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Research Article

Early Newborn Bath Practice and its Associated Factors Among Mothers Who Gave Birth within Last Six Month in Kamba Zuria District, South Ethiopia, a Community-Based Cross-Sectional Study, 2023

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Abstract

Background: Early newborn bathing refers to washing a newborn within the first 24 hours of life, often practiced in many cultural settings. This practice increases risks of hypothermia, skin infections, and disruption of the natural skin barrier, which may contribute to neonatal morbidity and mortality. Despite global recommendations to delay bathing until at least 24 hours postpartum, studies reveal high rates of early bathing, reflecting deep-rooted traditional beliefs and inadequate awareness. In Ethiopia, previous studies primarily focused on health facilities and are concentrated in specific regions, limiting a comprehensive understanding of its impact at the community level. These gaps underscore the need for community-based research. Therefore, this study aimed to assess early newborn bath practice and its associated factors among who give birth within last six months in Kamba Zuria District, south Ethiopia, 2024.

Method: A community-based cross-sectional study conducted among 601 postpartum mothers in Kamba Zuria District, Southern Ethiopia from January 1 to 30, 2024. A computer generated simple random sampling technique used to select study participants. A structured an interviewer administered questionnaires used to collect data. Data entry conducted in Epi Data version 4.6, then exported to SPSS version 26 for analysis. A bivariable and multivariable logistic regression model analysis used to examine the association between independent and dependent variables. Adjusted odds ratios with a 95% confidence interval and p value <0.05 were used to measure the strength of associations and statistical significance.

Results: This study revealed that 290 (48.3%) mothers, with a 95% CI (44%, 52%), were practicing early newborn bathing. Antenatal care follow-up (AOR = 1.6, 95% CI = 1.087, 2.409), home delivery (AOR = 4.57, 95% CI = 3.046, 6.876), information about the time of baby bathing (AOR = 3.66, 95% CI = 2.48, 5.39), and knowledge about neonatal danger signs (AOR = 2.47, 95% CI = 1.48, 4.1) were significantly associated with early newborn bath practice.

Conclusion and recommendations: This study revealed a high practice of early newborn bath, in contrary to world health organization's recommendation. Therefore, strengthening community-based health education and counseling on antenatal care follow up, facility- deliveries, timing of newborn bath, and neonatal danger signs are essential to reduce early newborn bathing.

Keywords: Newborn; Bathing; Early; Ethiopia

Introduction

New born bathing is washing away skin remnants like blood and meconium from the newborn's body and hydrating the stratum cornea of the skin to preserve skin integrity, body temperature, and barrier function [1]. Neonates can be bathed using a variety of techniques, including the tub bath, a sponge, a swaddle, and running water [2].

The World Health Organization's (WHO) and Save the Children's endorsement of newborn care interventions is recommended, as bathing should be delayed to at least 24 hours after birth unless cultural reasons inhibit the practice. However, when cultural reasons prohibit the intervention, women must postpone newborn bathing for at least 6 hours to minimize the risk of neonatal hypothermia [3].

Early newborn bathing is the washing or refreshing of a newborn's body in water before 24 hours following delivery [1,2]. It causes hypothermia [4], which leads to potentially fatal conditions like low blood sugar, respiratory distress, irregular coagulation, jaundice, pulmonary bleeding, and an increased risk of infection [5]. Additionally, a newborn's early bath prevents skin-to-skin contact that can impede the crawling reflex, potentially reducing the time to effective breastfeeding [3,6].

Early bathing contributes 50% of under-five mortality and 46% of infant mortality compared with delayed bathing of new born [7]. Early bathing is significant cause for hypothermia [8], which contributes to global neonatal mortality either directly or indirectly. Hypothermia secondary to early newborn bathing is a major cause of death if it concurrently occurs with low blood sugar levels, respiratory distress, abnormal clotting, jaundice, pulmonary hemorrhage, and an increased risk of developing infections [9].

