Factors associated with new born care practice in Tarai districts of Lumbini province, Nepal: a cross-sectional study

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ABSTRACT

Introduction: Neonatal mortality remains a major public health concern, especially in low- and middle-income countries, with the first week of life being the most critical period. Limited postnatal care services and inadequate maternal knowledge and practices increase risks for newborns. This study aimed to assess factors associated with mothers' knowledge and practices of newborn care among mothers with children less than one year in selected districts of Terai region of Lumbini province.

Methods: A community-based cross-sectional study was conducted among 414 mothers with children age less than one year in three districts of the Lumbini province of Nepal using multistage proportionate random sampling. Data were analyzed in SPSS version 25 using descriptive statistics and logistic regression at $p < 0.05$.

Results: Among the 414 respondents, 63.3% of mothers had adequate knowledge on newborn care, while 55.1% demonstrated good newborn care practices. Multivariable logistic regression analysis revealed that religion ($p = 0.036$), type of family ($p < 0.001$), parity ($p = 0.039$), husband's education ($p = 0.002$), and monthly family income ($p < 0.001$) were significantly associated with mothers' knowledge of newborn care. Similarly, parity ($p = 0.041$), maternal education ($p = 0.002$), and family income ($p < 0.001$) were significantly associated with newborn care practices.

Conclusion: The majority of mothers had adequate knowledge and more than half practiced appropriate newborn care, however gaps still remain. Socio-demographic factors significantly influenced the level of mothers' knowledge and practices. Strengthening maternal education and targeted health education programs may help to improve newborn care practices.

Keywords: Breast feeding practice, lumbini, maternal knowledge, newborn care, socio-demographic factors.

INTRODUCTION

Newborn health care begins long before birth, starting with proper maternal care during pregnancy, labor, and delivery.[1] Appropriate care during these periods is the first step in ensuring good newborn health.[2] Globally, 3.1 million newborns die each year within the first 28 days of life according to the World Health Organization. Alarmingly, half of these deaths occur within the first 24 hours, and 75% occur in the early neonatal period.[3] Ninety-nine percent of these deaths occur in low- and middle-income countries, particularly in South-Central Asia and sub-Saharan Africa.[4,5] In Nepal, under-five mortality has declined substantially, neonatal mortality has decreased at a slower pace compared with infant and child mortality,[6-8] highlighting the need for focused interventions for newborns. According to NDHS report 2022, Lumbini Province has a neonatal mortality rate of 22 per 1,000 live births and an under-five mortality rate of 40 per 1,000 live births. These rates show that more efforts are still needed in the province to reduce child mortality and achieve the Sustainable Development Goals (SDG) targets at the national level.

Neonatal morbidity and mortality in Nepal are influenced by multiple factors, including economic, geographical, cultural, institutional,

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and ethnic determinants. Ethnicity is an important factor, as communities with persistent caste hierarchies often show disparities in newborn care. Specially, in rural community lower caste groups practice poor newborn care compared to higher caste groups.[9] Despite the Government of Nepal's launch of the Integrated Package of Child Survival Interventions in 2015 to address major health problems of sick newborns and manage childhood illnesses among children under five,[10] and support from various nongovernmental organizations, neonatal morbidity and mortality remain high.[11] Evidence shows that community-level interventions and simple, evidence-based practices at the family and community level can significantly reduce neonatal morbidity and mortality.[7] Identifying gaps in knowledge and newborn care practices is therefore essential for implementing effective interventions. This study aims to assess the factors associated with knowledge and practices of newborn care among mothers with children less than one year of age in selected districts of the Terai districts of Lumbini province Nepal. Understanding these factors will help inform community-based strategies and policies to improve newborn health outcomes, reduce disparities in care, and contribute to lowering neonatal morbidity and mortality in the region.

METHODS

A community-based cross-sectional study design was adopted. The study was conducted in three districts of the Lumbini province of Nepal: Nawalparasi west, Kapilvastu, and Rupandehi. Data were collected during November 2021 to April 2022. The study population included mothers with children aged less than one year attending immunization clinics at selected health facilities in the three districts. Ethical approval was obtained from the Institutional Review Committee of Universal College of Medical Sciences, Bhairahawa (UCMS/IRC/65/19). Participants were informed about the study objectives, and written informed consent was obtained. Mothers with children aged less than one year attending the selected immunization clinics were included, where mothers who were unwilling to participate or unable to provide complete responses were excluded from the study.

