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Determinants of essential newborn care practices among mothers. A descriptive cross-sectional study in a peri-urban community, Ghana

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Abstract

Background Promoting essential newborn care practices is one of the effective approaches to improving child health outcomes, especially in low-resource areas. This study aims to assess the determinants of essential newborn care practices among mothers in a peri-urban community in Ghana.

Methods This descriptive community-based cross-sectional study design used 280 mothers within the Kukuo community in the Tamale metropolis selected through convenience sampling technique. A pretested questionnaire was used for data collection. Data was entered into EpiData version 3.1 and cleaned before being imported into IBM SPSS Statistics Version 26.0 for analysis. The univariate chi-square test and t-test statistic were used to determine the likelihood of practising essential newborn care among mothers. Statistically significant statistics at p-value ≤ 0.05 were modelled using multivariable regression.

Results Mothers (77.2%) identified the immediate care given to a newborn as essential newborn care. The study revealed that mothers had good knowledge (50.7%) and good practices (60.7%) of essential newborn care. Mothers between the ages of 25–29 years (AOR 1.18; 95%CI 0.35–4.01), had tertiary education or above (AOR = 5.2; 95%CI 1.36–18.49), and traders (AOR = 1.41; 95%CI 0.45–4.42) were more likely to practice good essential new-born care than their counterpart. Also, having good knowledge of ENBC (AOR = 11.57, 95%CI 5.21–25.70) and knowing danger signs in newborns (AOR = 4.62, 95%CI 2.26–9.45) was significantly associated with essential new-born care practice.

Conclusion The study's outcome revealed that mothers had adequate knowledge of essential newborn care, appropriately identified the danger signs in newborns, and practised good essential newborn care. Interventions to improve newborn care must segregate mothers and target specific client knowledge as significant differences were found based on knowledge, education level, and employment type.

Plain English language summary

The type and nature of care usually given to newborn babies are critical for their survival. This care supports their ability to regulate body temperature, decrease their risk of infection, promote the initiation of breastfeeding and increase the bonding between mothers and babies. This study assessed the factors that influence the type of care for newborn

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babies. We conducted a survey using 280 mothers in the Tamale metropolis. The mothers responded to a pretested questionnaire. Our study demonstrated that mothers had good knowledge about the type of care usually rendered during the first days of life. The factors that influenced the care rendered to newborn babies were the mothers' age, level of education, occupation, having good knowledge of childcare and knowing the danger signs of infants. It is therefore important that during health education in the ante-natal and post-natal clinics, mothers are segregated based on these characteristics for the health information to be tailored to address their specific needs.

Keywords Care, Childcare, Infant, Knowledge, Mothers, New-born, Peri-urban, Practices

Background

Enhancing the survival of newborns is an important goal within global health priorities and critical for initiatives aiming to guarantee child well-being [1, 2]. This can be achieved through collaborative efforts to ensure that -infants benefit from essential newborn care practices (ENCP), especially within the perinatal period [2]. Neonatal mortality continues to be a significant contributor to the overall death among children under the age of five. This situation could be mitigated by adhering to straightforward and effective WHO recommendations for ENCP. The World Health Organization (WHO) considers essential newborn care utilization as a strategy to enhance health by implementing interventions before conception, throughout pregnancy, during delivery, immediately after birth, and throughout the postnatal phase [2–4]. This period is critical for ensuring child survival and mitigating the undesirable consequences of dangerous signs in infants. About three million infants globally die within the initial month of life; out of these, one million die on the first day, constituting 40% of under-five mortality [5]. Also, estimates suggest that 7.7 million children below the age of five years die, with roughly 3.1 million occurring during the neonatal phase, that is, 28 days after birth [6, 7]. About 99% of these fatalities occur within low- and middle-income countries [6–8]. The influence of poor health practices among babies in Africa is even higher due to underdeveloped health infrastructure and lack of knowledge of health. This increases the averages of neonatal and newborn deaths in these low socio-economic settings. Each year, at least 1.16 million babies in Africa die in the first 28 days of life, and 850,000 of these babies do not live past a week [7, 9]. Therefore, the initial 28 days of newborns require meticulous care and attention to enhance their chances of survival [10]. The care requirements at this stage of the child's development include clean delivery, thermoregulation, breastfeeding initiation, cord care, and recognition of danger signs among infants [11, 12]. Within Ghana, the neonatal mortality rate stands at 29 deaths per 1000 live births [9, 12, 13]. Generally, reducing neonatal morbidity and mortality requires immediate caregivers' or mothers' recognition of suggestive danger signs in the neonates and taking prompt action to curtail the resultant repercussions [12]. This has been the reason for initiating several maternal and child health programs to support mothers in identifying appropriate care modalities, identifying danger signs of infants, and instituting adequate measures to promote essential newborn care. Two-thirds of newborns could experience survival benefits from maternal and child health programs already in place, which emphasize aspects like cord care to reduce sepsis, managing temperature to avert hypothermia, and promoting early breastfeeding initiation to reduce hypoglycemia incidence [9, 12]. However, despite this significance in the care initiation, several and multiple cultural practices remain a hindrance for families and babies to benefit from these essential newborn care practices.

