

## RESEARCH PAPER

# Knowledge of Essential Newborn Care Among Rural Mothers

Mst Beauty Begum<sup>1</sup>, Kazi Shafiqul Halim<sup>2</sup>, Farzana Hossain<sup>3</sup>

<sup>1</sup>Senior Staff Nurse, Kurmitola General Hospital, Dhaka Cantonment, Dhaka, Bangladesh; <sup>2</sup>Department of Epidemiology, National Institute of Preventive and Social Medicine (NIPSOM), Dhaka, Bangladesh;

<sup>3</sup>Freelance Researcher, Dhaka, Bangladesh

## Abstract

**Background:** Components of essential newborn care and neonatal resuscitation are proven interventions for reducing neonatal mortality and stillbirth.

**Objective:** To assess the level of knowledge of essential newborn care among the rural mothers.

**Methods:** This cross-sectional study was carried out during January - December 2019 in Panchagarh district of the Rangpur division in Northern Bangladesh. A total of 354 rural postnatal mothers were purposively selected for the study. Rural mothers were interviewed with a semi-structured pre-tested questionnaire.

**Results:** The mean age of the mothers was 22.1±3.2 years where 33.1% were illiterate and 83.3% were house wives. Majority of the mothers (76.3%) had taken antenatal care visit, 48.3% delivered their children at home, 70.9% had normal delivery and 56.5% had taken postnatal care. Only few mothers (11.0%) knew about kangaroo cares, 83.9% mothers did not know that baby should be given first bath after 24 hours of birth, 26.3% mothers knew that the umbilical stump of baby should not be covered a cloth/bandage. Majority of the mothers (57.1 %) knew that one should start breast feeding immediately after birth and 62.4 % mothers knew that one should start vaccination just after birth. Less than half of the mothers (41.2 %) knew that one should not use any substance like Kajol to eyes. Majority of the mothers (59.3%) had inadequate knowledge regarding ENC while 40.7% had adequate knowledge. Literate mothers involved in job, family members <6 with monthly family income > 20,000 taka had significantly more adequate knowledge than others ( $p<0.001$ ). Again, mothers who took ANC, delivered their babies at private hospitals, underwent cesarean section and took postnatal care had significantly more adequate knowledge than others ( $p<0.001$ ).

**Conclusion:** Majority of the mothers had inadequate knowledge regarding essential newborn care. Health education and behavioral change communications on essential newborn care are recommended. Health workers should give special emphasis on thermal care by Kangaroo care, naval care and early breast feeding.

**Keywords:** Rural mothers, Newborn care, Knowledge of essential newborn care, Kangaroo mother care

## Introduction

With the arrival to this world, the neonate begins highly vulnerable period in which many psychological and physiological adjustments to life-outside uterus must be made, and if they fail, it leads to mortality and morbidity.<sup>1</sup>

Essential newborn care (ENC) is a comprehensive strategy designed to improve the health of newborns through interventions before conception, during pregnancy, at and soon after birth, and in the postnatal period.<sup>2</sup>

About 45% of under-five deaths and 60% of infant deaths are accounted for the neonatal mortality. Almost all (99%) of these neonatal deaths occur in low income and middle-income countries.<sup>3</sup> Up to two thirds of these deaths could be prevented by practising effective measures at birth and during the first week of life. Most deaths occur in the first 24 hours of life.<sup>4</sup>

In Bangladesh, under-five mortality rate (U5MR) is 32 deaths per 1,000 live births and Neonatal mortality rate (NMR) is 18 deaths per 1,000 live births.<sup>5</sup> There is currently a gap in knowledge of the use of ENC by place of delivery in Bangladesh.<sup>6</sup> Reporting of recommended breastfeeding practices and thermal care was either low or moderate among facility deliveries in Bangladesh. The proportions of women reporting immediate breastfeeding within 1 h and immediate wiping within 10 min among facility

