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# Knowledge and Practice of Essential Newborn Care and Associated Factors among Nurses and Midwives Working at Health Centers in Jimma Zone, Ethiopia, 2016

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## Abstract

**Background:** In Ethiopia, institutionalization of deliveries are happening at a fast pace. Assessing the knowledge and practice of midwives and nurses in these institutions is a priority in this current scenario. The initial adaptations by the baby at the time of birth should be facilitated by the midwives by giving essential newborn care. Therefore, this study is aimed to identify knowledge and performance gap on essential newborn care.

**Objective:** The objective of this study was to assess knowledge and practice of essential newborn care and associated factors.

**Methods:** Facility based cross-sectional design was conducted. Simple random sampling method was used to select the estimated 279 study participants from those who provide delivery and neonatal care. Self-administer questionnaires was distributed to participants to collect data and facilitated by data collectors. Data was entered to EpiData Manager and exported to statistical package for social sciences version 20 and analyzed. Finally, the result was illustrated in the form of text and tables.

**Results:** The mean knowledge score of study participants was 23.27. The study revealed that 52.2% and 47.8% of the respondents had good and poor knowledge respectively. The mean score of practice was 32.82 and 51.1% and 48.9% of the respondents had good and poor level of practice respectively. Field of study, educational level, interest to work in delivery room, in-service training was significantly associated with level of essential newborn care practice.

**Conclusion and recommendation:** The study population had poor knowledge and practice on some components of essential newborn care. Level of education, interest, in-service training and level of knowledge were found to be independent predictors of practice. Hence, strengthening of in-service training, priority should be given for those trained to give delivery and newborn care service, and incorporation of all components of essential newborn care in curriculum was recommended.

**Keywords:** Knowledge; Practice; Essential newborn care; Midwives; Nurses

## Background

The transition to extra uterine and initial adaptations are crucial to the baby's subsequent wellbeing and should be understood and facilitated by the health care providers at the time of birth and after birth by giving essential newborn care (ENC) [1]. The care health workers provide at time of birth is critical in helping to prevent complications and ensuring survival [2]. Skilled care during labour and childbirth with prompt management of complications alone can prevent about 50% of newborn mortality and 45% of intra-partum stillbirths. Combined with adequate newborn care in the postnatal period, 75% of current newborn deaths can be prevented [3]. Therefore, WHO recommends ENC; is a comprehensive strategy designed to improve the health of newborns through interventions before conception, during pregnancy, at and soon after birth and in the postnatal period [4,5]. The ENC Protocol is a series of time bound and chronologically-ordered that a baby receives at birth and it has standardized effective procedural steps: dry and stimulate, evaluate breathing, cord care, keep the newborn warm (Prevent hypothermia), initiate breastfeeding within the first one hour, administer eye drops/eye ointment, administer vitamin k intramuscularly, place the newborn's identification bands, weigh the newborn when it is stable and warm, record all observations and treatment provided, delay bathing of the baby for 24 h after birth [6,7].

Newborns are most vulnerable during the first hours and days of life, yet this critical window of opportunity is being missed. While evidence shows that initiating breastfeeding within one hour of birth reduces the baby's risk of death by 44%, recent data show that less than half of newborn babies worldwide receive the benefits of immediate breastfeeding. Great efforts have been made to improve neonatal death

around the world over the past four decades, yet achievements have not been as expected [8]. As many as two-thirds of neonatal deaths could be saved with ENC. Simple interventions to improve in health facilities have demonstrated up to 47% reduction in newborn mortality in Tanzania [9]. Unless newborn receives appropriate basic care, they quickly fall sick and too often they die [10]. Ethiopia is one of the ten countries with the highest number of neonatal deaths globally and neonatal mortality has remained stable at around 37 deaths per 1000 live births in recent years [10,11] and in Jimma there was high status of neonatal mortality and immediate neonatal care practices were identified as one of the determinant factors [12].

Promotion of ENC is one strategy for improving newborn health outcomes [13]. This requires health systems that provide continuity of care starting from the beginning of pregnancy (and even before) and continuing through professional skilled care at birth into the postnatal period. But, the standardized procedure for providing ENC is not commonly practiced [14]. Knowledge is one of the crucial aspects of health systems to adherence to ENC practices. But, in Ethiopia hospitals health workers' mean knowledge score for immediate newborn care was relatively low and there was performance gap on immediate ENC provided until the first hour after birth [15].

In addition to this gap, although midwives and nurses are providing primary care to women during pregnancy, labor, ENC care and the postpartum period in almost all health centers, still there is no study about knowledge and practice of ENC among midwives and nurses working at health centers in Jimma zone. Therefore, the main purpose of this study is to identify whether there is knowledge and performance gap on ENC among nurses and midwives.