In low and middle-income countries, diverse cultural practices for newborn care at home differ from the health service recommendations [9, 12]. These care practices are related to temperature regulation, cord care, infection prevention practices, and breastfeeding initiation. Therefore, emphasizing culturally sensitive approaches to newborn care practices is critical in ensuring neonatal and infant survival [5, 6]. Implementing successful interventions can prevent neonatal deaths and provide high-quality care throughout the neonatal and infant periods [5, 6]. These deaths may be attributable to inadequate maternal knowledge, especially on danger signs and unfavourable attitudes towards essential newborn care [10, 14–16]. Considering communities' diversity of cultures and traditions, traditional newborn practices can vary significantly [13]. It is imperative to identify the determinants, knowledge, and practices of essential newborn care to develop critical interventions to promote infant survival. In limited resources settings like northern Ghana, where cultural practices are still pervasive and an increasing need to curtail infant mortality, the determinants of essential newborn care practices must be identified and incorporated in neonatal health interventions. Also, Ghanaian northern communities have different and unique cultures and traditions, which may vary regarding newborn care practices. Hence, assessing the determinants, women's

knowledge, and types of practices will increase awareness and aid in mitigating harmful cultural practices. Therefore, good practices should be identified and promoted while detrimental ones are discouraged. This is because -mothers' and caregivers' understanding of essential newborn care plays a pivotal role in ensuring quality of care. Therefore, this study aims to assess the determinants of essential new-born care practices among mothers in a peri-urban community in Ghana.

Methods

Study design

The study employed a community-based descriptive cross-sectional design. The mothers with neonates were recruited to respond to a questionnaire; no follow-up was required.

Study settings

The study was conducted in the Kukuo Community in the Tamale metropolis of the Northern region of Ghana. The Kukuo community is in the eastern part of the metropolis. The community shares boundaries with the Tamale Teaching Hospital to the west, the Northern Regional Coordinating Council to the north, the Ghana Senior High School to the south, and the Russian Bungalows and the Jarkariyilli community to the east. The total population of Kukuo is estimated to be about four thousand eight hundred and sixty-five (4865). Out of the total population, two thousand three hundred and twenty are males (2320), while two thousand five hundred and forty-five (2545) are females, and 52% are economically active (GSS, 2020).

Sampling

The sample size was estimated using the prevalence of good knowledge of neonatal danger signs [12]. Using the level of knowledge regarding the neonatal danger signs estimated at 18% [12] with a 95% confidence and a 5% margin of error, the acceptable minimum sample size was computed. By considering 5% possible non-response and a design effect of 1.5 (medium effect size), the final sample was computed to be 280 using Cochran's formula for calculating an infinite population sample.

Where: n = the desired sample size; z = confidence interval at 95% set at 1.96; p = the prevalence of good knowledge of neonatal danger signs of (18.2%); and e = maximum error allowed (5%, 0.05). The data collection was done using trained research assistants who aided respondents in completing the questionnaire. The data collection lasted for a year beginning June 2023 to July 2024.

Data collection instruments

The women neonates responded to a pretested questionnaire. The questionnaire was divided into three parts: part "A" focused on the sociodemographic characteristics, including sex, age, ethnicity, level of education, and occupation. Part "B" assessed the knowledge on essential newborn care that involved exclusive breastfeeding and health-seeking habits. Finally, part "C" assessed the women's practices of essential newborn care.