\*Correspondence: Mst. Beauty Begum, Senior Staff Nurse, Kurmitola General Hospital, Dhaka Cantonment, Dhaka, Bangladesh. e-mail: [mstbeauty.5988@gmail.com](mailto:mstbeauty.5988@gmail.com)  
ORCID: 0000-0002-7222-0753

deliveries were 40% and 66%, respectively. The proportion of women reporting delayed bathing for at least 6 h was much higher at 98%.<sup>7</sup> However, this measure, along with wiping within 10 min, is more lenient than the corresponding recommendations, which are wiping within 5 min and delayed bathing for at least 72 hours.<sup>8</sup>

In settings where a majority of births take place at home without a skilled attendant and care seeking rates are low, preventive interventions including promotion of essential newborn care practices is one strategy for improving newborn health outcomes.<sup>9</sup> If the mother is well equipped with the knowledge of ENC, it is believed that, neonatal deaths can be prevented.

The ability to identify knowledge gaps early in the neonatal period would help healthcare workers identify and implement timely and appropriate interventions that would lead to better neonatal outcomes. Therefore, the present study had been designed to assess the level of knowledge of Essential Newborn Care among rural mothers.

### Materials and Methods

This was a cross sectional study conducted during January-December 2019 in Panchagarh district. Data were collected from several villages of Atwari and Boda Upazila of Panchagarh district of the Rangpur division in Northern Bangladesh. Sample size was calculated with the formula of  $n = z^2 p(1-p)/d^2$ . Considering 1.96 desired confidence level, 36.1% of mothers had good knowledge and 5% desired level of precision, the calculated sample size was 354. Therefore, a total of 354 rural postnatal mothers (the first six weeks after child birth) were purposively selected for the study. Mothers having infants who were critically ill were excluded from the study. A semi-structured interviewer-administered questionnaire was used to collect data. The questionnaire had four parts. First part contained questions regarding socio-demographic status which included age, educational status, occupational status, family member, monthly family income, and religion. Second part contained questions regarding child's particulars. Third part contained questions regarding reproductive and maternal healthcare utilisation. Fourth part contained knowledge related questions. There were total 11 questions related to knowledge. There were two questions regarding thermoregulation which had four correct answers, one question

regarding naval care which had two correct answers, three questions regarding breastfeeding which had three correct answers, two questions regarding vaccination which had two correct answers, two questions regarding eye care which had five correct answers, one question regarding danger sign recognition which had ten correct answers.

The statistical analyses were performed using Statistical Package for Social Science (SPSS) version 25 statistical software. Means and standard deviations for continuous variables and frequency distributions for categorical variables were used to describe the characteristics of the total sample. Further, age, family members and monthly family income were converted into categorical variables.

Knowledge was assessed using 'Yes/No' questions on various aspects of newborn care. The values were coded as 1 = Correct response and 0 = Incorrect response. Knowledge was adequate for mothers who responded greater than 50% of knowledge related questions correctly whereas knowledge was inadequate for mothers who responded less than or equal to 50% of knowledge related questions.<sup>10</sup> Associations of categorical variables were assessed using Chi square test. Here,  $p < 0.05$  was considered significant and all  $p$ -values were two sided.

At the beginning, approval was obtained from the ethical committee of NIPSOM, under the Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Then informed written consent was obtained from participants after informing about the purpose of the study. Each respondent was interviewed separately and their privacy and confidentiality were maintained strictly.

### Results

The mean age of rural mothers was  $22. \pm 3.2$  years which ranged from 17-30 years where 53.4% of the rural mothers were from 20-24 years age group others were from up to 19 years (24.0%) and 25 to 30 years (22.6%) age group. Among the rural mothers, 33.1% were illiterate and 16.4% husbands were illiterate. Out of 354 rural mothers, 83.3% were house wives and 16.7% were service holders. Near about one fourth of the rural mothers (26.8%) had 3-4, 38.1% had 5-6 members in the family and 35.1% had >6 members in the family. Monthly family income of the rural mothers was  $15906.78 \pm 7780.98$  taka. Most (80.2%) mothers were multiparous (table I).