## Methods

Facility based cross-sectional study design was conducted in 68 health centers found in ten Districts of Jimma zone from March 9 to April 8, 2016. A total of 279 participants were participated in the study which was selected by simple random sampling from those who were actively providing delivery care after proportional allocation was made for each Districts and health centers based on the number of nurses of each health center in the selected Districts as sampling frame. A single population proportion formula was used to estimate the sample size. There was no study conducted in Jimma area on the topic. To estimate the desired sample size, the following assumptions were made: proportion of knowledge and practice of study participants on ENC was taken as 50% (p=0.5), level of significance was considered to be 5% (α=0.05), 95% confidence level (Zα/2=1.96) and margin of error to be tolerated 5% (d=0.05). Because of the source population is less than 10,000; sample size correction was made to estimate the final sample size and 10% of the sample size added for non-response rate that made the final sample size of 279.

All qualified diploma and degree nurses and midwives recruited by government who provide delivery care services at selected health centers were included whereas those who did not provide delivery care services within the last six month prior to data collection to the time of data collection were excluded.

Data was collected by distributing self-administered structured questionnaires that adopted from published articles and further modification was done based on the Ethiopian Federal Ministry of health newborn care training Participants manual [7]. The questionnaire had both closed and open ended questions and participants were completed the necessary information by themselves.

Data collectors facilitated data collection process and helped the participants in case if they had any questions on the items of tool. Data collectors waited for each respondent to complete their questionnaire and immediately retrieved after they completed. After standardized study tool was adopted, tool was checked for validity by three professional experts. Pretest was done on 6% of the sample size in four health centers found in Jimma town. Reliability test was done and chrombach's alpha coefficient was 0.84. Modification of tools was done prior to actual data collection time based on pretest results. Data collectors were two diploma nurses and one diploma midwife who know more about the topic issue. Supervisor was one degree nurse on academic status of Graduate assistant II. Detail training was given for data collectors and supervisor. Daily, supervisor and principal investigator supervised and checked the completeness and quality of data. Incomplete and inconsistent questionnaires were excluded from analysis.

Data was coded and entered to EpiData Manager and exported to SPSS version 20 and analyzed. Each correct alternative under each knowledge questions was graded as 1point and incorrect was graded as 0. Finally, it was dichotomized as good knowledge and poor knowledge based on the sum of correct responses by taking the mean score as cut-off point. Practice of essential newborn care was graded by assigning scores to Likert scale responses on a scale of 0-2 points: 0=never, 1=sometimes, 2=always. There were 24 items of practical question and the maximum total score for practice was considered to be 48. The total score was dichotomized in to good practice and poor practice based on the summed score taking the mean score as cut-off point. Bivariate analysis was done to determine candidates for multivariate analysis. Those variables which have significant association fatherly analyzed by multivariate Logistic regression to identify the independent predictors of knowledge and practice of ENC. Confidence interval of 95%was used to see the precision of the study and the statistical association was considered as significant if p-value is less than 0.05.

Before starting any steps, ethical clearance and approval was obtained from the ethical committee of Addis Ababa University. Official letter was obtained from department of Nursing and brought to Oromia regional health Bureau and then written permission was provided to Jimma Zone health Office and from there to respective Districts health offices. Oral permission was ensured from each health center managers. Finally, the data collectors gave detail explanation of the purpose and possible benefit of the study, clarified that participation is voluntary, as well as respect of the subject privacy was ensured, obtained written consent of participants and confidentiality of the data was kept.

## Results

### Socio-demographic characteristics

From the total 279 estimated sample, five questionnaires were excluded as a result of incompleteness and inconsistencies and two questionnaires were not returned back, making the response rate of 97.49%. The analysis was done based on the data collected from 272 participants. Accordingly, largest proportion of the respondents were between the ages of 25 and 29 years and smallest proportion found between 40 and 44 years .The participants age ranges from 22 to 51 years with the mean of 28.86(SD= ± 5.78) years. Two third and 3/4 of the study participants had less than six years' experience of delivery care service. Among the study participants, 60 (22.1%) had no interest

to work in delivery room, 164 (60.3%) had work load. Regarding availability of equipment and vaccines of newborn care, 125 (46.0%) and 117 (43.0%) of study subjects were responded that all equipment, vaccines and drugs respectively were available at their health institution. The study revealed that, only 101 (37.1%) of respondents were took training on new born care (Table 1).

| Question | Response | Frequency | Percent |
|---|---|---|---|
| Work experience in health care services in years | 0-5 | 180 | 66.2 |
| | 6-10 | 69 | 25.4 |
| | 11-15 | 2 | 0.7 |
| | 16-20 | 8 | 2.9 |
| | >20 | 13 | 4.8 |
| Work experience of delivery service in years | 0-5 | 208 | 76.5 |
| | 6-10 | 46 | 16.9 |
| | 11-15 | 4 | 1.5 |
| | 16-20 | 5 | 1.8 |
| | >20 | 9 | 3.3 |
| Interest to work in delivery room | Yes | 212 | 77.9 |
| | No | 60 | 22.1 |
| Availability of equipment | Yes | 125 | 46 |
| | No | 147 | 54 |
| Availability of drugs and vaccines | Yes | 117 | 43 |
| | No | 155 | 57 |
| Work load | Yes | 164 | 60.3 |
| | No | 108 | 39.7 |
| In service training | Yes | 101 | 37.1 |
| | No | 171 | 62.9 |
| Number of in service trainings | One | 53 | 52.5 |
| | Two | 35 | 34.7 |
| | >Three | 13 | 12.9 |