In assessing the knowledge regarding essential newborn care, 32 items were used to evaluate essential newborn care, and fourteen items were used to evaluate the danger signs of newborns. All the items in this section were answered using a 5-point Likert-type scale ranging from 1 (Strongly disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly agree). Agree and strongly agree were grouped as "Yes"; the responses of Neutral were grouped as "Don't know"; and strongly disagree and disagree as "No". Correct responses for the questions attracted one (1) point each and the wrong answers attracted no mark (0). The total score for each respondent was obtained by adding the individual scores of each item. The overall score was divided by the number of items within each section to obtain an overall mean score. Subsequently, the overall mean value was used as a cut-off point to determine knowledge or lack of it. Those who scored the mean and above were considered to have "Good Knowledge" while those who scored below the mean were considered to have "Bad Knowledge".

In assessing the women's practices, there were twenty-four items regarding essential new-born care practices scored on a 5-point Likert type scale ranging from 1 (Strongly disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly agree). Practices were estimated by summing all individual responses to each item, and an overall mean value was calculated and used as a cut-off point. Respondents who scored the mean and above were considered to have a "Good Practice", while those who scored below the mean were considered to have a "Bad Practice".

Pretesting

The questionnaires were pretested in the Jakarayilli community. The community is located in the Tamale metropolis and has the same demographic characteristics as the Kukuo community. In total 20 women were selected to respond to the questionnaire. The pretest data was not included in this study but was used to compute the test–retest reliability score. The pretesting allowed certain modifications in the questionnaire. These modifications are related to the nature of the wording and sequence of

questions. The pretested data was used to assess the test–retest reliability of the instrument with an alpha Cronbach score of 0.72.

Data analysis

Data was entered into EpiData version 3.1 and cleaned before being imported into IBM SPSS Statistics Version 26.0 for analysis. The data was first presented as descriptive statistics involving frequencies, mean and standard deviations. A multivariable binary logistic regression analysis was used to compare the associations between the dependent and independent variables, using Odds Ratio (OR) at 95% Confidence Interval (CI). All statistical tests were considered at a p-value ≤ 0.05 to be statistically significant.

Ethical consideration

Ethical clearance was obtained from the institutional ethics review committee of the university for development studies in Ghana (UDS/RB/154/23). The study was executed according to the guidelines stipulated by the institutional ethics review committee. All respondents, in line with the ethics review committee guidelines, gave written and verbal informed consent.

Results

Socio-demographic information of respondents

The average age of the mothers was 29.58 ± 4.41. Mothers' education (34.3%) and fathers (48.6%) were tertiary. Mothers (16.6%) and fathers (14.3%) had no formal education. Similarly, the mothers were Dagombas (67.1%) and Muslims (61.1%). The mothers who had maternity leave were 53.6%. The period of maternity leave varied from two (32,8%), three (33.9%), four (30.2%), and six (3.2%) months. The mothers described the household income status as low (21.4%), middle (74.6%), and high (3.9%). Table 1 shows the socio-demographic information of respondents.

Mothers' knowledge of essential new-born care and danger signs in infants

Concerning mothers' knowledge of essential newborn care, it was shown that the mothers (77.2%) agreed that the immediate care given to a newborn after birth is essential newborn care. Also, mothers (92.9%) agreed that caregivers are crucial in providing a supportive and nurturing environment for the newborn, ensuring proper feeding, hygiene, and regular healthcare visits. Furthermore, mothers (87.9%) agreed that—Essential newborn care components are thermal care, umbilical cord care, breastfeeding initiation, and early newborn assessment. Similarly, mothers (91.8%) revealed that it is