**Table-I:** Distribution of respondents by socio-demographic status and child' particulars (n=354)

Criteria	Frequency	Percentage
Age (in years)		
Up to 19	85	24.0
20-24	189	53.4
25-30	80	22.6
Mean $\pm$ SD 22.14 $\pm$ 3.27 years (Minimum: 17, Maximum: 30)		
Educational status of the respondents		
Illiterate	117	33.1
Up to primary	67	18.9
Up to SSC	92	26.0
HSC and above	78	22.1
Educational status of husbands		
Illiterate	58	16.4
Up to primary	68	19.2
Up to SSC	86	24.3
HSC and above	142	40.1
Occupational status of the respondents		
House wife	295	83.3
Service holder	59	16.7
Occupational status of the husbands		
Service holder	111	31.4
Businessman	110	31.1
Others	133	37.5
No. of family member		
3-4	95	26.8
5-6	135	38.1
>6	124	35.1
Monthly family income ( in taka)		
Up to 10000	92	16.1
11000 to 20000	196	42.4
> 20000	66	25.7
Mean $\pm$ SD 15906.78 $\pm$ 7780.98 TK (Minimum: 4000 TK, Maximum: 40000 TK)		

Out of the 354 rural mothers, 76.3% had taken antenatal care (ANC) visit and 48.3% delivered their children at home. Mode of delivery status showed that 70.9% rural mothers had normal delivery. Postnatal care (PNC) was taken by 56.5% rural mothers (table II).

Among the mothers, 86.4% mothers knew that baby should be kept warmth by wrapping with dry cloth. Others knew that baby should be nursed in same

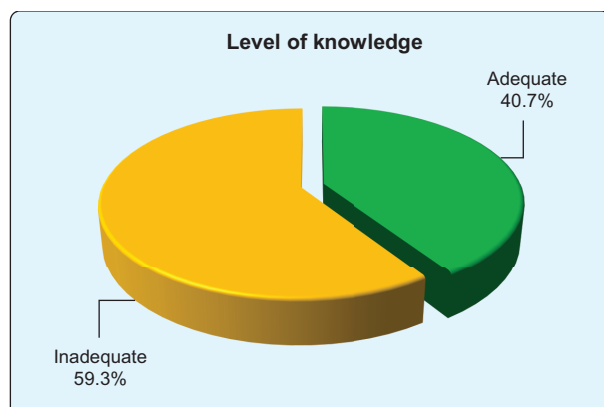
room with mother (41.8%), kept in skin to skin contact immediately after delivery (11.0%) and given first birth after 24 hours of birth (16.0%) to maintain thermoregulation.

**Table-II:** Distribution of respondents by reproductive and maternal healthcare utilization (n=354)

Criteria	Frequency	Percentage
Ante Natal Care (ANC)		
Not taken	84	23.7
Taken	270	76.3
Place of delivery		
Home	171	48.3
Government hospital	95	26.8
Private hospital	88	24.9
Mode of delivery		
Normal delivery	251	70.9
Cesarean section (CS)	103	29.1
Postnatal care		
Taken	200	56.5
Not taken	154	43.5

One fourth (26.3%) mothers knew that the umbilical stump of baby not be covered a cloth/bandage and 76.3% mothers knew that the umbilical stump should not be spoiled. Knowledge regarding early and exclusive breastfeeding status showed that 57.1 % mothers knew that one should start breast feeding immediately after birth, 5.9% mothers knew that the interval of feeding of the baby is every 2/3 hours per day and 88.7% mothers knew that the duration of exclusive breast feeding is six months. Knowledge regarding vaccination status showed that 62.4 % mothers knew that one should start vaccination just after birth and 94.1% mothers knew that the child should be vaccinated to prevent disease. Knowledge regarding eye care showed that 63.0 % mothers knew that reddening of eye is a sign of eye infection, 41.2 % mothers knew that one should not use any substance like Kajol to eyes and 31.1% mothers knew that one should use eye ointment immediately after birth. Most of the mothers (91.7%) mothers knew that vomiting / diarrhea is a danger sign for child. Majority of the mothers knew that yellowish discoloration of eyes, palms, and sole (77.4%) and abdominal distention (64.7%) are danger signs for child (table III).