The sample size was calculated using the prevalence of postnatal care utilization in Nepal, reported as 57%,[11] and the single population proportion formula:

$n = Z^2pq/d^2$

$n = (1.96)^2*0.57*0.43/(0.05)^2 = 377 +10\%$ (non-response) = 414

The calculated sample size was 377, which was increased by 10% to account for non-response, resulting in a final sample of 414. A multistage proportionate random sampling technique was employed. First, one rural municipality was randomly selected from each district. Next, two health facilities were randomly selected from each municipality, resulting in a total of six health facilities. From each facility, 69 mothers were selected using random sampling. The collected data were checked for completeness and entered into SPSS version 25 for analysis. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe the socio-demographic characteristics of the participants and their knowledge and practice of newborn care. Overall knowledge was assessed by scoring the response, where each correct response scored 1 and each incorrect response scored 0, giving a total score range of 0–6. Mothers scoring more than 60% were categorized as having adequate knowledge, while those scoring less than 60% were considered to have inadequate knowledge. Newborn care practice was assessed using four components adapted from essential newborn care standards. Each correct practice was scored as "1" and incorrect practice as "0". Mothers with overall score more than 60% were classified as having good newborn care practice, while those who score less than 60% were categorized as having poor practice. Bivariate logistic regression analysis was performed to identify factors associated with knowledge and practice of newborn care. Variables with a p-value less than 0.05 in the bivariate analysis were included in multivariable logistic regression to control for possible confounding factors. The results were presented using adjusted odds ratios (aOR) with 95% confidence intervals (CI), and statistical significance was considered at $p < 0.05$.

RESULT

Table 1: Socio-demographic characteristics

Variables	Frequency(n)	Percentage(%)
15-19	87	21
20-24	107	25.8
25-29	129	31.2
30-34	50	12.1
35-39	41	9.9
Ethnicity		
Dalit	47	11.4
Janajaati	122	29.5
Madhesi	139	33.6
Muslim	41	9.9
Brahmin/Chhetri	65	15.7
Religion		
Hindu	285	68.8
Muslim	41	9.9
Christian	38	9.2
Buddhist	50	12.1
Family Type		
Nuclear	77	18.6
Joint	337	81.4
Sex of newborn		
Male	224	54.1
Female	190	45.9
Parity		
First	146	35.3
Second	189	45.7
Third	58	14
Fourth or more	21	5.1
Mothers Educational Status		
Illiterate	270	65.2
Primary	79	19.1
Secondary	41	9.9
Intermediate	24	5.8
Educational Status of Husband		
Illiterate	194	46.9
Primary	100	24.2
Secondary	72	17.4
Intermediate	48	11.6
Occupation of mother		
Agriculture	190	45.9
Job	65	15.7
Business	49	11.8
Labor	110	26.6
Monthly Income in family		
<NPR 20000	186	44.9
NPR 20000-30000	180	43.5
>NPR 30000	48	11.6

Socio-demographic characteristics

Among 414 respondents, most mothers were aged 25–29 years (31.2%), followed by 20–24 years (25.8%) and 15–19 years (21%), with a mean age of 27 ± 5 years. A 21% of teenage pregnancy was seen. Majority of respondents lived in joint families (81.4%), and 54.1% of newborns were male. Nearly half of the mothers had second parity (45.7%), followed by first parity (35.3%). Most respondents were Hindu (68.8%) and Madhesi (33.6%), followed by Janajaati (29.5%). A significant number of mothers were illiterate (65.2%), while 46.9% of their husbands were illiterate. Nearly half of mothers were involved in agriculture (45.9%), and most households had a monthly income NPR 30,000 and below (88.4%) (Table 1). Age ranged from 15-39 years with mean ± SD= 27 ± 5 years

Knowledge on newborn care

Knowledge was assessed using six related questions on knowledge about newborn care. Knowledge was relatively higher for cord care (54.6%) and thermal care (48.1%), but lower for colostrum feeding (43.0%), timing of first bathing (39.9%), and initiation of breastfeeding (36.0%) (Figure 1). Among the 414 respondents, 63.3% had adequate knowledge of newborn care, whereas 36.7% had inadequate knowledge (Table 2).