Early newborn bathing practices vary significantly across the

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globe, with notable differences observed between regions. In the United States, studies show that 27% of newborns in New York City and 23% in Peru are bathed within the first 24 hours of birth [10,11]. In Asia, this rate is significantly higher, reaching 86% [12]. In Africa, early newborn bathing practices display a wide range. In East Africa, the prevalence is lower, with 19% of home-delivered newborns and 45% of hospital-delivered newborns receiving early baths [13]. Comparatively, West Africa has higher rates, ranging from 93% in Ghana to 98.2% in Nigeria (14,15). South Africa reports a moderate prevalence of 40.6% [16]. Across Sub-Saharan Africa, approximately 50% of newborns are bathed early [17], with East Africa ranging from 19% in Tanzania to 74% in Malawi [13,18]. On Ethiopia, early newborn bathing rates vary significantly by region, from 32.5% in Jimma to 84% in Southwest Guji [19,20].

Previous studies on early newborn bathing practices suggest that low levels of education [8], insufficient knowledge about hypothermia [8,19], and limited awareness of newborn danger signs [19,21] were predicators. In addition, being a first-time mother [8], lack of antenatal care visits [21], living in urban settings [22], having a vaginal delivery [19], and delivering without the support of skilled birth attendants (SBAs) [18] were factors influence for early new born bathing.

Globally, various interventions have been implemented to reduce early newborn bathing, including multi-sectorial maternal and newborn programs [23], home-based care packages [24], community-based preventive care [25], and educational projects promoting skin-to-skin contact [26]. In Ethiopia, the government prioritized newborn thermal protection as a key child survival strategy, integrating it into essential newborn care packages in both community and health facility settings [27].

Most studies conducted in Ethiopia are facility-based [19,21,22], failing to capture the magnitude and practices of early newborn bathing at the community level, where cultural practices and traditional beliefs are more influential. In addition, existing studies have concentrated of specific region, rarely explored the role of socioeconomic factors, such as income status, and limited data exists on practices of postnatal mothers regarding early newborn bathing, especially within the first six months postpartum. As a result, this study is intended to address these gaps. Therefore, this study aimed to assesses early newborn bath practice and its associated factors among mothers who gave birth within last six month.

Methods and Materials

Study area, period and study design

A community based cross-sectional study conducted in Kamba Zuria District, south Ethiopia from January 1 to 30, 2024. It located in 100Km West of Arba Minch town and 545 Km from Addis Ababa, a capital city of Ethiopia. According to 2022/23 district health office projection plan, estimated population was 146,308 from this 71,691 were male, whereas, 74617 were females. The district consists of 33 public health institutions (6 health centers, and 27 health posts).

Study population and eligibility criteria

All mothers who gave birth in the last six months preceding the study period in a district were source populations. Whereas, all simple randomly selected postpartum women who gave birth in the last six months in sampled Kebeles in a district were study population.

All women who gave live birth in the last six months before the data collection period and living in the selected Kebele (smallest administrative unit) for more than six months were included in the study. However, postnatal mothers who were unconscious or seriously ill were excluded from the study.

Sample size determination and sampling technique

A single population proportion formula used to calculate sample size by considering the assumptions: 95% confidence interval, 5% margin of error, and prevalence of early bathing practice (43%) from a previous study conducted in the Gurage Zone, southern Ethiopia [21].

n= $(Z\alpha/2)^2 \times p\ (1-p)/d2$. Where, $Z\alpha/2$ = Standard normal variable at 95% confidence level (1.96), p = Population proportion prevalence, d = Margin of error, n = Sample size, so n = $(1.96)^2 \times 0.43(1-0.43)/(0.05)^2$; n = 376.630~377. By taking design effect 1.5 and 10% non-response rate, the total sample size was (377*1.5) +38= 623.