Out of 354 mothers, 40.7% had adequate knowledge while 59.3% had inadequate knowledge regarding essential newborn care (figure 1).



**Figure 1:** Distribution of respondents by level of knowledge regarding essential newborn care (n=354)

Illiterate mothers had significantly more inadequate knowledge than literate mothers ( $p < 0.001$ ). Again,

mothers whose husbands were illiterate, had significantly more inadequate knowledge than mothers who had literate husbands ( $p < 0.001$ ).

Housewives had significantly more inadequate knowledge than mothers who were involved in jobs ( $p < 0.001$ ). Mothers whose husbands were involved in service or in business had significantly more adequate knowledge than others ( $p < 0.001$ ). Mothers who had family members more than six had significantly more inadequate knowledge than others ( $p < 0.001$ ). Mothers who had monthly family income more than 20,000 taka had significantly more adequate knowledge than others ( $p < 0.001$ ) (table IV).

Mothers who took ANC, delivered their babies at private hospitals, underwent cesarean section and took PNC had significantly more adequate knowledge than others ( $p < 0.001$ ) (table V).

**Table III:** Distribution of the respondents by knowledge regarding different components of ENC (n=354)

Criteria	Frequency	Percentage
Keep baby warmth by wrapping dry cloth	306	86.4
Baby should be nursed in same room with mother	148	41.8
Keep baby skin to skin contact immediately after delivery	39	11.0
First birth after 24 hours of birth	57	16.1
The umbilical stump of baby should not be covered by a cloth/bandage	93	26.3
Umbilical stump should not be soiled	270	76.3
One should start breast feeding immediately after birth	202	57.1
The interval of feeding the baby is every 2/3 hours per day	21	5.9
The duration of exclusive breast feeding is six months	314	88.7
One should start vaccination just after birth	221	62.4
The child should be vaccinated to prevent disease	333	94.1
Reddening of eye is a sign of eye infection	223	63.0
Eye discharge is a sign of eye infection	177	50.0
Swollen eye is a sign of eye infection	187	52.8
Should not use any substance like Kajol to eyes	146	41.2
Should use eye ointment immediately after birth	110	31.1
Vomiting / Diarrhoea is a danger sign	325	91.8
Yellowish discoloration of eyes, palms, and sole is a danger sign	274	77.4
Abdominal distension is a danger sign	229	64.7
Difficulty of breathing is a danger sign	143	40.4
Unable to breast feed is a danger sign	93	26.3
High grade fever ( $>37.5^{\circ}\text{C}$ ) is a danger sign	86	24.3
Abnormal jerking movement of limbs and eyes is a danger sign	42	11.9
Crying excessively is a danger sign	33	9.3
Lethargic baby is a danger sign	25	7.1
A baby cold to touch ( $<35.5^{\circ}\text{C}$ ) is a danger sign	15	4.2

**Table IV: Association of level of knowledge with socio-demographic variables**

Socio-demographic variables	Level of knowledge		p value
	Inadequate	Adequate	
Educational status of the respondents			
Illiterate	96 (82.1)	21 (17.9)	p<0.001
Primary	54 (80.6)	13 (19.4)	
Secondary	50 (54.3)	42 (45.7)	
Above secondary	10 (12.8)	68 (87.2)	
Educational status of the husbands			
Illiterate	54 (91.3)	4 (6.9)	p<0.001
Primary	53 (77.9)	15 (22.1)	
Secondary	49 (57.0)	37 (43.0)	
Above secondary	54 (38.0)	88 (62.0)	
Occupational status of the respondents			
House wives	203 (68.8)	92 (31.2)	p<0.001
Others	7 (11.9)	79 (88.1)	
Occupational status of the husbands			
Service holders	36 (32.4)	75 (67.8)	p<0.001
Businessmen	75 (68.2)	35 (31.8)	
Others	99 (74.4)	34 (25.6)	
No. of family members			
3-4	50 (52.6)	45 (47.4)	p<0.001
5-6	61 (45.2)	74 (54.8)	
>6	99 (79.8)	25 (20.2)	
Monthly family income (in taka)			
Up to 10000	72 (78.3)	20 (21.7)	p<0.001
11000-20000	127 (64.8)	69 (35.2)	
>20000	11 (16.7)	55 (83.3)	