**Table 1:** Distribution some selected factors of knowledge and practice of ENC (n=272).

## Knowledge and Practice of Airway Management

Regarding measures to be taken for babies not cries immediately after delivery, 205 (75.4%) of them knew that the correct measure is calling a help and start resuscitation, whereas the remaining did not know. About position of the baby's head to open the airway, 169 (62.1%) responded as head should be slightly extended and the remaining participants did not able to mention the correct position. Out of the responding participants, only 93 (34.2%) could identify that 40 breath per minute is the recommended breath per minute during ventilation of newborn, but the left participants could not respond in

line with guideline. The average knowledge score of resuscitation domain was 60.48% (Table 2).

| Variables | Response | Frequency | Percent |
|---|---|---|---|
| Measures to be taken if the baby not cries | Cover the baby and allow skin to skin contact | 49 | 18 |
| | Call a help and start resuscitation | 205 | 75.4 |
| | Put baby on new born table and give mother care | 18 | 6.6 |
| Position of baby's head to help open the airway | A flexed | 66 | 24.3 |
| | Slightly extended | 169 | 62.1 |
| | Hyper extended | 37 | 13.6 |
| The mentioned measures if baby is not breathing well after stimulation | More stimulation to breath | 81 | 29.8 |
| | Ventilation with bag and mask | 191 | 70.2 |
| The mentioned breath/min | 30 | 87 | 32 |
| | 40 | 93 | 34.2 |
| | 60 | 92 | 33.8 |

**Table 2:** Knowledge on neonatal airway management (n=272).

When the respondents asked about wiping of face and eyes, 128 (47.1%) responded that they applied always whereas 58 (21.3%) of the respondents did not apply at all. Regarding Apgar score, 168 (61.8%) of the respondents took Apgar score of all delivery they conducted, 82 (30.1%) took only for some babies. Concerning airway clearance, 181 (66.5%) respondents were applied the principle of checking and sucking airway for all babies they delivered, 86 (31.6%) were applied for some babies. Majority, 201 (73.9%) were checked for breathing while drying it always, whereas 63 (23.2%) were checked only sometimes (Table 3).

| Item of practice | Response | Frequency | Percent |
|---|---|---|---|
| Wipes the eyes and face when the head is delivered | No never | 58 | 21.3 |
| | Yes, some times | 86 | 31.6 |
| | Yes, always | 128 | 47.1 |
| Taking Apgar Score | No never | 22 | 8.1 |
| | Yes, some times | 82 | 30.1 |
| | Yes, always | 168 | 61.8 |
| check and Sucks the air way | No never | 5 | 1.8 |
| | Yes, some times | 86 | 31.6 |
| | Yes, always | 181 | 66.5 |
| Check for breathing while drying | No never | 8 | 2.9 |
| | Yes, some times | 63 | 23.2 |
| | Yes, always | 201 | 73.9 |

**Table 3:** Practice on neonatal airway management (n=272).

## Knowledge and Practice of Thermal Protection

According to the study, 183 (67.3%) respondents knew that newborn should be bathed after 24 h of delivery, but the remaining 89 (32.7%) of the respondents did not know the recommended time for bathing. About methods of thermal protection, 136 (50.0%) were aware that immediately dry can be used and 204 (75.0%) were aware that we can use skin to skin contact whereas 12 (4.4%) responded as early bathing which is not correct method of thermal protection. Regarding newborn placement immediately after birth, majority, 210 (77.2%) knew that newborn should kept on the mother's belly immediately after birth, but 62 (22.8%) did not know (Table 4).

| Questions | Response | Frequency | Percent |
|---|---|---|---|
| Time of newborn bathing | Immediately | 11 | 4 |
| | Within the first 24 h | 78 | 28.7 |
| | After 24 h of delivery | 183 | 67.3 |
| Methods of thermal protection | Immediately dry | 136 | 50 |
| | Allow skin to skin contact | 204 | 75 |
| | Early bathing | 12 | 4.4 |
| Where newborn should kept immediately after birth | Beside the mother | 26 | 9.6 |
| | With someone else | 1 | 0.4 |
| | On the mother's belly | 210 | 77.2 |
| | On newborn bed/table | 35 | 12.9 |

**Table 4:** Knowledge of thermal protection (n=272).

Regarding to thermal protection, 218 (80.1%) of the participants dried all newborn immediately after delivery with dry towel whereas 63 (23.2%) applied only for some babies. Out of the total respondents, 198 (72.8%) Kept all babies on mothers belly immediately after delivery whereas 7 (2.6%) of them did not kept, 154 (56.6%) discarded wet towel and cover with dry towel for all babies while109 (40.1%) of them applied for some babies. Majority, 235 (86.4%) of them initiated breast feeding within the first hours of delivery (Table 5).