From 27 Kebeles in district, eight were selected by simple random lottery method. Then, total sample size proportional allocated for each selected Kebele, depending on average of two-month EPI record of last year, which is 1,144. Finally, study population selected by computer generated simple random sampling techniques (Figure 1).

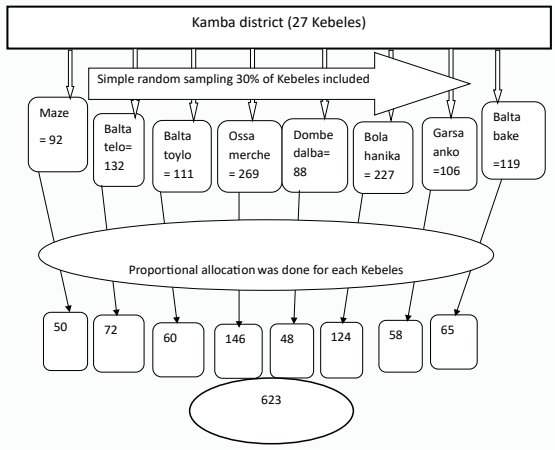

Figure 1: Schematic presentation of sampling techniques and procedures to assess early newborn bath practice and its associated factors among mothers in Kamba Zuria District, Gamo Zone, Southern Ethiopia, 2024.

Data collection tools and procedure

A structured English version questionnaires adapted from previous literature [21,28]. The questionnaire contained four sections: Socio-demographic information, maternal and neonatal health service-related factors, health care related factors, and knowledge-measuring questionnaires. Data collected by using face-to-face interviewer administered Gamogna version (local language) questionnaires.

Study variables

Dependent variable; early newborn bathing

Independent variables

Socio-demographic factors: Age, ethnicity, religious, marital status, education level, occupation, and wealth status.

Maternal and neonatal health service-related factors: Parity, ANC follow-up and counseling, types of pregnancy, mode of delivery, place of delivery, delivery attendants, complications during recent pregnancy, NICU admission, KMC service, childhood bed net use, and PNC follow-up.

Health Care related factors: Heath facility nearby, health providers give awareness, health providers who give awareness and distance from health facility.

Women's knowledge related factors: Having information on when to bathe the neonate, first bath time after delivery, type of water used for new-born bathing, bathing techniques, knowledge on neonatal hypothermia, and knowledge about neonatal danger signs.

Operational definition and measurement

Early bathing: Washing or refreshing a newborn's body in water before 24 hours following delivery (2). Who bathed before 24 hours scored yes (1) and who bathed after 24 hours 0 (no) [8,19,29,30].

Knowledge of newborn danger sign: postpartum women recalled three or more out of ten WHO-recognized newborn danger signs without the interviewer's considered as good knowledge [31].

Household wealth status: It was generated using principal component analysis. A total of 38 dichotomous (Yes/No) questions were used including domestic animals, durable assets, productive assets, and dwelling characteristics [28]. Finally, it was grouped as poor, medium and rich [32].

Data quality assurance

Data collectors and supervisors received training regarding on the objective of the study, data collection procedures, and maintaining the confidentiality and privacy of the information of the respondents. A pre-test was done by using 5% of samples before the actual data collection and necessary amendment was taken. The investigators and supervisors carefully were reviewed and checked completeness, accuracy, and consistency before receiving the completed questionnaires from the data collectors and made necessary validations

Data processing and analysis

First data coded and entered into Epi Data version 4.6.0.6, then exported to SPSS version 26.0 for analysis. A descriptive statistic such as frequency, mean, standard deviation, and percentages were used to characterize study. The data were presented in the form of a table and chart. The multicollinearity effect and model fitness test were checked by using Variance Inflation Factor (VIF) and Hosmer-Lemeshow statistical test respectively. A bivariable logistic regression analysis was used to calculate the COR with its 95% confidence interval to assess relations between dependent and outcome variables. Variables with a p-value of ≤0.25 in the bivariable logistic regression analysis were considered candidates for multivariable logistic regression. AOR with a 95% CI was used to measure the strength of association and statistical significance was declared with p-value <0.05 in multivariable logistic regression analysis.