Figure within parenthesis indicates in percentage

**Table V: Association of level of knowledge and reproductive and maternal healthcare utilization (n=354)**

Reproductive and maternal healthcare utilisation	Level of knowledge		p value
	Inadequate	Adequate	
Ante Natal Care (ANC)			
Not taken	76 (90.5)	8 (9.5)	p<0.001
Taken	134 (49.6)	136 (50.4)	
Place of delivery			
Home	122 (71.3)	49 (28.7)	p<0.001
Government hospital	66 (69.5)	29 (30.5)	
Private hospital	22 (25.0)	66 (75.0)	
Mode of delivery			
Normal delivery	176 (70.1)	75 (29.9)	p<0.001
Cesarean delivery	34 (33.0)	69 (67.0)	
Post natal care			
Not taken	112 (72.7)	42 (27.3)	p<0.001
Taken	98 (49.0)	102 (51.0)	
Parity			
Primiparous	30 (42.9)	40 (57.1)	p=0.002
Multiparous	180 (63.4)	104 (36.6)	

Figure within parenthesis indicates in percentage



## Discussion

Maintaining a neutral thermal environment is one of the key physiologic challenges that a newborn must face after delivery. Thermal care is central to reducing morbidity and mortality in newborns.<sup>11</sup> Out of the 354 postnatal mothers, 86.4% knew that baby should be kept warmth by wrapping with dry cloth. Other studies also reported that most of the mothers knew this fact.<sup>12,13</sup> Mothers of the present study had lacking in knowledge regarding the fact that the baby should be nursed in same room with mother as 41.8% mothers knew it while 84.5% Ethiopian mothers knew this.<sup>13</sup> Only 11.0% mothers knew that baby should be kept in skin to skin contact immediately after delivery to maintain thermoregulation. Others studies also reported unsatisfactory results regarding this issue. Study conducted in Bangladesh reported that only 8.1 percent knew about Kangaroo method (method of caring for a baby, holding the naked or partially dressed child against the bare skin of a parent, typically the mother, for as long as possible each day) for thermoregulation.<sup>14</sup>

Newborn cord care practices may directly contribute to infections, which account for a large proportion of the 4 million annual global neonatal deaths.<sup>14</sup> One fourth of the study participants (26.3%) knew that the umbilical stump of baby not be covered a cloth/bandage. Study of Meseka et al. also reported low knowledge in this issue.<sup>12</sup> Majority of the (76.3%) mothers knew that the umbilical stump should not be soiled which was consistent with other study.<sup>13</sup>

In this study majority of the mothers had knowledge regarding exclusive breastfeeding and when to start immunization. This result is comparable with other study.<sup>13</sup>

Majority of the mothers had knowledge regarding signs of eye infection which matched other study.<sup>13</sup> But mothers had knowledge gap regarding eye care as 41.2 % knew that one should not use any substance like Kajol to eyes and 31.1% had knowledge on using eye ointment immediately after birth. Study conducted in India also found low level of knowledge regarding eye care as 22.0% knew that one should not use Kajol to eyes.<sup>15</sup>

Most of the mothers (91.7%) knew that vomiting / diarrhea is a danger sign for child. Other mentionable danger signs were yellowish discoloration of eyes, palms, and sole, abdominal distention, difficulty in

breathing, inability in feeding and fever. Consistent results were observed in other studies where mothers also mentioned vomiting / diarrhea, difficulty in breathing, inability in feeding and fever.<sup>13,16</sup>