Table 1 Distribution of demographic sociodemographic characteristics

Variable	Frequency	Percentage
Age *(Mean ± Std. Deviation)*	29.58 ± 4.41	
Mother's level of education		
Basic	34	12.3
No formal education	46	16.6
Secondary	75	27.1
Technical	27	9.7
Tertiary	95	34.3
Total	277	100
Father's level of education		
Basic	6	2.1
No formal education	40	14.3
Secondary	53	18.9
Technical	45	16.1
Tertiary	136	48.6
Total	280	100
Ethnicity		
Akan	35	12.5
Dagomba	188	67.1
Ewe	31	11.1
Gonja	5	1.8
Mamprusi	3	1.1
Others	18	6.4
Total	280	100
Religion		
Christianity	109	38.9
Islam	171	61.1
Total	280	100
Occupation		
Housewife	50	18.0
Public Civil Servant	122	43.9
Trader	106	38.1
Total	278	100
Maternity leave		
Yes	150	53.6
No	130	46.4
Total	180	100
Period of maternity leave		
Four months	48	17.1
Six months	6	2.1
Three months	164	58.7
Two months	62	22.1
Total	280	100
Average household income		
High	11	3.9
Low	60	21.4
Middle	209	74.6
Total	280	100
Distance to a nearby health facility		
> 30 min	80	28.6
Less than 30 min	200	71.4
Total	280	100

recommended to breastfeed newborns immediately after birth. Mothers (88.6%) indicated that the first immunization should be given to a newborn within the first month after birth. Most mothers (90.3%) agreed that routine newborn screening tests help identify potential health conditions or disorders requiring early intervention. The overall level of knowledge of mothers was assessed. The current study revealed that 50.7% of mothers had good knowledge of essential newborn care practices, with the mean score being 103.3 ± 17.19, a minimum score of 27, and a maximum of 125.

Knowledge of danger signs in newborns revealed that mothers (95.4%) agreed that yellowish discolouration of eyes, palms, and soles is a danger sign among infants. Also, mothers (94.6%) agreed that the inability to breastfeed is a dangerous sign in newborns. Similarly, mothers (95.7%) agreed that abnormal limb and eye-jerking movements are dangerous signs among infants. Furthermore, other danger signs, as indicated by the mothers, include difficulty breathing (95.8%), high-grade fever (96.8%), a baby cold to touch (93.6%), and a lazy baby/lethargy (96.8%). Table 2 shows the distribution of mothers' knowledge of the danger signs in new-born.

On respondents' knowledge level on the danger signs in newborn children, 56.8% had good knowledge, while 43.3% had poor knowledge with a mean score of 44.7 ± 6.58 with a minimum of 10 and a maximum of 50.

Table 2 Distribution of mothers' knowledge of danger signs in new-born

Variable	Agree (%)	Neutral (%)	Disagree (%)	Total
Yellowish discolouration of eyes, palms, and soles	267 (95.4)	9 (3.2)	4 (1.4)	280
Unable to breastfeed	265 (94.6)	9 (3.2)	6 (2.1)	280
Abnormal jerking movement of limbs and eyes	268 (97.8)	6 (2.2)	6 (2.1)	280
Difficulty of breathing	268 (95.8)	9 (3.3)	3 (1.9)	274
High-grade fever	271 (96.8)	6 (2.2)	3 (1.1)	280
A baby cold to touch	262 (93.6)	6 (2.2)	12 (4.3)	280
Lethargic baby	271 (96.8)	9 (3.2)	0 (0.0)	280
Abdominal distension	271 (96.8)	9 (3.2)	0 (0.0)	280
Vomiting /diarrhoea	271 (96.8)	6 (2.2)	3 (1.1)	280
Crying excessively	265 (94.6)	9 (3.2)	6 (2.1)	280

Practices of essential new-born

The study findings revealed that the majority of mothers agreed that they kept new-born warmth by covering all body, including the head and legs (94.7%), skin-to-skin contact was maintained for at least one hour/until completion of the first breastfeeding (86.4%), gave a bath after 24 h of birth (86.4%), and the first breastfeeding session was initiated within the first hour after birth (91.1%). The majority (91.8%) continued breastfeeding alongside complementary foods and 91.4% agreed that the baby fed breast milk every 2–3 h daily. Table 3 shows the distribution of the practices of essential newborn care among mothers.

The study again revealed that 60.7% of mothers with neonates had good essential newborn care practices while 39.3% had a bad practice, with a mean score of 80.3 ± 12.22 a minimum score of 19, and a maximum of 95.