Result

Socio demographic characteristics of respondents

A total of 601 participants were involved in this study, with response rate of 96.4%. The minimum and maximum ages of the respondents were 19 and 47 years old, respectively. The mean age of the respondents was 30.65 (±5.62 SD). Around four hundred fourteen (68.9%) respondents were aged 20-34 years old. Five hundred forty-seven (91.0%) were Gamo. Half (52.2%) of the study participants were protestant. Almost all (98.5%) of the participants were married. One hundred seventy-six (30.3%) mothers and three hundred twenty (33.4%) husbands have no formal education. Four hundred twelve (68.6%) mothers and four hundred eighteen (69.6%) husbands were farmers. Two hundred households (33.3%) were located in the low wealth status (Table 1).

Table 1: Distribution of socio-demographic characteristics of early newborn bath practice and associated factors among mothers who gave birth in the last six month in Kamba Zuria Districts, Gamo Zone, Southern Ethiopia, 2024 (n=601).

Variables	Categories	Frequency (n)	Percent (%)
Age	<20 yr.	23	3.8
	[20-34] yr.	414	68.9
	[>=35] yr.	164	27.3
Ethnicity	Gamo	547	91.0
	Gofa	23	3.8
	Wolaita	10	1.7
	Amhara	21	3.5
Religions	Protestant	314	52.2
	Orthodox	259	43.1
	Muslim	28	4.7
Marital status	Married	593	98.7
	Divorced	8	1.3
Mothers` education	Uneducated	182	30.3
	Read and write	151	25.1
	Primary education	176	29.3
	Secondary education	67	11.1
	Certificate and above	25	4.2
Husbands` educational status	Uneducated	204	33.9
	Read and write	97	16.1
	Primary education	148	24.6
	Secondary education	98	16.3
	certificate and above	54	9.0
Mothers' occupation	Employee	20	3.3
	Farmer	412	68.6
	Merchant	160	26.6
	Student	9	1.5
Husbands' current occupation	Employee	38	6.3
	Farmer	418	69.6
	Merchant	105	17.5
	Student	12	2.0
Wealth status	Poor	200	33.3
	Medium	198	32.4
	Rich	203	33.8

Maternal and neonatal health service-related characteristics

This study showed that two hundred seventy-five mothers (45.8%) had a parity of two to four. More than half of the respondents, 346 (57.6%), had ANC follow-up, and out of them, ninety-nine (28.6%) had four or more visits. During ANC follow-up, 331 (95.6%) respondents received counseling about birth preparedness, complications, and newborn care.

More than half, 329 (54.7%) of the mothers, gave birth at a health facility. Almost all (99.3%) study participants gave birth through vaginal delivery. Three hundred twenty-nine (54.7%) were assisted by health SBAs. The remaining women, 22 (3.7%) and 250 (41.6%), were assisted by traditional birth attendants (TBAs), family or relatives, and without any assistance, respectively. Two hundred sixty-four (43.9%) mothers had PNC in recent baby births. Only 44 (7.3%) mothers had faced complications recently (Table 2).

Health facility-related characteristics

Among the respondents, only 0.3% reported hospital is nearby to them, while 43.4% had access to health centers and 56.2% to health posts. Nearly half (44.9%) acknowledged that these institutions raised awareness about essential newborn care, with healthcare providers such as 26.1% HEWs and 18.8% nurses, midwives, and public health

Table 2: Maternal and neonatal health service-related characteristics in Kamba Zuria District, Gamo Zone, Southern Ethiopia, 2024(n=601).

