



## Research article

## Health professionals' knowledge and practice of essential newborn care at public health facilities in Bench-Sheko Zone, southwest Ethiopia

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## ABSTRACT

**Background:** Essential newborn care (ENC) is the most vital care, particularly during the first hour of the newborn's life. This study aimed to assess health professionals' knowledge and practice of ENC at public health facilities in the Bench-Sheko Zone, southwest Ethiopia.

**Methods:** A cross-sectional study was conducted among health professionals at selected public health facilities in the Bench-Sheko Zone of southwest Ethiopia. The data were collected using a self-administered, tested, and structured questionnaire. The data collected were entered in Epi info version 7 and analyzed using SPSS version 22. Bivariate and multivariable analyses were performed to determine the association between the dependent and independent variables. Categorical variables were presented in tabulations by frequencies and percentages. Continuous data were summarized by the mean score and standard deviation. Statistical significance was set at a p-value < 0.05.

**Results:** Among the 157 respondents, 60 (38.2%) and 97 (61.8%) had good knowledge and good practice of ENC, respectively. The factors associated with good knowledge of ENC were being female (AOR = 0.72, 95% CI [0.48, 0.86]), the availability of on-the-job training (AOR = 2.00, 95% CI [1.01, 3.97]), and interest in working in the delivery room (AOR = 2.5, 95% CI [1.27, 4.94]). Better educational qualification (AOR = 4.12, 95% CI [1.67, 10.18]) and the availability of on-the-job training (AOR = 3.60, 95% CI [1.58, 8.18]) were the factors associated with good practice of ENC.

**Conclusion:** Knowledge of essential newborn care among health professionals was very low; however, the practice of essential newborn care was somewhat average compared to other studies in Ethiopia. Being female, the availability of on-the-job training and interest in working in the delivery room were the factors associated with a good knowledge of ENC; while educational qualification and the availability of on-the-job training were the factors associated with a good practice of ENC. Therefore, concerned bodies should consider the provision of refreshment on-the-job training, upgrading the qualification of health professionals, and providing incentives and motivators to improve interest in working in the delivery room.

## 1. Introduction

Worldwide, nearly 7,000 newborns die every day, accounting for nearly half of all deaths among children under the age of five. The neonatal mortality rate (NMR) was halved from 36.6 deaths per 1,000 live births in 1990 to 18 deaths per 1,000 live births in 2017; however, neonatal mortality declined more slowly than under-five mortality. Global NMRs were significantly different in developing countries such as West and Central Africa, with South Asia having the highest share [1].

A child born in sub-Saharan Africa or South Asia is ten times more at risk of death in the first month of life than a child born in high-income

countries. In sub-Saharan Africa and Central and South Asia, approximately 27 and 24 newborn babies died of 1,000 births, respectively [2, 3, 4, 5]. As a result, over 60 countries are expected to hasten their progress towards realizing the SDGs (Sustainable Development Goals) on neonatal mortality by 2030 [1].

Most neonatal deaths occur in the first week of life, and 93% of NMR cases are caused by asphyxiation at birth (47.5%), neonatal infections (34.3%), and prematurity (11.1%) [6]. The three-delay model of maternal mortality can be applied to identify contributors to NMR. The delay in accessing and utilizing quality care in a health facility responsible for 30% of the NMR, which could be due to the lack of capacity of

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health facilities and the lack of good knowledge of health professionals to deliver quality care to the newborn [6].

The World Health Organization (WHO) continues to collaborate with ministries of health and partners to strengthen and invest in quality care, especially at the time of birth and the first week of life since most newborns die in this period [2, 3, 4, 5, 7]. The Essential Newborn Care Course (ENCC) is very important for providing health care workers with the necessary skills and knowledge to provide appropriate care to the newborn. The health care worker should have the necessary equipment (which includes two clean dry towels, cord clamps, razor blade, cord tie, functional resuscitation equipment, vitamin K, syringes and needles, and tetracycline eye ointment), 'three cleans' (clean hands, clean surfaces, and clean equipment) and rigorous application of the eight steps of essential newborn care [8] to minimize and ultimately prevent neonatal mortality.