| Questions | Response | Frequency | Percent |
|---|---|---|---|
| Drying the baby immediately with dry towel | No, never | 7 | 2.6 |
| | Yes, some times | 47 | 17.3 |
| | Yes, always | 218 | 80.1 |
| Discarding wet towel and cover the baby with dry towel | No, never | 9 | 3.3 |
| | Yes, some times | 109 | 40.1 |
| | Yes, always | 154 | 56.6 |
| Keeping the baby on mothers bell immediately after birth | No, never | 7 | 2.6 |
| | Yes, some times | 67 | 24.6 |
| | Yes, always | 198 | 72.8 |

| | No, never | 8 | 2.9 |
|---|---|---|---|
| Keeping skin to skin contact with the mother | Yes, some times | 95 | 34.9 |
| | Yes, always | 169 | 62.1 |
| Initiating breast feeding Within the first hour of delivery | No, never | 0 | 0.00% |
| | Yes, some times | 37 | 13.3 |
| | Yes, always | 235 | 86.4 |

**Table 5:** Practice of thermal protection (n=272).

## Knowledge of Breast Feeding

Regarding breast feeding, 234 (86.0%) of study participants were aware that initiation of breast feeding after delivery should be taken within the first hours of delivery, more than 3/4 were aware that colostrums has infection protection role in newborn whereas the remaining 56 (20.6%) did not aware. About duration of exclusive breast feeding, 210 (77.2%) of the respondents knew that the mother should feed exclusively for the first six months (Table 6).

| Questions | Response | Frequency | Percent |
|---|---|---|---|
| Initiation of breast feeding | Within 1 h of delivery | 234 | 86 |
| | Within 1-6 h of delivery | 34 | 12.5 |
| | >6 h of delivery | 4 | 1.5 |
| Colostrum has infection protection role | Yes | 216 | 79.4 |
| | No | 56 | 20.6 |
| Duration of exclusive breast feeding | <6 months | 13 | 4.8 |
| | For 6 months | 210 | 77.2 |
| | >6 months | 49 | 18 |

**Table 6:** Knowledge of breast feeding (n=272).

## Knowledge and Practice of Prevention of Infection and Cord Care

Regarding cord care, 103 (37.9%) of participants were aware that the cord of crying baby should be clamped at 2-3 minutes of delivery, but 169 (62.1%) did not respond correctly. About recommended care of dirty umbilical cord, 99 (36.4%) were aware that it should be cleaned with soap and water, dried and no need of bandaging, but, 63.6% responded wrongly. About the recommended cares of low birth weight babies,145 (53.3%), 192 (70%) and 46 (16.9%) could identify that breast feeding early and frequently, keeping the child warm and infection prevention respectively are the recommended cares whereas 11 (4.0%) responded as bathing often which is contradictory with WHO guidelines (Table 7).

| Questions | Response | Frequency | Percent |
|---|---|---|---|
| Time to clamp or tie the umbilical cord of a crying baby | Immediately | 102 | 37.5 |
| | 1-2 min | 67 | 24.6 |
| | 2-3 min | 103 | 37.9 |
| Instrument to cut the cord | Clean Scissor | 20 | 7.4 |
| | New Surgical blade | 66 | 24.3 |
| | New razor blade | 6 | 2.2 |
| | Sterile Scissor | 254 | 93.4 |
| Care of dirty umbilical cord | Clean with soap and water and cover with bandage | 67 | 24.6 |
| | Clean it with soap and water, dry it and do not cover | 99 | 36.4 |
| | Use alcohol to clean the umbilicus | 103 | 37.9. |
| | Clean with sterile water and apply topical antibiotics | 3 | 1.1 |
| Treatment of eye infection in newborn | Apply nothing | 7 | 2.6 |
| | Apply breast milk | 6 | 2.2 |
| | Clean with sterile water | 74 | 27.2 |
| | Apply silver nitrate/tetracycline | 252 | 92.6 |
| Care for Low Birth Weight | Bath often | 11 | 4 |
| | Breast feeding early and frequently | 145 | 53.3 |
| | Keep the child warm | 192 | 70.6 |
| | Prevent infection | 46 | 16.9 |

**Table 7:** Knowledge of respondents on prevention of infection and cord care (n=272).

About personal protective equipment, 207 (76.1%) used sterile glove during cord care for all babies whereas 64 (23.5%) of them used some times only .Of the total respondents, only 51 (18.8%) wore clean mask for all deliveries, 123 (45.2%) of the respondents did not wear clean mask for all deliveries they conducted, 123 (45.2%) of them wore clean apron during all deliveries they conducted whereas 45 (16.5%) did not wear at all. Concerning hand washing during delivery, only 37 (13.6%) reported that they always wash their hand with soap and water before procedure whereas 133 (48.9%) did not wash their hand before all delivery they conducted. On the other hand, only 40 (14.7%) study participants ensured all mother to wash their hands before handling the baby. Regarding cord care, 87 (32.0%) waited for 2-3 min after delivery to clamp the umbilical cord of all crying babies while 126 (46.3%) clamped the cord of all crying babies within less than 2 min or immediately after baby delivered. After clamping the cord, the vast majority, 250 (91.9%) were used sterile scissor to cut the cord but, 22 (8.1%) were used sterile scissor sometimes only. Of the study participants, 118 (43.4%) reported that they gave cord care by cleaning and letting it to air dry whereas 113 (41.5%) of them applied this care only for some babies they delivered.