Variables	Categories	Frequency (n)	Percent (%)
Parity	1	94	15.6
	2-4	275	45.8
	>=5	232	38.6
ANC	No	255	42.4
	Yes	346	57.6
If yes how many times	One	59	17.1
	Two	82	23.7
	Three	106	30.6
	Four and above	99	28.6
Get ANC counselling	Yes	331	95.6
	No	15	4.4
Type of pregnancy	Single	571	95
	Multiple	30	5
Place of delivery	Home	272	45.3
	Health institution	329	54.7
Mode of delivery	Vaginally	597	99.3
	Cesarean section	4	0.7
Attendant of last birth	Traditional birth attendant	22	3.7
	Health professions (SBA)	329	54.7
	Nobody/self	250	41.6
Complication during recent birth	Yes	44	7.3
	No	557	92.7
Preparedness for delivery	Yes	141	23.5
	No	460	76.5
History of NICU admission	Yes	7	1.2
	No	594	98.8
History of KMC service	Yes	1	0.2
	No	600	99.8
PNC (follow-up)	Yes	264	43.9
	No	337	56.1

officers playing key roles. Additionally, 18.5% of participants noted that healthcare facilities were within 5 km of their location.

Maternal knowledge about neonatal danger sign

Knowledge of newborn danger signs was limited, with only 20% of respondents able to identify three or more signs. Among the specific signs mentioned, 44.6% identified fever, 19.8% vomiting, and 19.5% recognized feeding problems (Figure 2).

Timing of newborn bath

Nearly half of the respondents (48.3%) bathed their newborns within the first 24 hours of birth. Most (70.9%) used tepid water for the first bath, while 29.1% used cold water, and almost all (99.8%) practiced immersion bathing (Figure 3).

Factors associated with early newborn bath

Multivariable logistic regression analysis revealed that ANC, place of delivery, information about the time of baby bathing, and knowledge about neonatal danger signs were the most statistically significant factors that determined early newborn bathing.

Mothers didn't attend for ANC visits at all were 1.6 times more likely to practice early baby bathing as compared with who visit for ANC at least once in current pregnancy (AOR 1.6, 95% CI = 1.087, 2.409). Mothers deliver at home were 4.5 times more likely to practice early baby bathing as compared with women delivered at health institutions (AOR=4.57, 95%CI=3.046, 6.876). Mothers had no information about the time of baby bathing were 3.6 times more likely early baths compared with who had information about baby bathing time (AOR = 3.66, 95% CI = 2.48, 5.39). Mothers had a poor knowledge about neonatal danger signs were 2.5 times more likely to practice early baby bathing compared to those had good knowledge of neonatal danger signs (AOR = 2.47, 95% CI = 1.48, 4.12) (Table 3).

Discussion

Delaying newborn bathing is a crucial aspect of thermal care to prevent hypothermia and reduce neonatal morbidity and mortality. Accordingly, the WHO recommends postponing bathing for at least 24 hours after birth [33].

This study on early newborn bathing practices found that 48.3% of mothers bathed their newborns early. Factors associated with this practice included ANC follow-up, place of delivery, knowledge of neonatal danger signs, and information on appropriate bathing timing.

The finding of this study (48.3%, 95% CI= (44%-52%) is higher than studies conducted in Bangladesh (23%) [18], Harar, region Eastern Ethiopia (35.4%) [8], and Jimma (32.5%) [19].

This difference might be due to variations in residency, level of education, ANC service utilization, and access to information about newborn bath. Participants involved in this study were more rural mothers than the reference study populations; as a result, participants from rural areas have less exposure to information. Mothers who had no information about the time of baby bathing were more likely to practice an early newborn bath [21]. Mothers who resided in rural areas were more likely to practice early newborn bathing [22]. Additionally, education improves the health care-seeking behaviors of mothers, and this allows receiving information on appropriate newborn care practices. In this study uneducated population was higher than the second and third reference studies, (27%, and 10.3%). Uneducated mothers were more likely to practice early newborn bathing [8,19,32].

Moreover, mothers who do not attend ANC service in second and third (9%, 11.9%) reference studies were lower than this study. Those mothers who didn't attend ANC visits at all were more likely to practice early newborn bathing [21].