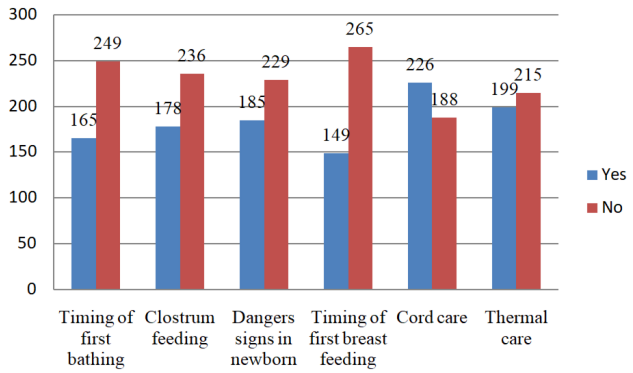

Figure 1: Knowledge about newborn care

Practice on newborn care

Among the 414 respondents, slightly more than half practiced colostrum feeding (51.0%), and 48.1% practiced appropriate cord care. However, fewer mothers practiced early initiation of breastfeeding (43.0%), and only 20.8% followed the recommended timing of first bathing, indicating low adherence to several recommended

newborn care practices (Figure 2). Among the 414 respondents, 228 (55.1%) mothers demonstrated good newborn care practices, whereas 186 (44.9%) had poor practices (Table 2).

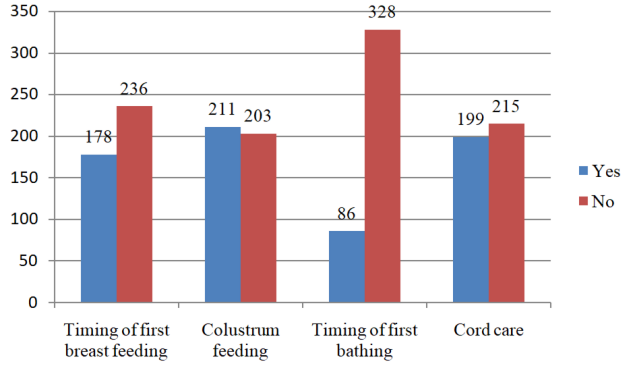

Figure 2: Practice on newborn care

Table 2: Overall knowledge and practice of Newborn care

Variables	Frequency (n)	Percentage (%)
Knowledge		
Adequate	262	63.3
Inadequate	152	36.7
Practice		
Good	228	55.1
Poor	186	44.9

Factors associated with knowledge on newborn care

Multivariable logistic regression analysis showed that religion, type of family, parity, husband's education, and monthly family income were significantly associated with knowledge of newborn care. Christian mothers were less likely to have adequate knowledge compared to Hindu mothers (aOR = 0.241, 95% CI: 0.06–0.91, p = 0.036). Mothers from joint families had lower odds of adequate knowledge than those from nuclear families (aOR = 0.11, 95% CI: 0.03–0.32, p < 0.001). Mother having higher parity was associated with greater knowledge, particularly among mothers with second parity (aOR = 4.457, 95% CI: 1.07–18, p = 0.039) and four or more children (aOR = 10.58, 95% CI: 1.75–63.3, p = 0.01). Husband's higher education was significantly associated with maternal knowledge. Additionally, higher monthly family income (NPR 20,000–30,000 and > NPR 30,000) was significantly associated with increased odds of adequate newborn care knowledge compared to income < NPR 20,000 (Table: 3).

Factors associated with newborn care practice

Multivariable logistic regression analysis identified parity, maternal education, and family income as significant factors associated with newborn care practices. Mothers with third parity were more likely to have good newborn care practices compared to first-parity mothers (aOR = 2.93, 95% CI: 1.21–9.05, p = 0.041). Maternal education was also significantly associated with practice, as mothers with secondary education had higher odds of good newborn care practice compared to illiterate mothers (AOR = 4.17, 95% CI: 1.96–12.68, p = 0.002). Additionally, families with monthly income of NPR 20,000–30,000 showed a significant association with good newborn care practices compared to those earning <NPR 20,000 (aOR = 1.96, p < 0.001). However, maternal occupation and higher income (>NPR 30,000) were not significantly associated with newborn care practices in the adjusted model (Table 4).