Out of the 354 post natal rural mothers, majority (59.3%) had inadequate knowledge regarding essential new born care. In India, majority of the mothers found to have average knowledge regarding this issue.<sup>17</sup> In Pakistan, the knowledge of postnatal mothers on ENC was found poor.<sup>18</sup> In Sri Lanka, majority of the mothers lack adequate knowledge.<sup>19</sup> In Ethiopia, majority of the mothers also had inadequate knowledge regarding essential new born care.<sup>9,13</sup>

Illiterate mothers had significantly more inadequate knowledge than literate mothers ( $p < 0.001$ ). Studies conducted in Sri Lanka and India also found significant association between knowledge on ENC and educational status of the mothers.<sup>17,19</sup>

Housewives had significantly more inadequate knowledge than mothers who were involved in jobs ( $p < 0.001$ ). Mohini & Shetty also found significant association between knowledge on ENC and occupational status of the mothers.<sup>17</sup> Person who is involved in job has opportunity to communicate with many people from where they can get many information. On the other hand, house wives are confined at home and engaged themselves in household works. They get less opportunity to acquire knowledge. For this reason, employed mothers had significantly better knowledge than others mothers.

Mothers with higher monthly family income had significantly more adequate knowledge than others. Another study also found that wealth index is associated with knowledge and practice regarding ENC.<sup>20</sup> Person from high socio-economic class get more opportunity to come in contact with mass media such as TV, radio, internet. These media helps them to get many information. For this reason, respondent having more monthly income had better knowledge than respondent having less monthly income.

Mothers who took ANC, delivered their babies at private hospitals, underwent cesarean section and took PNC had significantly more adequate knowledge than others. During ANC and PNC visit, health extension workers or other health care providers discussed and counseled mothers regarding ENC. These enables mothers to acquire adequate knowledge and do appropriate practice.

As this study was conducted at the community level, it had the opportunity to collect data at grass root level and helps to devise mechanisms to improve the services at community level.

There were a few limitations of the study. The study was based on reported rather than observed knowledge towards newborn care which could be the possible limitation of this study. In addition, due to the cross-sectional nature of the study, it could be difficult to see the causal relationship between the independent and the dependent variables. The observed associations between the independent and dependent variables could be confounded by variables that were not measured in this study.

### Conclusion

Majority of the mothers had inadequate knowledge regarding essential newborn care while less than half had adequate knowledge. Literate mothers involved in job, family members <6 with monthly family income > 20,000 taka had significantly more adequate knowledge than others. Again, mothers who took ANC, delivered their babies at private hospitals, underwent cesarean section and took PNC had significantly more adequate knowledge than others. Health education and behavioral change communications on essential newborn care are recommended. Special emphasis should be given to improve thermal care by Kangaroo mother care for the newborn and to encourage immediate and exclusive breastfeeding.