However, this study's finding is lower than studies conducted in India (82.6%) [34], Nepal (75.5%) [35], Malawi (74%) [18], Pakistan (86%) [17], Ghana (93%) [36], four regions of Ethiopia (74.7%) [37], and Guji (84%) [24]. The observed variance in the findings could potentially be credited with variations in the socio-demographic attributes of mothers, temporal variations, and the impact of Ethiopia's health extension program, which has expanded women's access to prenatal care and facility delivery in the study region.

Mothers didn't attend ANC visits at all were 2 times more likely to practice early newborn bathing compared with who have ANC visit for at least once current pregnancy. This is consistent with study conducted in Nepal [38] and Gurage [21]. It might be due to this study aligns with previous research, reporting similar middle-class wealth status (30.0%) and uneducated populations (34.4%). Wealth status [39,40] and maternal education [41] were key factors influencing the utilization of ANC services and maternity care.

Mothers delivered in their home were 4.5 times more likely to practice early baby bathing compared with those who delivered in health facilities. This is similar to a study in Ghana [42], 30% of the population in this study was uneducated, highlighting the influence of education on home delivery and early newborn bathing. Mothers and

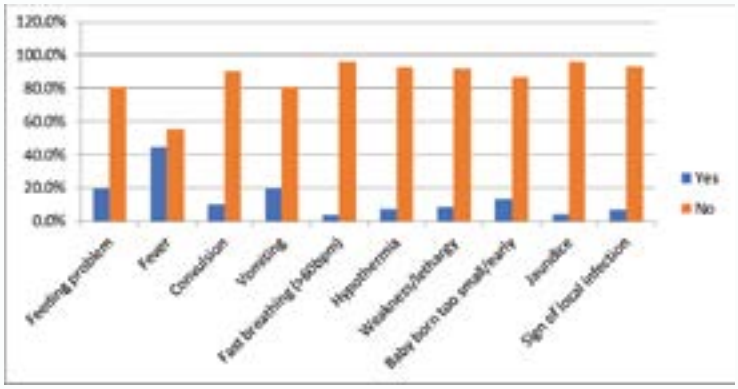

Figure 2: Maternal knowledge of neonatal danger sign in Kamba Zuria District, Gamo Zone, Southern Ethiopia, 2024 (n=601).

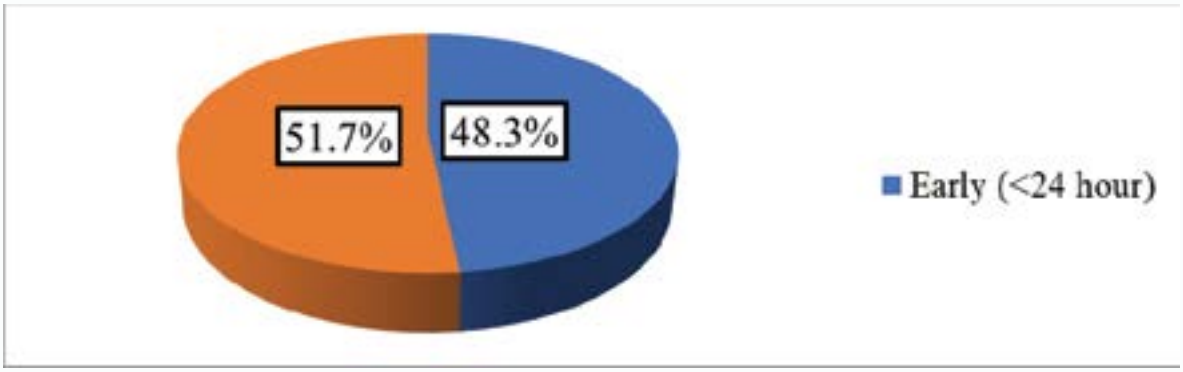

Figure 3: Time of newborn bathing among mothers in Kamba Zuria District, Gamo Zone, Southern Ethiopia, 2024 (n=601).