The lack of adequate supplies and equipment for essential newborn care, which is exacerbated by the lack of knowledge and practice of health professionals is a problem in many sub-Saharan African countries [7]. Health professionals' knowledge and practice of lifesaving care for newborn care were determined by their profession, qualification, interest in working in the delivery room, having on-the-job training, year of training, and the availability of a national guideline in their institution [9, 10, 11, 12, 13, 14].

Some studies on the knowledge of essential newborn care; revealed that 25 % of health care providers did not have adequate knowledge and 28 % of them did not have good essential newborn care practices [12] and 9.8% of the study participants were knowledgeable about newborn resuscitation [9]. In studies conducted in Uganda and Ethiopia, half of health care providers lack the knowledge to deliver essential care to newborns [11, 13, 15, 16].

"Ensure healthy lives and promote well-being for all ages" that ends preventable deaths of newborns and children under 5 years of age were a direct statement of SDG 3 [17]. This goal can be achieved when all countries reduce NMR to a minimum of 12 per 1,000 live births [2]. However, the projected data revealed that between 2020 and 2030, an estimated 28 million newborns would die globally; 80 % of them are in sub-Saharan Africa [3].

According to the Ethiopian demographic health survey (EDHS) reports, the neonatal mortality rate has not significantly decreased since 2005 and it remained at approximately 30 newborn deaths per 1,000 live births; 39 in 2005, 37 in 2011, 29 in 2014, and 30 in 2019 [18, 19, 20, 21]. A single prospective follow-up study conducted in Jimma showed that the NMR was 35.5 per 1,000 live births [22]. This problem is reduced when health professionals have good knowledge and practice of vital care for newborns. Therefore, this study aimed to assess the health professionals' knowledge and practice of ENC at public health facilities in the Bench-Sheko Zone, southwest Ethiopia.

## 2. Methods and materials

### 2.1. Study design, area, and period

An institutional cross-sectional study was conducted at public health facilities in the Bench-Sheko Zone, southwest Ethiopia. The Bench-Sheko Zone is administratively divided into six woredas (districts) and 2 town administrations. The total population of the study area was predicted to be 847,168 (417,751 men and 429,417 women). The zone has 1 teaching hospital; 11 health centers (1 urban and 10 rural) and 128 health posts in 137 kebeles. The study was conducted between March 1 and 30, 2019.

### 2.2. Source and study populations

All health professionals working in the delivery room at all public health facilities in the Bench-Sheko Zone were the source population. All health professionals working in the delivery room in the selected public health facilities in the Bench-Sheko Zone were the study population.

### 2.3. Sample size determination and sampling method

The required sample size was determined using the Open Epi Info 7 software, taking into account the proportion of good knowledge of ENC from a study done in the Woliya zone to be 57.9% [13], 95% confidence level, 5% margin of error, and by adding 10% non-response rate compensation. The final sample size was 165. In the study area, there are 1 teaching hospital, 1 urban, and 10 rural health centers. Of these, seven public health facilities, 6 health centers (1 urban and 5 rural) were randomly selected, and 1 teaching hospital was selected purposively. The number of participants in the study was proportionally distributed according to the number of employees. The potential study participants were selected using simple random sampling by applying the lottery method.

### 2.4. Study variables and measurements

The dependent variables were the knowledge and practice of ENC. The independent variables were socio-demographic (age and sex) and characteristics of health professionals (profession, qualification, experience, training, and interest of health professionals to serve in the delivery room).

Essential newborn care is provided to the newborn immediately after delivery between birth and 24 h; the care includes drying and breathing stimulation, keeping the newborn warm, cord and eye care, vitamin A administration, and baby weighing [23, 24].