On eye care, more than half did not clean eyes immediately after birth whereas 85 (31.3%) were applied this care only sometimes, but few, 28 (10.3%) of them reported that they applied this care for all babies they delivered. Of the total participants, 149 (54.8%) were reported that they applied eye ointment for all newborns they delivered, 107 (39.3%) were applied sometimes. When they apply eye ointment, 178 (65.4%) applied without touching the eyes with the tip of ampule but 34 (12.5%) applied always by touching. More than three quarters of the participants reported that they weighed and recorded the weight of all babies they delivered (Table 8).

| Item of practice | Level of practice | | |
|---|---|---|---|
| | No, never | Yes, some times | Yes, always |
| Put on sterile glove | 1 (0.4%) | 64 (23.5%) | 207 (76.1%) |
| Wearing mask | 123 (45.2%) | 98 (36.0%) | 51 (18.8%) |
| Wearing apron | 45 (16.5%) | 104 (38.2%) | 123 (45.2%) |
| Hand washing before the procedure | 133 (48.9%) | 102 (37.5%) | 37 (13.6%) |
| clean eyes immediately after birth from medial to lateral side with swab soaked in sterile water | 159 (58.5%) | 85 (31.3%) | 28 (10.3%) |
| Using Sterile Scissor | 0 (0%) | 22 (8.1%) | 250 (91.9%) |

| | | | |
|---|---|---|---|
| Clamping the cord within 2-3 min | 126 (46.3%) | 59 (21.7%) | 87 (32.0%) |
| Ensuring the mother wash her hands | 145 (53.3%) | 87 (32.0%) | 40 (14.7%) |
| Giving eye ointment | 16 (5.9%) | 107 (39.3%) | 149 (54.8%) |
| Not touching the eyes with the tip of the ampule | 34 (12.5%) | 60 (22.1%) | 178 (65.4%) |
| Cleaning the cord and letting to air dry | 41 (15.1%) | 113 (41.5%) | 118 (43.4%) |
| Weigh and record the baby's weight | 2 (0.7%) | 32 (11.8%) | 238 (87.5%) |

**Table 8:** Practice of infection prevention and cord care (n=272).
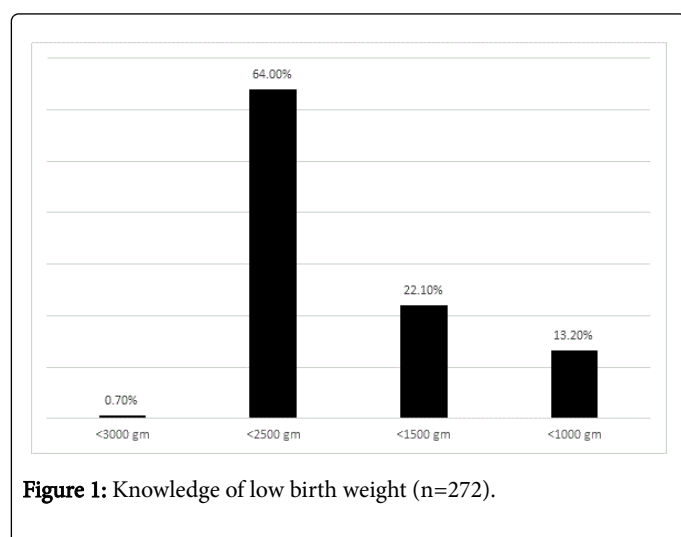


**Figure 1:** Knowledge of low birth weight (n=272).

As shown in Figure 1 above, nearly two third (64.0%) knew that low birth weight is weight less than 2500 g but, 60 (22.1%) defined as weight of less than 1500 g, 36 (13.2%) of them defined as less than 1000 and 2 (0.7%) defined as weight of less than 3000 g.

According to the study, 104 (38.2%) of the study participants were aware that immediate newborn care should start just during birth whereas 28 (10.3%) and 138 (50.7%) responded as it should start before birth and after birth respectively and 2 (0.7%) of them responded as they do not know when it should start. The vast majority (90.1%) of the participants were aware that bleeding in newborn can be prevented by giving Vitamin K and the remaining 27 (9.9%) did not know the correct action to prevent. Regarding time of postnatal visit, 214 (78.7%) was aware that the best time of first post natal visit should be within the first 24 h of delivery (Table 9).

| Variables | Response | Frequency | Percent |
|---|---|---|---|
| Time for first postnatal visit | Within the first 24 h | 214 | 78.7 |
| | On the 3rd day | 46 | 16.9 |
| | On the 7th day | 12 | 4.4 |
| Mentioned vaccines as components ENC | BCG | 237 | 87.1 |
| | OPV | 261 | 96 |

| | | | |
|---|---|---|---|
| | TTC | 49 | 18 |
| | Vit k | 94 | 34.6 |
| | Rota | 2 | 0.74 |
| | PCV | 2 | 0.74 |
| | Pentavalent | 1 | 0.37 |
| Action to prevent bleeding in newborn | Breastfeeding | 12 | 4.4 |
| | Not necessary to give anything | 15 | 5.5 |
| | Give vitamin K | 245 | 90.1 |
| Dose of Vitamin k for preterm babies | 1 mg | 107 | 39.3 |
| | 0.5 mg | 160 | 58.8 |
| | Other dose | 5 | 1.8 |