Table 3: Bivariate and multivariable logistic regression analysis for early newborn bath practice among women who gave birth in the last six month in Kamba Zuria District, South Ethiopia, 2024 (n=601).

Variables	Categories	Early bathing practice		COR (95% CI)	AOR (95% CI)	p-value
		Yes	No			
ANC follow-up	No	162(63.5)	93(36.5)	2.96 (2.12-4.15)	1.618 (1.08-2.40)	0.018
	Yes	128(36.9)	218(63.1)	1	1	1
Place of delivery	Health institution	92(28)	237(72)	1	1	1
	Home delivery	198(72.8)	74(28.2)	6.89 (4.81-9.87)	4.57(3.04-6.87)	0.000*
Having information	No	209(65.1)	112(35.9)	4.585 (3.2-6.48)	3.664 (2.48-5.39)	0.000*
	Yes	81(28.9)	199(71.1)	1	1	1
Knowledge of neonatal danger sign	Good	33(27.5)	87(72.5)	1	1	1
	Poor	257(53.4)	224(46.6)	3.025(1.95-4.69)	2.47(1.48-4.13)	0.001*
Faced complications during this birth	Yes	13(29.5)	31(70.5)	0.42 (0.21-0.83)	0.599(0.27-1.33)	0.209
	No	277(49.7)	280(50.3)	1	1	1
PNC follow-up	No	174 (52)	160(48)	1.416 (1.02-1.9)	1.218(0.82- 1.81)	0.33
	Yes	116 (43.4)	151(56.6)	1	1	1

COR: Crude Odds' Ratio; **AOR**: Adjusted Odds' Ratio. Significant at: *P<0.05; **p<0.001, **1:** reference group.

husbands without formal education were less likely to choose facility-based delivery [43].

Mothers lacking information on timing of newborn bathing were 3.7 times more likely to bathe their babies early, this consistent with a study in Gurage [21]. This may reflect limited health education and low community awareness, hindering informed decision-making and proper newborn care practices [44].

Mothers had a poor knowledge about neonatal danger signs were 2.5 times more likely to practice early baby bathing compared to those had a good knowledge about neonatal danger signs. This finding was in line with study conducted in Gurage [21], and Jimma [19]. Awareness of neonatal warning signs enables mothers to provide proper newborn care, particularly thermal treatment, and influences their health-seeking behavior [45,46].

Limitations of Study

Relying on mothers' recall, and not considering traditional and cultural aspects of the community as predictors were limitations of this study.

Conclusion and recommendations

According to this study, the magnitude of the early newborn bath practice was high, contrary to WHO recommendations. ANC follow-up, delivery setting, awareness of newborn baths, and knowledge

of newborn danger signs were significantly associated with early newborn bathing.

To address the high prevalence of early newborn bathing, healthcare providers should enhance community education on WHO guidelines for newborn care. ANC visits should focus on counseling mothers about the risks of early bathing and the importance of following evidence-based practices. Furthermore, healthcare facilities should provide consistent messaging and highlight the importance of recognizing newborn danger signs to discourage this practice.

Ethical approval and consent of participants

Ethical clearance was obtained from the Institutional Review Board (IRB) of the Arba Minch University College of Medicine and Health Sciences ((**IRB/23105/2023).** Additionally, permission was obtained from the Gamo zone health office and Kamba Zuria district. Before data collection, informed consent was obtained from study participants and the right to withdraw from the interview was guaranteed. The privacy and confidentiality of the information obtained from the respondents was kept confidential and secret.

Availability of data and materials

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

Author contributions

All authors (KK, MT, GE, BM, and KK) contributed equally in conception of the research problem, initiated the research, wrote the research proposal, conducted the research, made data, entry, analysis, and interpretation, and wrote and reviewed the final manuscript. All authors read and approved the final manuscript.

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