DISCUSSION

Knowledge of newborn care among mothers is essential for ensuring appropriate care during the postnatal period. In the present study, 63.3% of mothers had adequate knowledge regarding newborn care, while 36.7% had inadequate knowledge. The findings of this study are comparable with similar research conducted in Lalitpur, Nepal on 2022, reported that 52.6% of respondents had good awareness while 47.4% had poor awareness regarding newborn care,[12] which is relatively similar to the proportion observed in this study. However, another study conducted in Bhaktapur reported that 96% of mothers had adequate knowledge regarding newborn care,[13] indicating a substantially higher level of awareness compared to this study findings. Such differences may be attributed to variations in study settings, educational status of participants, accessibility to maternal health services, and exposure to health education programs. International studies also demonstrate variability in maternal knowledge regarding newborn care. A study conducted in Thailand found that 60% of mothers had good awareness of newborn care,[14] which closely aligns with the results of this study. In contrast, a study

Table 3: Factors associated with knowledge on newborn care

Variable	Frequency (n)	Knowledge on newborn care		cOR (95% CI)	aOR (95% CI)
		Adequate (%)	Inadequate(%)		
Religion					
Hindu	285	186(73.5)	99 (61.5)	r	r
Muslim	41	29 (11.5)	12 (7.5)	0.73(0.32-1.35)	2.28(0.93-5.58)
Christian	38	9 (3.6)	29 (18)	0.57(0.23-1.37)	0.24(0.06-0.91)*
Buddhist	50	29 (11.5)	21 (13)	4.45(1.7411.33)*	1.04(0.32-3.33)
Type of family					
Nuclear	77	65(25.7)	12 (7.5)	r	r
Joint	337	188 (74.3)	149 (92.5)	0.23(0.12-0.44)*	0.11(0.03-0.32)*
Parity					
First	146	98 (38.7)	48 (29.8)	r	r
Second	189	97 (38.3)	92 (57.1)	2.08(0.66-6.52)	4.45(1.07-18.01)*
Third	58	41 (16.2)	17 (10.6)	4.03(1.3012.42)*	2.35(0.61-9.05)
Four or more	21	17 (6.7)	4 (2.5)	1.76(0.51 - 6.01)	10.58(1.7563.29)*
Education of husband					
Illiterate	194	74 (29.2)	120 (74.5)	r	r
Primary	100	75 (29.6)	25(15.5)	4.86(2.38-9.94)*	0.66(0.22-1.95)
Secondary	72	68 (26.9)	4 (2.5)	1.00(0.45-2.21)	0.21(0.07-0.63)*
Intermediate and above	48	36 (14.2)	12 (7.5)	0.17(0.05-0.58)*	0.10(0.02-0.43)*
Monthly income in family					
<NPR.20000	186	57 (22.5)	129 (80.1)	r	r
NPR.20000-30000	180	160(63.2)	20 (12.4)	6.78(3.29-14.03)*	3.18(1.22-9.03)*
>NPR.30000	48	36 (14.2)	12 (7.5)	0.37(0.16-0.83)*	8.77(3.6-21.20)*

r-Reference category, CI-Confidence interval, cOR-Crude Odds Ratio, aOR-Adjusted Odds Ratio, *P <0.05 = Significant

from Ethiopia reported that 80.4% of participants had good knowledge of essential newborn care,4 indicating a higher level of awareness compared to presented findings. Meanwhile, a study conducted in India showed that only 48% of mothers had adequate knowledge regarding newborn care,[15] which is lower than the proportion observed in this study.

This study found that 55.1% of mothers demonstrated good newborn care practices, while 44.9% had poor practices. This finding is consistent with a meta-analysis conducted in Ethiopia, which reported that 55.05% of women had good newborn care practices and 41.49% had poor practices.[16] Similarly, another study conducted in Ethiopia found that 62.0% of mothers had good neonatal care practices,[17] which is slightly higher than the finding of the present study. In contrast, a different study from the same country reported that 92.9% of mothers practiced essential newborn care appropriately,[4] which is substantially higher than the result of this study. On the other hand, a study conducted in Northwest Ethiopia showed that only 47.73% of mothers had good infant care practices,[18] which is slightly lower than the finding of the current study. These variations in the level of knowledge and newborn care practices across studies may be due to differences in socio-demographic characteristics, access to health services, maternal education, cultural practices, and study settings. In this study logistic regression analysis showed that religion, type of family, parity, husband's education, and monthly family income were significantly associated with mothers' knowledge and practice of newborn care. Similar responsible factors have been reported in other studies.[1,12,16,19] Religion can influence maternal behavior, as traditional beliefs and rituals often affect practices