**Table 9:** Knowledge of some components of post natal care and bleeding prevention in new born (n=272).

## Knowledge of Newborn Danger Signs

Respondents were considered as knowledgeable if they could identify at least four out the common 11 dager signs. Accordingly, less than 1/3 could mention four and more newborn danger signs whereas more than 2/3 could identify only three and less than three .The only two danger signs those more than half of respondents, 162 (59.6%) and 139 (51.1%) of them could mention were poor suckling and difficulty breathing respectively. To lesser extent, respondents were also able to mention fever 99 (36.4%), yellow palms/sole/eyes 77 (28.3%), lethargy 70 (25.7%), convulsion 51 (18.8%), baby too small/ born too early 44 (16.2%), redness/discharge at the cord 32 (11.8%) and the remaining respondents could list few danger signs; eyes red/swollen/discharge 26 (9.6%), baby feels cold 19 (7.0%), loss of consciousness 13 (4.8%).

The overall mean knowledge score of study participants was 23.27 (SD= ± 4.39) out of the total 35 points which revealed that 52.2% of the respondents had good knowledge of ENC where as 47.8% had poor knowledge. The mean score of practice of ENC was 32.82 (SD= ± 7.35) out of the total 48 points. An overall practice of ENC, 51.1% of the respondents had good level of practice and the remaining 48.9% of them had poor level of practice.

## Some Factors of Knowledge and Practice of Essential Newborn Care

A cording to the study, Age, Religion, Ethnicity, marital status, work experience and work load were not found to have significant association with participants' level of knowledge of ENC. Field of study was significantly associated with participants' knowledge about ENC care (p=0.001). Midwives were 3.899 times more likely knowledgeable than nurses (AOR (95% CI) 3.899 (1.781-8.537)). Educational qualification was also found to have association (p<0.001).Diploma holders were 0.250 times less likely knowledgeable about ENC than degree holders (AOR (95% CI) 0.250 (0.120-0.523)). Interest to work in delivery room was statistically significant (p=0.005).Those who had interest to work in delivery room were 2.822 times more likely knowledgeable than who had no interest (AOR (95% CI) 2.822 (1.372-5.807)). Training Also found to be a factor for knowledge of

ENC (p<0.001). Those participants who had at least one in-service training were 3.421 more likely knowledgeable than those did not trained at all (AOR (95%) 3.421 (1.779-6.579)) (Table 10).

| Variables | Good knowledge | Poor knowledge | COR(95% CI) | P value | AOR(95% CI) | P values |
|---|---|---|---|---|---|---|
| **Sex** | | | | | | |
| Female | 81 (57.0%) | 51 (39.2%) | | | | |
| Male | 61 (43.0%) | 79 (60.8%) | 0.486 (0.300-0.780) | 0.004* | 1.008 (0.544-11.868) | 0.979 |
| **Field** | | | | | | |
| Nursing | 76 (53.5%) | 115 (88.5% | | | | |
| Midwifery | 66 (46.5%) | 15 (11.5%) | 6.658 (3.542-12.514) | <0.001 | 3.899 (1.781-8.537) | 0.001* |
| **Qualification** | | | | | | |
| Degree | 34 (23.9%) | 16 (12.3%) | | | | |
| Diploma | 108 (76.1%) | 114 (87.7%) | 0.446 (0.233-0.854) | 0.015* | 0.250 (0.120-0.523) | <0.001* |
| **Interest** | | | | | | |
| No | 15 (10.6%) | 45 (34.6%) | | | | |
| Yes | 127 (89.4%) | 85 (65.4%) | 4.482 (2.350-8.549) | <0.001* | 2.822 (1.372-5.807) | 0.005* |
| **Training** | | | | | | |
| No | 64 (45.1%) | 107 (82.3%) | | | | |
| Yes | 78 (54.9%) | 23 (17.7%) | 5.67 (3.243-9.914) | <0.001* | 3.421 (1.779-6.579) | <0.001* |

**Table 10:** Association of socio-demographic characteristics and some selected variables.

Age, Religion, Ethnicity, marital status, work experience, work load and monthly salary were statistically insignificant with practice of ENC. Field of study was found to have significant association with their practice of ENC (p<0.001). Midwives were 4.419 times more likely practiced essential newborn care than nurses but, the association was insignificant after adjusting for possible confounder. Educational qualification was also found to have significant association with participants' practice of ENC (p=0.003). Diploma holders were 0.287 times less likely practiced than degree holders (AOR (95% CI) 0.287 (0.126-0.650)). Interest of participant to work in delivery room was found to be a factor for practice of ENC (p=0.008). Those who had interest to work in delivery room were 3.006 times more likely practiced than who had no interest (AOR (95% CI) 3.006 (1.328-6.804)).