The knowledge and practice were assessed using a total of 14 and 12 "Yes/No" questions, respectively, on the various aspects of newborn care (e.g. knowledge and practice regarding the place of putting baby after birth, cleanliness/drying, immunization, thermoregulation, breastfeeding, cleanliness and umbilical cord care, and eye care were assessed). The values were coded as "1 = Correct answer (consistent with WHO ENC guidelines) and 0 = Incorrect answer (inconsistency with WHO ENC guidelines)". Finally, a composite variable was generated from these questions to categorize health professionals as having "Good or poor knowledge".

Good knowledge: Health professionals who correctly answered at least 75% of the knowledge-related questions were categorized as having good knowledge, if not poor knowledge [25].

Good practice: Health professionals who correctly answered at least 75% of practice-related questions were categorized as having good practice, if not poor practice [25].

### 2.5. Data collection instrument and procedures

The data were collected through a self-administered questionnaire that was adopted and modified from the WHO and reviewed related literature [8, 12, 14, 25, 26, 27, 28]. The questionnaire was first prepared in English and then translated into Amharic and retranslated into English by an independent translator to verify its consistency (Additional Information – Questionnaire). The face validity of the questionnaire was assessed by an expert pediatrician. The reliability of the questionnaire was determined using Cronbach's alpha, where the coefficient of reliability was shown to be significant (Cronbach's alpha: 0.79). To assess the quality, the questionnaire was pre-tested in similar setups before the actual data collection was commenced. The training was given to data collectors and supervisors regarding the purpose and process of data collection and discussed the presence of ambiguous questions on the questionnaire.

### 2.6. Data processing and analysis

The data collected were entered in Epi info version 7 and analyzed using SPSS version 22. Categorical variables were tabulated using frequencies and percentages. Continuous data are summarized as mean and standard deviation. Bivariate and multivariable logistic regression

analyses were conducted to determine the association between dependent and independent variables. Independent variables with a p-value < 0.25 in the bivariate logistic regression analysis were included in the multivariable logistic regression analysis. Statistical significance was set at a p-value < 0.05.

### 2.7. Ethical approval and consent to participate

Ethical approval was obtained from the Mizan-Tepi University Ethical Review Committee. All study participants were informed about the purpose of the study, their right to deny participation, anonymity, and confidentiality of the information, and this study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained prior to participation in the study.

## 3. Results

Of the 165 participants, 157 completed the questionnaire, giving a response rate of 95.2%. The mean age was 27.3 (±4 SD) and ranged between 20 and 45 years. Eighty-eight (56.1%) and 67 (42.7%) participants were female and aged 25–29 years respectively. Over half (52.2%) participants held diploma/certificate qualifications. Sixty-seven (42.7%) participants were midwives and 51 (32.5%) were nurses. In terms of work experience, 122 (77.7%) had 1–2 years of experience and 54 (34.4%) had less than one year of experience in the essential newborn care unit. Nearly two-thirds (64.3%) and 90 (57.3%) of the participants took ENC training and were interested in offering ENC services (Table 1).

### 3.1. Knowledge of ENC

The mean score value of points for knowledge-related questions was 8.6 (±4.2 SD), ranging from 5 to 14. Only 63.7 % of the participants stated that the newborns should be placed on the mother's abdomen and

**Table 1.** Socio-demographic and professional characteristics among health professionals at public health facilities of the Bench-Sheko Zone in southwest Ethiopia.

Variables	Categories	Frequency	Percent
Age	20–24	43	27.4
	25–29	67	42.7
	30–34	36	22.9
	35+	11	7.0
Sex	Male	69	43.9
	Female	88	56.1
Qualification	Diploma/certificate	82	52.2
	Degree and above	75	47.8
Profession	Midwifery	67	42.7
	Nurse	51	32.5
	Health officer	29	18.5
	Medical doctor	10	6.3
Work experience	1–2	122	77.7
	3–5	26	16.6
	5–7	6	3.8
	Above 7	3	1.9
ENC service experience	<1	54	34.4
	1–2	61	38.9
	2–3	33	21.0
	Above 4	9	5.7
Availability of on the job training	Yes	56	35.7
	No	101	64.3
Interest in working in the delivery room	Yes	90	57.3
	No	67	42.7

66.9 % reported that the baby should be dried and the wet cloth should be changed and the head should be covered. Over half (57.7%) of the participants did not know if the baby needed resuscitation, and the first cord would have to be cut immediately. The proportion of healthcare professionals who were knowledgeable about ENC was 38.2 % (n = 60), and 95% CI (30.6%–45.8%) (Table 2).