Table 3 Distribution of the practices of essential newborn care among mothers

Variable	Agree	Neutral	Disagree	Total
Kept new-born warmth by covering all body	265 (94.7)	12 (4.3)	3 (1.1)	280
Skin-to-skin contact was maintained	242 (86.4)	15 (5.3)	23 (8.2)	280
Gave a bath for her baby after 24 h of birth	242 (86.4)	18 (6.4)	20 (7.1)	280
Kept the cord clean and dry	241 (86.1)	15 (5.3)	24 (8.6)	280
Counselled on feeding practices	265 (94.6)	12 (4.3)	3 (1.1)	280
First breastfeeding session was initiated within the first hour	255 (91.1)	15 (5.3)	10 (3.6)	280
Baby fed exclusively breast milk	257 (91.8)	15 (5.3)	8 (2.9)	280
Exclusive breastfeeding for the first six months	239 (86.3)	13 (4.7)	25 (9.0)	277
Breastfeeding alongside complementary foods	257 (91.8)	9 (3.2)	14 (5.0)	280
Baby-fed breast milk every 2–3 h per day	256 (91.4)	9 (3.2)	15 (5.4)	280
Breastfed on demand	267 (95.4)	9 (3.2)	4 (1.4)	280
Gave a bath for her baby after 24 h of birth	254 (90.7)	12 (4.3)	14 (5.0)	280
Baby received eye ointment immediately after birth	243 (86.8)	15 (5.3)	22 (7.9)	280
Not use any substance to the eye of the afterbirth	256 (91.4)	12 (4.3)	12 (4.3)	280

Factors associated with essential new-born care practices

A multivariable logistic regression model was used to examine the association between some selected maternal characteristics (age, mother's educational level, father's educational level, occupation, knowledge of ENBC, and knowledge of danger signs in newborns) and maternal practices of essential newborn care. Some demographic characteristics (age, education, and occupation) significantly influenced essential newborn care practices. Respondents who were between the ages of 25–29 years (AOR = 1.18, 95% CI:0.35–4.01), have tertiary education or above (AOR = 5.2, 95% CI:1.36–18.49) and traders (AOR = 1.41, 95%CI:0.45–4.42) were more likely to practice good essential new-born care practices than their counterpart. Also, women with good knowledge of ENBC (AOR = 11.57, 95% CI:5.21—25.70) had 11.57 times the odds of good essential newborn care practices. Also, those with good knowledge of danger signs in newborns (AOR = 4.62, 95% CI:2.26–9.45) had 4.62 times more odds of practising good essential newborn care practices than their counterparts. Table 4 shows the factors associated with essential newborn care practices.

Discussion

In this study, we determine mothers' knowledge and practices of essential care in Ghana's peri-urban community. Women's knowledge of essential newborn care, especially in peri-urban resource-limited settings, is critical in implementing measures to promote child health and ensure the attainment of the Millennium Development Goals. This ENBC is critical for averting neonatal care, promoting child health, and ensuring optimal growth and development [13, 14]. Therefore, identifying essential newborn care is a critical element of knowledge and subsequent practices. The mothers (50.4%) appropriately identified that the immediate care given to a newborn after birth is termed Essential New-born Care (ENBC). Understanding the critical components of