Table 4: Factors associated with practice on newborn care

Variable	Frequency (n)	Newborn care practice		cOR (95% CI)	aOR (95% CI)
		Good practice (%)	Poor practice (%)		
Parity					
First	146	91 (39.9)	55 (29.6)	r	r
Second	189	81 (35.5)	108 (58.1)	1.51(0.55-4.12)	1.78(0.54-5.80)
Third	58	41 (18.0)	17 (9.1)	3.33(1.23-8.96) *	2.93(1.21-9.05)*
Four or more	21	15 (6.4)	6 (3.2)	1.03(0.34 - 3.12)	1.00(0.27-3.64)
Education of mother					
Illiterate	270	124 (54.4)	146 (78.5)	r	r
Primary	79	51 (22.4)	28 (15.5)	5.88(1.96-17.68)*	1.24(0.85-5.83)
Secondary	41	33 (14.5)	8 (4.3)	2.74(0.85-8.83)	4.17(1.96-12.68)*
Intermediate and above	24	20 (8.8)	4 (2.2)	1.21(0.32-4.54)	1.54(0.34-6.91)
Occupation of mother					
Agriculture	190	95 (41.7)	95 (51.1)	r	r
Job	65	53 (23.2)	12 (6.5)	0.86(0.54-1.38)	0.63(0.32-1.24)
Business	49	29 (12.7)	20 (10.8)	0.19(0.09-0.40)*	1.96(0.63-6.10)
Labor	110	51 (22.4)	59 (31.7)	0.59(0.30-1.17)	0.54(0.32-2.10)
Income of family					
<NPR.20000	186	56 (24.6)	130 (69.9)	r	r
NPR.20000-30000	180	136 (59.6)	44 (23.7)	6.96(3.37-14.31)*	1.96(1.37-4.21)*
>NPR.30000	48	36 (15.8)	12 (6.5)	0.97(0.4-2.02)	0.99(0.3-3.17)

r-Reference category, CI-Confidence interval, cOR-Crude Odds Ratio, aOR-Adjusted Odds Ratio, * indicates P <0.05 = Significant

such as breastfeeding, cord care, and thermal care.[20] In Nepal, these beliefs may either support or hinder recommended newborn care practices.

Mothers in joint families often follow the guidance of senior family members, which can shape newborn care practices,[3] while mothers in nuclear families may rely more on health professionals and formal information sources. Parity is important, as multiparous mothers gain knowledge and practical experience from previous pregnancies, improving their newborn care practices.[1,12] Mothers with no formal education had lower knowledge scores about newborn care compared to those with higher levels of education.[21] Similarly, educated husbands are more likely to support health service utilization and encourage recommended practices,[16] while higher family income improves access to health facilities, information, and resources needed for proper newborn care. Additionally, in this study we found that 21% of participants were below the age of 19 years. This finding reflects a significant prevalence of teenage pregnancy. It highlights an important public health concern in rural communities of Nepal, which requires appropriate attention and targeted interventions. Overall, this study highlights the need for targeted health education, community awareness programs, and improved access to maternal and child health services in Nepal, especially for first-time mothers and families with lower socioeconomic status.

Limitation of the study: In this study, data were collected from mothers attending immunization clinics and were based on self-reported responses, which may lead to recall bias as mothers might not accurately remember their newborn care practices. Since only mothers visiting immunization clinics were included, selection bias may have occurred and the findings may not represent all mothers in the community. The study was conducted in

selected districts and rural municipality of Lumbini province and did not included Dang, Banke and Bardiya, which limits the generalizability of the findings. Furthermore, some important factors such as cultural beliefs, family influence, and accessibility of health services may not have been fully explored.

CONCLUSION

This study identified gaps in mothers' knowledge and practices regarding newborn care, with several socio-demographic factors influencing these outcomes. These findings highlights the need for targeted and context-specific interventions to improve neonatal health outcomes. Improving access to and utilization of postnatal care services is equally essential. Ensuring timely postnatal visits provides an opportunity for healthcare providers to educate mothers, identify harmful practices, and promote evidence-based newborn care. Special attention should be given to mothers with low literacy and limited financial resources by designing inclusive strategies such as visual aids, local language communication, and outreach services. Furthermore, integrating targeted awareness and behavior change interventions into existing maternal and child health programs can enhance their effectiveness. Collaborative efforts between government health systems, local stakeholders, and community-based workers are necessary to ensure sustainable implementation.

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