### 3.2. Factors associated with knowledge of ENC

After adjusting for sex, qualifications, and interest to work in the delivery room as confounding factors, being female (AOR = 0.72, 95% CI [0.48–0.86]), the availability of on the job training (AOR = 2.98, 95% CI [2.01–4.54]), and interest in working in the delivery room (AOR = 1.58, 95% CI [1.33–3.38]) were the factors associated with good knowledge of ENC (Table 3).

### 3.3. Practice of ENC

The mean score for practice questions was 7.7 (±3.8 SD) and ranged from 6 to 12. Of the 157, 56.1 % of health professionals had always kept the baby on the mother's abdomen. One hundred and seven (68.2%) of them were dried immediately after birth, and 96 (61.1%) of them always initiated breastfeeding within an hour of birth. Eighty-five (54.1%) cords were clamped within 2–3 min after birth. A total of 112 (71.3%) and 111 (70.7%) of them applied TTC eye ointment and chlorhexidine to the cord after cord cutting respectively for the prevention of infection. The proportion of health professionals who had good practices of ENC was 61.8% (n = 97), 95 CI (54.2%–69.4%) (Table 4).

### 3.4. Factors associated practice of ENC

After adjusting for age, profession, and qualification as confounding factors, being a bachelor degree holder (AOR = 2.52, 95% CI [1.26–5.46]), the availability of on the job training (AOR = 1.86, 95 % CI [1.38–5.23]) and having good knowledge of ENC (AOR = 2.68, 95 % CI [1.67–4.25]) were the factors associated with good practice of ENC (Table 5).

**Table 2.** Knowledge of ENC among health professionals at public health facilities of the Bench-Sheko Zone in southwest Ethiopia.

Questions	Correct	Incorrect
	N (%)	N (%)
Place of putting the newborn immediately after birth	100 (63.7)	57 (36.3)
Dry baby immediately	105 (66.9)	52 (33.1)
Wipes eye after the head is delivered	70 (44.9)	87 (55.1)
Range of normal baby breath per minute	100 (63.7)	57 (36.3)
Tie the cord securely in two places	81 (51.6)	76 (48.4)
If the baby needs resuscitation, cut the cord immediately	68 (43.3)	89 (57.7)
Place the baby in skin-to-skin contact with the mother	58 (36.9)	99 (63.1)
Initiating breastfeeding immediately	105 (66.9)	52 (33.1)
Should not be bathed at birth because a bath can cool the baby dangerously	40 (25.5)	117 (74.5)
Bathing by water after 24 h of birth	83 (52.9)	74 (47.1)
Give eye care (while the baby is held by its mother).	138 (87.9)	19 (12.1)
Give the baby vitamin K, 1 mg by intramuscular injection (IM)	140 (89.2)	17 (10.8)
Weigh the baby	135 (86.0)	22 (14.0)
Care for low birth weight	120 (76.4)	37 (23.6)

**Table 3.** Factors associated with good knowledge of ENC among health professionals at public health facilities of the Bench-Sheko Zone in southwest Ethiopia.

Variables	Categories	Knowledge of ENC		COR (95%CI)	AOR (95%CI)
		Poor	Good		
Sex	Male	41	28	1	1
	Female	56	32	0.84 (0.52–0.92)**	0.72 (0.48–0.86)**
Qualification	Diploma	48	34	1	1
	Degree	49	26	0.75 (0.58–2.42)*	0.67 (0.56–2.01)
Interest in working in the delivery room	Yes	45	45	3.47 (2.12–5.18)**	2.98 (2.01–4.54)**
	No	52	15	1	1
Availability of on the job training	Yes	30	26	1.71 (1.24–3.77)**	1.58 (1.33–3.38)**
	No	67	34	1	1

ENC: Essential Newborn Care, 1: reference, \*p < 0.25, \*\*p < 0.05.