There was significant difference between those who trained and not trained (p=0.004). Participants who had at least one time training on ENC were 2.937 more likely practiced than those did not trained (AOR (95% CI) 2.937 (1.415-6.098)). On bivariate analysis, availability of newborn care equipment at health centers and newborn care drugs and vaccines were found to have association with ENC practice (p=0.002) and (p=0.001), respectively but after adjustment of possible confounders, both variables were statistically insignificant. The study also showed significant association between level of knowledge and level of practice of ENC (p<0.001).Those respondents who had good knowledge were 4.848 times more likely practiced than those who had poor knowledge ((AOR (95% CI) 4.848 (2.605-9.023)) (Table 11).

| Variable | Poor practice | Good practice | COR(95% CI) | P-Value | AOR (95%CI) | P-value |
|---|---|---|---|---|---|---|
| **Sex** | | | | | | |
| Female | 54 (40.6%) | 78 (56.1%) | 0.535 (0.330-0.865) | 0.011 | 1.025 (0.527-1.991) | 0.943 |
| Male | 79 (59.4%) | 61 (43.9%) | | | | |
| **Field** | | | | | | |
| Nursing | 113 (85.0%) | 78 (56.1%) | 4.419 (2.470-7.905) | <0.001 | 1.522 (0.667-3.472) | 0.319 |
| Midwifery | 20 (15.0%) | 61 (43.9%) | | | | |

| Qualification | | | | | | |
|---|---|---|---|---|---|---|
| Degree | 14 (10.5%) | 36 (25.9%) | 0.337 (0.172-0.659) | 0.001 | 0.297 (0.126-0.650) | 0.003 |
| Diploma | 119 (89.5%) | 103 (74.1%) | | | | |
| **Interest** | | | | | | |
| No | 47 (35.3%) | 13 (9.4%) | 5.297 (2.703-10.378) | <0.001 | 3.006 (1.328-6.804) | 0.008 |
| Yes | 86 (64.7%) | 126 (90.6%) | | | | |
| **Training** | | | | | | |
| No | 108 (81.2%) | 63 (45.3%) | 5.211 (3.012-9.018) | <0.001 | 2.937 (1.415-6.098) | 0.004 |
| Yes | 25 (18.8%) | 76 (54.7%) | | | | |
| **Availability of equipment** | | | | | | |
| No | 85 (63.9%) | 62 (44.6%) | 2.199 (1.352-3.579) | 0.002 | 0.964 (0.485-1.139) | 0.916 |
| Yes | 48 (36.1%) | 77 (55.4%) | | | | |
| **Availability of drugs and vaccine** | | | | | | |
| No | 90 (67.7%) | 65 (46.8%) | 2.383 (1.455-3.901) | 0.001 | 1.687 (0.861-3.307) | 0.128 |
| Yes | 43 (32.3%) | 74 (53.2%) | | | | |
| **Knowledge** | | | | | | |
| Poor | 98 (73.7%) | 32 (23.0%) | 9.362 (5.390-16.263) | <0.001 | 4.848 (2.605-9.023) | <0.001 |
| Good | 35 (26.3%) | 107 (77.0%) | | | | |

**Table 11:** Association of selected socio-demographic variables, personal and institutional factors with practice of essential new born care.

## Discussion

Knowledge is one of the crucial aspects of health systems for ENC practices and lack of knowledge may impede provision of ENC. In this study, the average knowledge and practice score about ENC were 66.48% and 68.38%, respectively. This is lower compared to study conducted in India [16,17]. The discrepancy could be due to the difference in in-service training. But this knowledge is higher than that of Khartoum [1], Tanzania [13] and Ethiopia [15]. In this study, 52.2% of the respondents had good knowledge and 47.8% had poor knowledge whereas, 51.1% had good and 48.9% had poor level of practice. This is relatively higher compared to Egypt [18], Uganda [19] and India [16]. This discrepancy in level of practice could be due to methodological difference. The slight difference in knowledge might be due to difference between study participants in which only nurses participated in case of study conducted in Egypt and it included nurse assistants in case of Uganda.

The study finding revealed that average knowledge score of resuscitation domain was lower compared to that of India [18] and Afghanistan [20].This difference might be due to difference in in-service training on resuscitation. Lack of knowledge can impede practice of resuscitation and increase risk of death and complication of asphyxia.

Exclusive breastfeeding has a significant protective effect against infections. Early breastfeeding and keeping the baby close to the mother reduce the risk of hypothermia and hypoglycemia and delaying of breast feeding after delivery limits the opportunities for mothers and

infants to benefit from early initiation. In this study, 86.0% of participants were aware the time of breast feeding initiation and 77.2% knew duration exclusive breast feeding whereas greater than 86.4% of participants initiated feeding within one hours of delivery. This is far greater compared with study conducted in Ethiopia, Tanzania [21] and MAISHA [22]. This discrepancy could be due to the difference between study settings. Hospitals with the heaviest volume of deliveries make the providers busy to consider all components of care on time and there is also time gap between the studies; now a day government focused on newborn care and giving training for midwives. This indicated that this study increased the opportunities for mothers and infants to benefit from early initiation of breastfeeding.