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### References

1. Clarel. Health Begins at Home. Nurs J India, 2010; 64: 119.
2. UNICEF. Maternal and newborn health. 2012. Available from: <https://www.unicef.org/sowc09/docs/SOWC09-FullReport-EN.pdf> (Last accessed June 2019).
3. Narayanan I, Rose M, Cordero D, Faillace S, Sanghvi T. The components of essential newborn care. Arlington, VA: Basics Support for Institutionalizing Child Survival Project for the United States Agency for International Development. 2004.
4. World Health Organization (WHO). Every Newborn Action Plan. World Health Organization. Geneva, Switzerland: 2019.
5. Katie M. Where we have been and where we need to go? Lancet. 2014. Available from: <https://www.mhft.org/2014/05/lancet-launches-every-newborn-series-where-weve-and-where-we-need-to-go/> (Last accessed April 2019).
6. UNICEF. Child survival. 2018. Available at: <https://data.unicef.org/country/bgd/> (accessed May 2019).
7. Kim ET, Singh K. The state of essential newborn care by delivery location in Bangladesh. Matern. Child Health J. 2017;21:2078-2085. DOI: 10.1007/s10995-017-2319-7.
8. Pagel C, Prost A, Hossen M, Azad K, Kuddus A, Roy SS, Nair N, Tripathy P, Saville N, Sen A, Sikorski C. Is essential newborn care provided by institutions and after home births? Analysis of prospective data from community trials in rural South Asia. BMC pregnancy and childbirth. 2014;14:99. DOI: 10.1186/1471-2393-14-99.
9. NIPORT M. and ICF: Bangladesh demographic and health survey 2014. Technical report, National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International, Dhaka, Bangladesh, and Rockville, Maryland, USA: NIPORT, Mitra and Associates, and ICF International. 2013, 2016.
10. Berhan D, Gulema H. Level of Knowledge and Associated Factors of Postnatal Mothers' towards Essential Newborn Care Practices at Governmental Health Centers in Addis Ababa, Ethiopia. Advances in Public Health. 2018;2018. DOI: 10.1155/2018/8921818
11. Misgna HG, Gebru HB, Birhanu MM. Knowledge, practice and associated factors of essential newborn care at home among mothers in Gulomekada District, Eastern Tigray, Ethiopia, 2014. BMC pregnancy and childbirth. 2016;16:144. DOI: 10.1186/s12884-016-0931-y.
12. Newborn Thermoregulation: A Self-Learning Package. Interprofessional Education and Research Committee of the Champlain Maternal Newborn Regional Program (CMNRP), 2013.
13. Mesekaa LA, Mungai LW, Musoke R. Mothers' knowledge on essential newborn care at Juba Teaching Hospital, South Sudan. South Sudan Med J. 2017;10:56-59. DOI:10.4314/SSMJ.V10I3.
14. Berhea TA, Belachew AB, Abreha GF. Knowledge and practice of Essential Newborn Care among postnatal mothers in Mekelle City, North Ethiopia: A population-based survey. PloS one. 2018;13:e0202542. DOI: 10.1371/journal.pone.0202542.
15. Alam MA, Ali NA, Sultana N, Mullany LC, Teela KC, Khan NU, Baqui AH, El Arifeen S, Mannan I, Darmstadt GL, Winch PJ. Newborn umbilical cord and skin care in Sylhet District,

- Bangladesh: implications for the promotion of umbilical cord cleansing with topical chlorhexidine. *J perinatol.* 2008;28:S61-68. DOI: 10.1038/jp.2008.164.
16. Srinivasa S, Bhavya G, Patel S, Harish S, Anjum SK. Knowledge, attitude and practice of mothers in infantile skin care. *Int. J. Contemp. Pediatr.* 2018; 5:536-541. DOI: 10.18203/2349-3291.ijcp20180550.
  17. Ekwochi U, Ndu IK, Osuorah CD, Amadi OF, Okeke IB, Obuoha E, Onah KS, Nwokoye I, Odetunde OI, Obumneme-Anyim NI. Knowledge of danger signs in newborns and health seeking practices of mothers and care givers in Enugu state, South-East Nigeria. *Ital J Pediatr.* 2015;41:18. DOI: 10.1186/s13052-015-0127-5.
  18. Mohini H, Shetty BS. A study to assess the knowledge of mothers on home based neonatal care at selected area of rural Bangalore. *Int. J. Community Med. Public Health.* 2017;4:1695-1700. DOI: <http://dx.doi.org/10.18203/2394-6040.ijcmph20171786>.
  19. Gul S, Khalil R, Yousafzai MT, Shoukat F. Newborn care knowledge and practices among mothers attending pediatric outpatient clinic of a hospital in Karachi, Pakistan. *Int J Health Sci (Qassim).* 2014;8:167-175. DOI: 10.12816/0006083.
  20. Priyadarshanie MN, Pethiyagoda K. Mothers' knowledge regarding neonatal baby care. *GSTF J Nurs Health Care.* 2015;2:14-17. DOI: 10.5176/2345-718X\_2.1.57.
  21. Mersha A, Assefa N, Teji K, Shibiru S, Darghawth R, Bante A. Essential newborn care practice and its predictors among mother who delivered within the past six months in Chench District, Southern Ethiopia, 2017. *PloS one.* 2018;13: e0208984. DOI: 10.1371/journal.pone.0208984.