**Table 4.** Practice of ENC among health professionals at public health facilities of the Bench-Sheko Zone in southwest Ethiopia.

Questions	Correct	Wrong
	N (%)	N (%)
Putting the baby on the mother's abdomen after birth	88 (56.1)	69 (43.9)
Dry the baby immediately	107 (68.2)	50 (31.8)
Assessing APGAR score	99 (63.1)	58 (36.9)
Clamping the cord within 2–3 min	85 (54.1)	72 (45.9)
Cleaning the cord and leaving it to dry	136 (86.6)	21 (13.4)
Place the baby in skin to skin contact	90 (57.3)	67 (42.7)
Initiating breastfeeding within 1 h of birth	96 (61.1)	61 (38.9)
Wipe eyes and cover head	71 (45.2)	86 (54.8)
Apply TTC eye ointment	112 (71.3)	45 (28.7)
Give Vitamin K IM on anterior mid- thigh	92 (58.6)	65 (41.4)
Apply chlorohexidine to cord after cord-cutting	111 (70.7)	46 (29.3)
Weigh the baby	117 (74.5)	40 (25.5)

APGAR: Appearance, Pulse, Grimace, Activity, and Respiration; IM: Intramuscular; TTC: Tetracycline.

#### 4. Discussion

This study aimed to assess the health professionals' knowledge and practice of ENC at public health facilities in the Bench-Sheko Zone, southwest Ethiopia. The proportion of healthcare professionals who were knowledgeable about essential newborn care was 38.2 %, 95% CI (30.6%–45.8%). This finding was lower than 74.7% in the Tigray region [12], 57.9% in Woliyta zone [13], 56% in Bahir Dar city [27], and 47.8% in Jima zone [11] in Ethiopia, and 56.2% in Ekiti State, Nigeria [26], 65.1% in Rwanda [29] and 46.5% in Uganda [15]. The proportion of health professionals who had good practices of ENC was 61.8%, 95 CI (54.2%–69.4%). This finding was in line with 59.7% in Bahir Dar city [27] and 62.7% in Afar region [14] studies in Ethiopia and 62.9% in Ekiti State, Nigeria [26]. It is higher than 51.1% in the Jima zone, Ethiopia [11]. However, it is lower than 72.8% in the Tigray region, Ethiopia [12].

The observed discrepancy is due to the difference in the operational definition used (this study uses a threshold of ≥75 % to dichotomize the knowledge and practice of study participants, while others used mean score value), the study participants (this study included all health professionals, while others specifically included midwives and nurses. This may underestimate the outcomes of the study as one can expect more accurate responses from midwives and nurses than other professionals due to frequent contact with such an intervention) and the sample size

**Table 5.** Factors associated with the practice of ENC among health professionals at public health facilities of the Bench-Sheko Zone in southwest Ethiopia.

Variables	Categories	Practice of ENC		COR (95%CI)	AOR (95%CI)
		Poor	Good		
Age	20–24	20	23	1	1
	25–29	26	41	1.37 (1.25–5.38)**	1.22 (0.86–3.46)
	30–34	8	28	3.04 (1.12–4.87)**	2.45 (1.67–4.76)
	35 +	6	5	0.72 (0.56–1.46)	0.68 (0.56–2.49)
Profession	Midwifery	25	42	1	1
	Nurse	18	33	1.09 (0.82–2.74)*	0.92 (0.72–3.64)
	Health officer	12	17	0.84 (0.60–2.85)*	0.66 (0.42–2.55)
	Medical doctor	5	5	0.60 (0.42–1.56)	0.54 (0.33–2.15)
Qualification	Diploma	42	40	1	1
	Degree	18	57	3.33 (1.37–5.04)**	2.52 (1.26–5.46)**
Availability of on the job training	Yes	16	40	1.93 (1.56–3.86)**	1.86 (1.38–5.23)**
	No	44	57	1	1
Knowledge of ENC	Good	14	46	2.96 (1.42–4.66)**	2.68 (1.67–4.25)**
	Poor	46	51	1	1

ENC: Essential Newborn Care, 1: reference, \*p < 0.25, \*\*p < 0.05.

used (unlike this study, all other studies included more samples). In addition, the variation observed between the current and other studies conducted in Ethiopia is explained by the difference in educational profile and the availability of on-the-job training for health professionals.