Thermal protection in newborn is very important. Because, it can prevent the complication of hypothermia. According to this study, 67.3% respondents knew time of newborn bathing, 77.2% knew where newborn should kept immediately after birth, greater than 72.8% kept the baby on the mother's chest/belly, more than 80.1% dried the babies immediately with dry towel, more than 56.6% discarded wet towel and covered with dry clothes, greater than 62.1% kept the baby skin to skin contact with the mother. This is consistent with study done in Khartoum [1]. But, this study is relatively lower compared to that of Tanzania [9]. This difference might be knowledge difference between the two study group on importance of thermal protection and scarcity of newborn care equipment. On the other hand study in India revealed that, although 89% of the providers demonstrated wiping of newborn with dry cloth, 63% showed putting neonate on warm surface [17] and study in Philippine revealed that more than 90% of infants were dried

[23]. The reason of this difference might be difference of educational level of study participants leads to knowledge difference. On the other hand the study finding is higher compared to study done in Ethiopia [15] and in other study in 4 regions of Ethiopia [13]. This difference might be time gap between these studies. Now a day government focused on newborn health and giving training and others may share experience from those trained to some extent. This study was far greater compared to that of Tanzania ;skin to skin contact occurred infrequently at health centers likely due in part to the traditional practice of keeping the infant separated from the mother [21].

Clean cord care is very important in preventing early neonatal infections. The precise timing of clamping and cutting the umbilical cord is important as there is some evidence of potential benefits for the baby when the cord is not clamped and cut immediately after birth [24]. This study finding showed that, only 37.9% of the study participants knew the precise time of cord clamping and 32.0% and 21.7% of the participants delayed clamping of umbilical cord for all babies and some babies they delivered respectively. This is lower compared to that of Tanzania [9]. The possible reason might be awareness difference on the importance of delayed cord clamping. But this study was consistence with that of Khartoum [1] and Ethiopia [15] and lower compared to that of Peru [25]. This great difference is as the reason of training in the case of Peru and it was post intervention result. The study revealed that, 13.6% washed their hand before all deliveries they conducted but 48.9% did not washed at all. The study finding also revealed that less than half consistently wore protective clothing other than gloves .This was lower than that of Tanzania [21]. The possible reason might be inadequate water and equipment of newborn care in the study institution. This study showed that, only 54.8% administered eye ointment for all babies they delivered, 39.3% did it only for some babies, 16.9% administered vitamin k for all babies they delivered, 59.9% administered only for some babies whereas 23.2% did not administered at all. This is consistent when compared with results of studies conducted in Egypt [18], lower than that of Philippine [21] but higher compared to that of Uganda [19]. This supports the above difference on administration of Vitamin K and eye ointment might be due to difference in availability of drugs in the study area in that of Philippine rather than knowledge gap.

Knowledge of study participants on newborn danger signs is very crucial for the survival and future well-being of the babies. But this study revealed that, less than one third could mention four and more newborn danger signs. This may impede the care they can give for the child with health problems and advice they can give for the mother.

Many factors can influence knowledge and practice of ENC. In this study, in-service training, field of study, educational qualification and interest to work in delivery room were found to be factor of knowledge level and difference in year of experience was insignificant with knowledge level which is similar with that of Uganda in which there was no statistical difference in knowledge by experience and there was difference in knowledge level based on field and level of education [19]. Similarly study in Egypt revealed that, there was a significance relationship between nurses education and their knowledge, while a negative correlation were found regarding to their years of experience [18]. On the other hand, this study showed that, educational level, interest to work in delivery room, in-service training was significantly associated with level of ENC practice. This in part due to all of these factors can increase knowledge level which can lead to increment of level of practice. Compared to that of Egypt [18], no significance

difference between nurses' knowledge and practices and the possible reason might be difference of study participants.

## Conclusion

Despite participants had good knowledge and practice in general, they had poor knowledge and practice on some components of ENC:

The study population had knowledge gap on resuscitation domains, poor infection prevention practice and, consistently administration of Vitamin K and eye ointment was relatively low, poor knowledge and practice on precise cord clamping time which may leads to neonatal anemia, majority were not knowledgeable on identification of neonatal danger signs.

Majority of the study population had good practice on timely initiating of breast feeding and good knowledge and practice on thermal protection. Field of study, educational level, interest to work in delivery room and in-service training were independent predictors of knowledge. Level of education, interest to work in delivery room, in-service training and level of knowledge were found to be independent predictors of ENC practice.

## Recommendations

Strengthen in-service training given to nurses and midwives on ENC including newborn resuscitation and upgrade their educational level. Give Priority for those who trained on area and for those have better educational level on the assignment of staffs working in delivery room by considering interest of staff to work in delivery room for better services, motivation should be there for those have good performance. Conduct further observational study on quality and level of ENC practice. Provide all necessary equipment, vaccine and drugs of newborn care and it is better if ministry of education incorporate all components of ENC in the curriculum for both diploma and degree program.

## Acknowledgement

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