Original Article

Knowledge & Practice Regarding Neonatal Resuscitation among Health Care Providers in Tertiary Care Hospitals of Nepal

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Abstract: Each year millions of neonates do not breathe immediately at birth and among them the majority requires basic newborn resuscitation Due to lack of inadequate neonatal resuscitation knowledge and lack of sufficient training the condition of neonate is very poor in developing countries. The study aimed to assess Knowledge and Practice of neonatal resuscitation among health Care providers in tertiary care hospital Descriptive, cross sectional study design with Enumerative sampling technique was used to collect the data from 80 health care providers working in NICU, neonate unit and labour room of Tribhuvan University Teaching Hospital. Using semi structured, structured and checklist questionnaire for socio-demographic characteristics, work related variables, knowledge and practice respectively. Data were analyzed in 26 version of SPSS using descriptive and inferential statistics.Out of 80 respondents, 73.8% respondents were above 25 years of age, 78.8% were female, 78.8% were Hindu and 8.7% were Brahmin/Chettri. With regard to the marital status 55% of respondents were unmarried, 43.8% were proficiency certificate level and 56.2% were bachelor and master level. Maximum of respondents i.e., 75% were staff nurse and 38.7 % working in NICU. Similarly, 77.5% had more than 2 years of experience, 83.7% respondents had not received any training and 78.8% of respondents performed more than 5 neonatal resuscitation. The study concluded that 91.2% respondents had poor level of knowledge, whereas 98.8% had good level of practice. Statistically significant association was found between respondents' level of knowledge and educational status (p=0.014).It is concluded that majority of the respondents had poor level of knowledge and good level of practice. Furthermore, provide the adequate in-service education and training to health care providers to enhance their knowledge regarding neonatal resuscitation.

Keywords: knowledge, practice, neonatal resuscitation

1. INTRODUCTION

A newborn infant, or neonate, is a child under 28 days of age, during these first 28 days of life, the child is at highest risk of dying. Globally 2.4 million children died in the first month of life [1]. There are approximately 7000 newborn deaths every day, a child born in sub-Saharan Africa or in Southern Asia is 10 times more likely to die in the first month than a child born in a high-income country ,where access to care is low [2]. In the early period, preterm birth (40.8%) and intrapartum complications (27.0%) accounted for the majority of deaths while in the late neonatal period nearly half of all deaths occurred from infectious causes (47.6%) [3]. In Nepal the neonatal mortality rate is 21 deaths per 1,000 live births, while the under-

5 mortality rate is 39 deaths per 1,000 live births, this means that 54% of all under-5 deaths occur in the first month of life (Nepal Demographic and Health Survey [4]. Globally, the main direct causes of neonatal death are preterm birth (28%), severe infections (26%), asphyxia (23%), and neonatal tetanus (7%) [5]. In Nepal, major causes of death are infections (39%), birth asphyxia/birth injury (33%), congenital anomalies (8%) and pre-maturity or low birth weight (6%) [6]. In context of underdeveloped country like Nepal, there have been various programs are conducted to reduce neonatal mortality rate like Millennium Development Goals, aimed to reduce child mortality and improve their health and Helping Babies Breathe training to reduce the burden of intrapartum deaths and facilitate health workers implements effective resuscitation practices [7]. However, there have been remarkable reductions in under-five child mortality over the last 15 years but the reduction in neonatal and perinatal mortalities has been relatively slow and neonatal mortality has stagnated within the same period [8]. Newborn resuscitation is defined as the set of interventions at the time of birth to support the establishment of breathing and circulation [9]. The principle of resuscitation is to provide oxygen by helping breathing and metabolism with artificial respiration and to help blood circulation by giving pressure to ventricle with chest compression and the goals of neonatal resuscitation are to prevent the morbidity and mortality associated with hypoxic ischemic tissue (brain, heart and kidney) injury and also to re-establish adequate spontaneous respiration and cardiac output. Proper knowledge of newborn resuscitation among health care workers can prevent the consequences of perinatal asphyxia [10]. A low cost intervention, basic neonatal resuscitation within the first few minutes of life can substantially prevent neonatal mortality and morbidity related to intrapartum-related hypoxic events. Approximately 3% to 6% of newborns require basic resuscitation, including stimulation at birth and assisted ventilation with bag and mask, to help them breathe [11]. This procedure can reduce intrapartum-related neonatal deaths by 30%. All doctors, nurses, and other health professionals trained to manage neonatal complications and should have the capacity to resuscitate newborn babies, whether deliveries take place in health facilities or at home [12]. Neonatal resuscitation is an essential component of maternal and child health services and is an inexpensive intervention by which many newborn lives can be saved. Neonatal resuscitation during first few minutes of birth has a significant effect on neonatal morbidity and mortality especially in high risk newborns like premature and low birth weight babies [13]. Due to poor resuscitation techniques had remained one of the leading causes of neonatal mortality and morbidity globally. A large number of these affected newborns develop complications such as cerebral palsy and cognitive impairment [14]. Neonatal asphyxia has been identified as a major cause of neonatal mortality worldwide. Meanwhile, birth asphyxia as a cause of neonatal deaths can be effectively treated with timely resuscitation of newborns by healthcare providers who are skilled in and knowledgeable about neonatal resuscitation. Effective resuscitation at birth can prevent up to about 30% of neonatal deaths [15]. Neonatal resuscitation requires the use of specialized knowledge and skill to initiate and stabilize the cardiopulmonary functioning of the neonate and regular practice to maintain health care provider's competency [16]. Different factors including health care provider's characteristics like educational level, experience, specialization; training, availability of guidelines and availability of equipment affect competency of neonatal resuscitation and thereby neonatal outcome [17]. Lack of equipment and training do not pose major barriers to newborn resuscitation in Afghanistan, but providers' knowledge and skills need strengthening in some areas. Competency-based pre-service and in-service training, complemented by supportive supervision, is an effective way to build providers' capacity to perform newborn resuscitation. This kind of training could also help skilled birth attendants based in the community, at private clinics, or at primary care facilities save the lives of newborns [18].