Being female, the availability of on-the-job training and interest in working in the delivery room were statistically associated with knowledge of ENC among health professionals. Female sex was statistically associated with knowledge of ENC. Female health professionals were 28% less likely to have good knowledge of ENC compared to male health professionals. This finding was supported by conducted in the Afar region, Ethiopia [14]. This may have been due to the lack of time to read and update their level of knowledge, which resulted from additional family services and child-rearing functions.

Health professionals who received on-the-job training were 3 times more likely to be knowledgeable about the essential care of newborns than those who had not received on-the-job training. This finding is supported by similar studies conducted in Ethiopia [9, 11, 12]. This could be because taking on-the-job training is a means of updating previous knowledge of essential newborn care by health professionals [31]. However, another study conducted in Woliyta, Ethiopia, found that receiving job training did not show a significant link with knowledge of ENC among health care workers [13].

The interest of health professionals working in the delivery room was closely linked to good knowledge of ENC. Healthcare professionals who were interested in working in the delivery rooms were 1.6 times more likely to be knowledgeable about ENC. This finding is supported by other studies conducted in Ethiopia [11, 13, 14]. This could be explained by the fact that the greater interest in working in the delivery room encourages health professionals to read and know the job they are interested in.

This study found that the qualifications of health professionals qualifications and exposure to frequent on-the-job training were statistically linked to their practice of ENC. Having a degree was statistically linked to the practice of ENC. Health professionals with degrees were 2.5 times more likely to have a good practice of ENC than those with a diploma or certificate. This finding was supported by similar studies conducted in

the Jimma Zone and Tigray region, Ethiopia [11, 12]. This may be because of the provision of more general knowledge about the topic at the degree level than the basic knowledge level required for work-related tasks at a diploma or certificate [30].

On-the-job training was statistically associated with good practice of ENC. Health professionals who had on-the-job training were 1.9 times more likely to have good practice of essential newborn care. This finding is supported by a similar study conducted in Ethiopia [11]. This relates to the possibility of updating the existing newborn care skills due to the presence of on-the-job training [31]. Having good knowledge of ENC was statistically associated with good practice. Health professionals who had good knowledge of ENC were 2.7 times more likely to have good practice of essential newborn care. This finding is supported by studies conducted in Ethiopia [12, 25, 32].

## 5. Limitations

Not including the supportive supervision role (since the role of supportive supervision is to identify and address knowledge and practice gaps amongst health professionals) was viewed as a limitation in this study. Therefore, we recommend it to evaluate the role of supportive supervision on the knowledge and practice of ENC in future studies.

## 6. Conclusions

The knowledge of essential newborn care among health professionals was very low; however, the practice of essential newborn care was somewhat average compared to other studies in Ethiopia. Being female, the availability of on-the-job training and interest in working in the delivery room were the factors associated with a good knowledge of ENC; while educational qualification and the availability of on-the-job training were the factors associated with a good practice of ENC. Therefore, concerned bodies should consider the provision of refreshment on-the-job training, upgrading the qualification of health professionals, and providing incentives and motivators to improve interest in working in the delivery room.

## Declarations

### Author contribution statement

Tewodros Yosef and Dawit Getachew: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Fekede Weldekidan: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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### Data availability statement

Data will be made available on request.

### Declaration of interests statement

The authors declare no conflict of interest.

### Additional information

Supplementary content related to this article has been published online at <https://doi.org/10.1016/j.heliyon.2021.e08369>.

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