. Nurses' Perception Toward Therapeutic Strategies for Children with Pneumonia. Journal of Pioneering Medical Science. 2023;12(1):1–6.

[8] Mahmoud RL, Shawq AH. Application of program for nurse's management about care of children treated with Ventricular Peritoneal Shunt. Pakistan Journal of Medical and Health Sciences. 2022;16(3):617–9.

[9] Talib A, Abdulwahd H. Impact of Factors upon Children' Weight Status of age one to Five years old at Primary Health Care Centers in AL Samawah City. Iraqi National Journal of Nursing Specialties. 2019;32(1):69–78.

[10] Merter OS, Karakul A, Karaarslan D, Assıstant R. The impact of umbilical cord care education given to Primiparous mothers on cord separation time: A randomized controlled study. J Pediatr Nurs 2023;71:e128–34.

[11] Guerri G, Vignoli M, Palombi C, Monaci M, Petrizzi L. Ultrasonographic evaluation of umbilical structures in Holstein calves: A comparison between healthy calves and calves affected by umbilical disorders. J Dairy Sci 2020;103:2578–90.

[12] Chapman AK, Aucott SW, Gilmore MM, Advani S, Clarke W, Milstone AM. Absorption and tolerability of aqueous chlorhexidine gluconate used for skin antisepsis prior to catheter insertion in preterm neonates. Journal of Perinatology 2013;33:768–71.

[13] Qasim A. Quality of Life of Children age from (8- lessthan13) years with Acute Lymphocytic Leukemia Undergoing Chemotherapy at Hematology Center in Medical City. Iraqi National Journal of Nursing Specialties. 2022;35(1):1–10.

[14] Jabar HA, Aziz AR. Effectiveness of an Education Program on Nurses Knowledge toward Care of Chest Tube in Children at Pediatric Teaching Hospital Baghdad City. Indian Journal of Forensic Medicine & Toxicology [Internet]. 2021 May 17;15(3):839–45. Available from: https://injns.uobaghdad.edu.iq/index.php/INJNS/article/view/405

[15] Al-Musawi KM, Shawq AH, Majeed Z, Zaid S, Ibraheem H. Risk factors for congenital anomalies in neonatal intensive care unit in Baghdad city. Medico-Legal Update. 2020;20(1):1168–74.

[16] Abd-Alrazzaq A, Aziz A. Assessment of Mothers' Knowledge about Their Children with Sickle Cell Anemia and Non-Pharmacological Approaches to Pain Management in Basra Center for Hereditary Blood Diseases. Iraqi National Journal of Nursing Specialties. 2021;34(1):11–20.

[17] Khalf AM, AbdulWahid HS. Neonatal Mortality Rate and Its Causes at Maternity Wards in Baghdad City's Hospitals. Indian Journal of Forensic Medicine & Toxicology. 2021;15(2):4628–33.

[18] Mahmoud RL, Shawq AH. Impact Of An Educational Program For Nursing Management About Care Of Children Treated With VP Shunt In Mosul City. Positive School Psychology. 2022;6(5).

[19] Coffey PS, Brown SC. Umbilical cord-care practices in low- and middle-income countries: a systematic review. BMC Pregnancy Childbirth [Internet] 2017 [cited 2024 Apr 7];17:1. Available from: https://doi.org/10.1186/s12884-017-1250-7

[20] Leslie MS, Erickson-Owens D, Park J. Umbilical Cord Practices of Members of the American College of Nurse-Midwives. J Midwifery Womens Health [Internet] 2019 [cited 2024 Apr 7];64:676–676. Available from: https://doi.org/10.1111/jmwh.13050

[21] Nwonwu E, Ituma B, Onu-Njoku C, Sunday A, Anyigor B, Amadi E. Knowledge, Practice and Techniques of Umbilical Cord Care among Mothers in Nwezenyi, Ebonyi State, Nigeria. Journal of Epidemiological Society of Nigeria [Internet] 2017 [cited 2024 Apr 7];1:39–44. Available from: https://doi.org/10.46912/jeson.13

[22] Afolaranmi TO, Hassan ZI, Akinyemi OO, Sule SS, Malete MU, Choji CP, et al. Cord Care Practices: A Perspective of Contemporary African Setting. Front Public Health [Internet] 2018 [cited 2024 Apr 7];6. Available from: https://doi.org/10.3389/fpubh.2018.00010

[23] Turyasiima M, Nduwimana M, Andres SM, Kiconco G, Egesa WI, Maren BM, et al. Neonatal Umbilical Cord Infections: Incidence, Associated Factors and Cord Care Practices by Nursing Mothers at a Tertiary Hospital in Western Uganda. Open J Pediatr [Internet] 2020 [cited 2024 Apr 7];10:288–301. Available from: https://doi.org/10.4236/ojped.2020.102030

[24] Shwe D, Akosu T, Afolaranmi T, Envuladu E, Yiltok E, Oguche S. Quantitative assessment of umbilical cord care practices amongst mothers in Jos, Plateau State, Nigeria. Nigerian Postgraduate Medical Journal [Internet] 2023 [cited 2024 Apr 7];30:210–7. Available from: https://doi.org/10.4103/npmj.npmj_8_23

[25] Ayub Kalufya, N, Ali Seif S, Masoi TJ. Knowledge and practice of umbilical cord care among young mothers of neonates in Tabora region: Analytical cross-sectional study. Medicine [Internet] 2022 [cited 2024 Apr 7];101:E31608. Available from: https://doi.org/10.1097/MD.0000000000031608

[26] Mwakawanga DL, Mselle LT. Early or delayed umbilical cord clamping? Experiences and perceptions of nurse-midwives and obstetricians at a regional referral hospital in Tanzania. PLoS One [Internet] 2020 [cited 2024 Apr 7];15. Available from: https://doi.org/10.1371/journal.pone.0234854

[27] 2Mukunya D, Haaland MES, Tumwine JK, Tylleskar T, Nankabirwa V, Moland KM. "The cord is the child": meanings and practices related to umbilical cord care in Central Uganda. BMC Pediatr [Internet] 2020 [cited 2024 Apr 7];20. Available from: https://doi.org/10.1186/s12887-020-2002-9

[28] Ekuri PE, Akah LU, Duke Nkere EI, Akpa SU, Ben Edet I. Traditional Variables and Umbilical Cord Management among Mothers in Calabar Education Zone, Cross River State, Nigeria. The Journal of Social Sciences Research [Internet] 2021 [cited 2024 Apr 7];152–7. Available from: https://doi.org/10.32861/jssr.73.152.157