2. MATERIALS & METHODS

Descriptive cross sectional study design was adopted for the study, the study areas was the neonate, NICU and labour department of Tribhuvan University Teaching Hospital (TUTH). It is a tertiary level hospital and run under the Institute of Medicine, situated at Maharajgunj, Kathmandu. Tribhuvan University Teaching Hospital (TUTH). The study population was all registered nurses, medical officers and resident doctors of the TUTH working in neonate, NICU and labour department (N=80) with enumerative sampling technique. The semi structured self-administered questionnaire was developed by the researcher based on research objectives and extensive literature review and constructive feedbacks from the research advisors, research experts and the members of research committee. The collected data was checked, reviewed and organized daily for its accuracy, completeness and consistency. The data was coded and entered in Statistical Package for Social Science (SPSS) 26.0 program for analysis. Data was analyze by using simple descriptive statistics and inferential statistics. Frequency, percentage, means, median and standard deviation was used for analysis the data. Chi-square test was used to find out the associations between selected demographic variables and level of knowledge and practice regarding neonatal resuscitation. Karl Pearson's coefficient of correlation was used to identify the correlation between level of knowledge and level of practice of health care providers regarding neonatal resuscitation.

3. RESULTS & DISCUSSION

Around 73.8% respondents were above 25 years of age and majority of respondent were female i.e.78.8%. Maximum of respondents i.e., 78.8% respondents were Hinduism. With regards to the ethnic group 41.3 % were Janjati. Regarding the marital status, 55% of respondents were unmarried. Likewise, 43.8% were proficiency certificate level and bachelor level.

Table 01: Socio-demographic Information of Respondents

Information	Frequency	Percentage (%)
Age		
> 25 years	59	73.8
< 25 years	21	26.2
Sex		
Female	63	78.8
Male	17	21.2
Religion		
Hinduism	63	78.8
Others*	17	21.3
Ethnicity		
Janjati	33	41.3
Brahmin/chettri	29	36.3
Others	18	22.5
Marital status		
Unmarried	44	55.0
Married	36	45.0
Educational qualification		
Proficiency certificate level	35	43.8
Bachelors	35	43.8
Master and above	10	12.4

* Buddhism ** Dalit,, Madhesi

Table 02 represents that maximum of respondents i.e., 75% were staff nurse and 38.7 % were working in NICU. Similarly, total professional experience, majority of respondents i.e., 77.5% had more than 2 years of experience. Likewise, maximum of respondents i.e., 83.7% had not received any training and among 16.3% respondents, 8.8 % received BLS and APLS training. Likewise, 78.8% of respondents performed more than 5 neonatal resuscitation.

Table 02: Work related Information of Respondents.

Information	Frequency	Percentage (%)
Designation		
Staff nurse	60	75.0
Others*	20	25.0
Current working area		
NICU	31	38.7
Labour room	29	36.3
Neonate unit	20	25.0
Total working experience		
More than 2 year	62	77.5
Less than 2 year	18	22.5
Attendant any training		
No	67	83.7
Yes	13	16.3
Training specification		
BLS	7	8.8
APLS	7	8.8
No.of neonatal resuscitation performed by respondent		
> 5	63	78.7
< 5	17	21.3

*Medical Officer, Resident Doctor

Table 03 reveals that 100% of respondents gave correct answer regarding meaning of neonatal resuscitation. In the purpose of neonatal resuscitation majority of respondents i.e., 91.3% answered correctly in to ensure effective circulation. Regarding initial steps of neonatal resuscitation maximum respondents i.e., 85% answered correctly in the reason for failure of bag and mask ventilation. Regarding advance neonatal resuscitation 88.7% of respondent give correct answer on indication to start chest compressions during neonatal resuscitation.