Table 4 Factors Association with essential newborn care practices

Variable	Essential newborn care practices		COR (95%CI)	AOR (95%CI)
	Good	Bad		
Age (in years)				
≤ 24	20 (7.14)	13 (4.64)	1	1
25–29	72 (25.71)	43 (15.36)	1.09 (0.49–2.41)	1.18 (0.35–4.01)
30–34	61 (21.79)	37 (13.21)	1.07 (0.48–2.41)	0.82 (0.24–2.87)
35 and above	17 (6.07)	17 (6.07)	0.65 (0.25–1.71)	0.93 (0.21–4.17)
Mother's Educational level				
No formal education	24 (8.66)	22 (7.94)	1	1
Basic	10 (3.61)	24 (8.66)	0.38 (0.15–0.98)	0.33 (0.09–1.17)
Secondary	48 (17.33)	27 (9.75)	1.63 (0.77–3.44)	3.24 (0.96–10.86)
Technical	22 (7.94)	5 (1.81)	4.03 (1.30–12.49)	4.17 (0.85–20.33)
Tertiary	66 (23.83)	29 (10.47)	2.09 (1.01–4.31)	5.02 (1.36–18.49)
Father's Educational level				
No formal education	22 (7.86)	18 (6.43)	1	1
Basic	2 (0.71)	4 (1.43)	0.41 (0.07–2.49)	0.24 (0.02–2.95)
Secondary	24 (8.57)	29 (10.36)	0.68 (0.30–1.54)	0.39 (0.12–1.29)
Technical	31 (11.07)	14 (5.00)	1.81 (0.75–4.40)	0.73 (0.19–2.77)
Tertiary	91 (32.50)	45 (16.07)	1.65 (0.81–3.39)	0.39 (0.12–1.35)
Occupation				
Housewife	28 (10.07)	22 (7.91)	1	1
Public Civil servant	80 (28.78)	42 (15.11)	1.50 (0.76–2.93)	0.48 (0.14–1.65)
Trader	60 (21.58)	46 (16.55)	1.02 (0.52–2.02)	1.41 (0.45–4.42)
Knowledge on ENBC				
Good knowledge	123 (43.93)	19 (6.79)	7.44 (3.93–14.10)	11.57 (5.21–25.70)
Poor knowledge	47 (16.79)	91 (32.50)	1	1
Knowledge of danger signs in new-born				
Good knowledge	129 (46.07)	30 (10.71)	4.19 (2.27–7.73)	4.62 (2.26–9.45)
Poor knowledge	41 (14.64)	80 (28.57)	1	1

essential newborns is critical for parents to implement community-based interventions.

Similarly, other studies also identified a good understanding of essential new-born care as the care usually rendered to children during the perinatal period [10, 14]. This knowledge was essential as it provided the impetus for the implementation of care by mothers and ensured the prevention of child morbidity and mortality [16]. The essential care provided included a supportive and nurturing environment for the newborn, ensuring proper feeding, hygiene, and regular healthcare visits. These measures are critical to promoting childcare [14]. Initiation of early breastfeeding is crucial for infant development, plays an important role in bonding, ensures adequate nutrition to the baby, and promotes early recovery of the mother [10]. Therefore, having adequate knowledge of the importance of early breastfeeding initiation is critical for mothers to do so, especially when it is most appropriate. In line with this knowledge, more than half (57.5%) of mothers indicated that they initiated breastfeeding right after birth. Similarly, previous studies also identified early breastfeeding initiation as an essential component of newborn care.

Consequently, it was reported that mothers (46.6%) had adequate knowledge of the importance of early breastfeeding initiation [17]. The findings of this study warrant the need to continue to promote education during the antenatal period to ensure that mothers initiate breastfeeding right after birth as a critical component of ENBC. This can only be achieved if the mothers have the requisite knowledge and understanding of the benefits of early initiations.

It is also important that mothers can appropriately identify the danger signs in the newborn as it is necessary to initiate measures to access services. Mothers' knowledge of essential newborn care is essential especially in developing countries as it forms the basis for improving behaviour change. Previous studies in Sri Lanka [18], Kenya [19] and Nepal [20] has reports of low levels of mothers' knowledge regarding identifying the danger signs in newborns. Furthermore, identifying some dangerous signs among infants is critical for parents to initiate care-seeking and avoid dangerous care practices. The study revealed that mothers (57.5%) identified yellowish discolouration of eyes, palms, and soles as a dangerous sign in newborns. However, another study showed mothers (10.5%) identified jaundice as a dangerous sign among neonates [21]. The yellowish discolouration of a baby within a few days after birth may be physiological or pathological and warrants the immediate assessment of a health service provider. The consequential influence can harm child growth, development, and survival.