TABLE 03: Respondents' Knowledge regarding Neonatal Resuscitation

Variables	Right no. (%)
Definition of neonatal resuscitation	
Emergency procedure to revive and restore the life of neonate	80(100%)
Purpose	
Main purpose of neonatal resuscitation	

To establish and maintain a clear airway, ventilation and oxygenation	70(87.5%)
To ensure effective circulation	73(91.3%)
To correct acidosis	23(28.7%)
To prevent hypothermia	35(43.8%)
Initial steps of neonatal resuscitation	
characteristics to be identified on rapid assessment	
Term gestation	47(58.8%)
Crying or breathing	60(75.0%)
Good muscle tone	69(86.3%)
Initial steps of neonatal resuscitation	
Provide warmth	56(70.0%)
Maintain position	65(81.3%)
Clear airway (if necessary)	70(87.5%)
Dry and stimulate	58(72.5%)
approximate time (“the Golden Minute”)	
60 Sec	76(95.0%)
correct position of baby’s neck for resuscitation	
Slightly extended.	66(82.5%)
Clear the airway of the baby	
Aspirate mouth first and then nose	73(91.3%)

Pressure of the suction vacuum must not be exceed	
80-100mmhg	29(36.2%)
Basic neonatal resuscitation	
Next step after 30 seconds of initial steps if baby is breathing but the heart rate is less than 100	
Start bag and mask ventilation (positive pressure ventilation)	31(38.7%)
Mask should cover	
Mouth, nose and tip of chin but not the eyes.	58(72.5%)
Rate of breaths by bag and mask	
40 breaths in one minute	27(33.8%)
percentage of oxygen should be started in Positive Pressure ventilation	
21-30%	23(28.7%)
limb for Spo2 monitoring in a newborn	
Right upper limb	34(42.5%)
Three minute target for SpO2 in newborns	
70-75%	46(57.5%)
Reasons for failure of bag and mask ventilation	
The seal mask is inadequate	65(81.3%)
The airway is blocked	68(85.0%)
inadequate pressure inappropriate position	63(78.8%) 61(76.3%)
Best indicator of effective bag and mask ventilation	

Rising heart rate and audible breath sounds	54(67.5%)
There is no sign of respiratory difficulty after the positive pressure ventilation	
Keep baby warm	66(82.5%)
Initiate breastfeeding	39(48.8%)
Continue monitoring the baby	66(82.5%)
Volume expansion	24(30.0%)
Advance neonatal resuscitation	
Indications to start chest compressions	
HR< 60b/m after bag & mask ventilation.	71(88.7%)
Recommended ratio of chest compression to ventilation	
3:1	42(52.5%)
Technique of chest compression	
Two thumbs	59(73.8%)
pressure should be applied when performing compression	
Lower 1/3rd of sternum	65(81.3%)
Pressure should be use during the chest compression	
The depth of compression should be one-third of the anterio-posterior diameter of the chest	36(45.0%)
Indications to start medications	
Heart rate <60 b/m after 30sec ventilation &60sec coordinated chest compression &ventilation	52(65.0%)
Preferred medication during resuscitation	
Epinephrine	65(81.3%)
Preferred dose of Adrenaline for neonate	
0.01-0.03mg/kg	50(62.5%)
Best solution for volume expansion in neonate	
Normal saline	40(50.0%)
Dose of volume expansion in neonate	
10 ml/kg	31(38.8%)
Time for resuscitate who has a systole	
20 minutes	43(53.8%)

Table 4 represents that maximum of respondents i.e., 91.2% respondents had inadequate level of knowledge whereas 8.8% had adequate level of knowledge.

Table 04: Respondents' level of knowledge regarding neonatal resuscitation

Level of knowledge	Frequency	Percentage
Good (≥80% of score)	7	8.8
Poor (≤80% of score)	73	91.2
Total	80	100

Table 5 represents that during neonatal resuscitation, majority of respondents i.e., 100.0% respondents wrap the newborn, except for the face and upper chest, in initial steps of neonatal resuscitation 100.0% of respondents Positioned the head of neonate in slightly extended position, suction well if there is secretion

in newborn's mouth and nose, formed a seal between mask and newborn's face, squeezed bag with two fingers only or the whole hand depending on the size of bag, checked seal by ventilating and observing chest rise, monitored the Spo2, monitored ECG, If the newborn's chest is not rising checked position of the head again, repositioned mask to improve seal, Ventilated with oxygen if neonate is breathing with severe in drawing. Likewise, 100.0% of respondent followed all the steps of advance neonatal resuscitation. Regarding post procedure task 90.0% of respondents place disposable suction catheters and mucus extractors in leak-proof container. Similarly, for reusable catheters and mucus extractors 95% of respondent place in chlorine solution for 10 minutes. Regarding documenting resuscitation procedures most of the respondent i.e., 98.8% recorded condition of neonate and measured the outcome of resuscitation.