In this study, we demonstrated that mothers used diverse and multiple techniques to ensure proper temperature regulation in the newborns. These techniques adopted ranged from keeping the newborn warm by covering the whole body, including the head and legs (62.9%), early initiation of breastfeeding (50.0%), and not bathing the baby within the first 24 h after birth (45.8%). Keeping the baby warm, especially in the first 24 h after birth, is critical for overall child survival, growth promotion, complications prevention, and proper bonding. Previous studies also showed that mothers practised these tenets to ensure newborn health and development. These practices included keeping warm with clothing (66.9%) [21], early initiation of breastfeeding (45.8%) [22], and late initiation of bathing (58.4%) [11]. To ensure the proper growth and development of the baby, diverse and multiple techniques must be adopted to ensure the comprehensiveness of the care and adequacy. Another important practice in newborn care is ensuring the cord is always clean and dry. In this current study, mothers (51.1%) appropriately ensured that the baby's cord was relatively clean and dry and did not apply anything to the cord. The cord has a higher risk of infection, which results in neonatal sepsis, should other household (non-sterile) chemicals and detergents be applied. This finding is an improvement to a previous one that showed that mothers (23.3%) applied other household chemicals and detergents to the cord [1]. The household chemicals usually applied to the cord of an infant include butter (especially Shea), pomade (Vaseline), and or other household detergents [1, 11, 12].

In this study, we identified that age (25–29 years), education (at least tertiary), and self-employment (trading) were significant predictors of good essential newborn care. These sociodemographic factors are essential for promoting good practices as respondents are found to have the basic capacity, resources, and time to learn appropriate care behaviours. Consequently, others with good knowledge of ENBC were 11.57 times more likely to have good essential new-born care practices, and those with good knowledge of danger signs in newborns were 4.62 times more likely to practice good essential newborn care practices. In India, it was also identified that having good maternal knowledge of the danger signs is strongly associated with the institutionalization of essential new-born care practices [22, 23]. Therefore, training community women on the danger signs in newborns may be a precursor to adopting essential newborn care. This is particularly the need to ensure that appropriate health education is given to mothers during pregnancy as it may promote ENBC. The birth attendants, mode of delivery, knowledge, and attitude of mothers toward essential

new-born care were found to be significantly associated with essential new-born care practices [7, 11, 24]. Having at least one ANC visit and preparedness for delivery were positively associated with good new-born care practices of mothers [13, 15]. Participants who received ENC education postpartum are over two times more likely to have good knowledge and practices of ENC than those who do not receive ENC education postpartum.

Strengths and limitations

One critical strength of this study is its ability to highlight the critical knowledge and practices of essential newborn care in peri-urban communities in Ghana. to the best of our knowledge, this is one of the very first studies in northern Ghana that assesses these practices among women under neonates. However, the study is not without some limitations. One important limitation is that the study was conducted in only one community within the tamale metropolis and overgeneralizing the findings to the entire northern Ghana may be inappropriate. Also, some study respondents were required to recall events within the last 28 days, depending on the child's age at the time of the study. This could have been influence by recall bias and social desirability bias.

Conclusion

The study's outcome revealed that mothers of the Kukuo community generally have adequate knowledge of the essential newborn practices and danger signs of newborns and demonstrated relatively good ENBC practices. Therefore, focused health education on newborn care practices should be integrated into routine antenatal care services to help increase women's knowledge and ability to practice safe newborn care behaviours. It is, therefore, imperative that maternal education during antenatal care, especially towards cord care, eye care, thermoregulation, and immunization, are emphasized, especially during the pre and postnatal periods. It is also important that health authorities like the Ghana Health Service institute community-based surveillance systems to identify and mitigate suboptimal neonatal care practices by leveraging the extended role and coverage of community health nurses in the primary health care system. This is because Ghana's health authorities and its stakeholders, including non-governmental organizations do not only congregate efforts to reduce neonatal deaths only at the institutional level but also intensify community-based new-born care strategies by creating strong linkages between health facilities and the home (especially newborns) to effectively handle risk factors strongly related to essential newborn care. Another critical intervention to improve essential newborn care is Improving sources of livelihood and targeted education to encourage early antenatal visits. Facility-based births might improve newborn care where it is inadequate.

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Author contributions
The authors, KDK and RNN, were responsible for conceptualizing the study, designing the research methodology, collecting statistical analysis and interpretation, and drafting the manuscript. All authors have reviewed and approved the final version of the manuscript.

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Availability of data and materials
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The study was executed according to the guidelines stipulated by the institutional ethics review committee. The ethical approval was obtained from the University for Development Studies ethical review board committee. All respondents, in line with the ethics review committee guidelines, gave written and verbal informed consent.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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References

1. Efa BW, Berhanie E, Desta KW, Hinkosa L, Fetensa G, Etafa W, et al. Essential new-born care practices and associated factors among post natal mothers in Nekemte City, Western Ethiopia. PLoS ONE. 2020;15(4): e0231354.
2. Abebe H, Adane D, Shitu S. Essential newborn care practice and its associated factors in Southwest Ethiopia. Arch Public Health. 2021;79:1–9.
3. Amsalu ET, Kefale B, Muche A, Fentaw Z, Dewau R, Chanie MG, et al. The effects of ANC follow up on essential newborn care practices in east Africa: a systematic review and meta-analysis. Sci Rep. 2021;11(1):12210.
4. 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. Adv Public Health. 2018;2018.
5. Alemu A, Eshete A. Newborn care practices and associated factors among lactating mothers at home in the rural districts of Gedeo Zone, southern Ethiopia. Pediatr Health Med Therapeut. 2020:47–54.
6. Alamneh Y, Adane F, Yirga T, Desta M. Essential newborn care utilization and associated factors in Ethiopia: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2020;20:1–9.
7. Tegene T, Andargie G, Nega A, Yimam K. Newborn care practice and associated factors among mothers who gave birth within one year in Mandura District, Northwest Ethiopia. Clin Mother Child Health. 2015;12(1):1000172.

8. Derese N, Ahmed K, Tesa E, Derese T. Essential newborn care practice and associated factors among home delivered mothers within the past six months. Abaya District, West Guji Zone, Oromia Regional State, Ethiopia. 2020.
9. Saaka M, Ali F, Vuu F. Prevalence and determinants of essential newborn care practices in the Lawra District of Ghana. BMC Pediatr. 2018;18:1–12.
10. Ayele AD, Tenaw LA, Kassa BG, Mihretie GN, Belay HG, Teffera AG, et al. Knowledge and practice of essential newborn care and associated factors among women in Ethiopia: systematic review and meta-analysis. Reprod Health. 2022;19(1):172.
11. Dagne H, Lemi H, Aman H, Gebru T. Essential newborn care practices and associated factors among mothers who attended postnatal care at public health facilities in Boset District, Ethiopia.
12. Nigatu SG, Worku AG, Dadi AF. Level of mother's knowledge about neonatal danger signs and associated factors in North West of Ethiopia: a community based study. BMC Res Notes. 2015;8:1–6.
13. Saaka M, Iddrisu M. Patterns and determinants of essential newborn care practices in rural areas of northern Ghana. Int J Popul Res. 2014;2014:1–10.
14. Meseka LA. Knowledge and practices on essential newborn care among postnatal mothers at Juba teaching hospital South Sudan: University of Nairobi; 2016.
15. Batamuriza M, Uwingabire E, Oluyinka A. Essential newborn care among postnatal mothers at selected health centers in eastern province, Rwanda. Rwanda J Med Health Sci. 2020;3(2):139–51.
16. Ayete-Nyampong J, Udofia EA. Assessment of knowledge and quality of essential newborn care practices in La Dade Kotopon Municipality, Ghana. PLoS ONE. 2020;15(8): e0237820.
17. 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 Childbirth. 2016;16:1–8.
18. Senarath U, Fernando DN, Vimpani G, Rodrigo I. Factors associated with maternal knowledge of newborn care among hospital-delivered mothers in Sri Lanka. Trans R Soc Trop Med Hyg. 2007;101(8):823–30.
19. Obimbo E, Musoke R, Were F. Knowledge, attitudes and practices of mothers and knowledge of health workers regarding care of the newborn umbilical cord. East Afr Med J. 1999;76(8):425–9.
20. Tuladhar S. The Determinants of Good Newborn Care Practices in the Rural Areas of Nepal. 2010.
21. 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(8): e0202542.
22. Chichiabellu TY, Mekonnen B, Astawesegn FH, Demissie BW, Anjulo AA. Essential newborn care practices and associated factors among home delivered mothers in Damot pulasa Woreda, southern Ethiopia. Reprod Health. 2018;15:1–11.
23. Sharan M. Determinants of safe motherhood and newborn care behaviors in rural India: The Johns Hopkins University; 2004.
24. Singh DR, Harvey CM, Bohara P, Nath D, Singh S, Szabo S, et al. Factors associated with newborn care knowledge and practices in the upper Himalayas. PLoS ONE. 2019;14(9): e0222582.

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