Table 05: Respondents 'Level of Practice regarding Neonatal Resuscitation

Performance	Done No. (%)
Getting ready	
Wrap or cover the newborn, except for the face and upper chest	80(100.0%)
Place the newborn on its back on a clean, warm surface	78(97.5%)
Tell the mother what is going to be done and respond to her concern	79(98.8%)
Give continual emotional support and reassurance to the mother?	79(98.8%)
Initial step of resuscitation	
Assess the breathing pattern, muscle tone, central cyanosis and heart rate of neonate	80(100.0%)
Check and maintain the temperature of neonate	80(100.0%)
Stimulate the baby by rubbing the back of neonate	79(98.8%)
Basic neonatal resuscitation	
Position the head of neonate in slightly extended position?	80(100.0%)
Suction well if there is secretion in newborn's mouth and nose	80(100.0%)
Suction first the mouth and then the nose	77((96.3%)
Place correct-sized mask on newborn's face so that it covers the chin, mouth and nose	75(93.8%)
Form a seal between mask and newborn's face	80(100.0%)
Squeeze bag with two fingers only or the whole hand depending on the size of bag	80(100.0%)
Check seal by ventilating and observing chest rise	80(100.0%)
Ventilate at 40 breaths/minute	75(93.8%)
Observe chest for easy rise and fall	75(93.8%)
Monitor the Spo2	80(100.0%)
Monitor ECG	80(100.0%)
Check position of the head again	80(100.0%)
Reposition mask to improve seal	80(100.0%)
Squeeze the bag harder to increase ventilation pressure, repeat suction	75(93.8%)
Ventilate for 1 minute and then assess if the newborn is breathing spontaneously	79(98.8%)
Ventilate with oxygen if neonate is breathing with severe in drawing	80(100.0%)
Advance neonatal resuscitation	
Intubate if not done	80(100.0%)
Chest compression coordinate with PPV	80(100.0%)
Administer 100% oxygen	80(100.0%)
Monitor ECG	80(100.0%)
Administer Iv epinephrine if heart rate still below 60/min	80(100.0%)

Correct the hypovolemia	80(100.0%)
Post-procedure tasks	
Place disposable suction catheters and mucus extractors in leak-proof container	72(90.0%)
For reusable catheters and mucus extractors:	
Place in chlorine solution for 10 minutes	76(95.0%)
Wash in water and detergent	73(91.3%)
Use a syringe to flush catheters/tubing	73(91.3%)
Documenting resuscitation procedures	
Record Condition of neonate	79(98.8%)
Measure the outcome of resuscitation	79(98.8%)
Record the possible reason for failing resuscitation, in case of failed	77(96.3%)
Record name of providers	77(96.3%)

Table 6 depicts that 98.8% respondents had good level of practice whereas only 1.2% respondents had poor level of practice.

Table 06: Respondents' Level of Practice regarding Neonatal Resuscitation

Level of Practice	Frequency	Percentage
Good (≥80% of score)	79	98.8
Poor (≤80% of score)	1	1.2
Total		

Table 7 depicts that there was statistically significant association between respondents' level of knowledge and the education status (p-0.014). While the rest of sociodemograhic characteristics like age, sex, religion, ethnicity and marital status were not significant with the level of knowledge regarding neonatal resuscitation.

Table 07: Association between Respondents' Level of Knowledge regarding Neonatal Resuscitation and Socio-demographic Characteristics

Variables	Level of knowledge		x^2	p-value
	Poor Knowledge (%)	Good knowledge (%)		
Age				
> 25 years	67.5	6.3	0.021	0.884
< 25 years	23.8	2.5		
Sex				
Female	73.8	5.0	0.959	0.325
Male	17.5	3.8		
Religion				
Hinduism	70.0	8.8	0.912	0.340
Others*	21.3	0.0		
Ethnicity				
Janjati	40.0	1.2	0.240	0.875
Bramin/ chettri	32.5	3.7		
Others**	18.7	3.7		

Marital status				
Unmarried	50.0	8.0		0.613#
Married	41.3	3.5		
Educational status				
PCL	43.7	0.0		0.014#
Bachelors	38.7	5.0		
Masters and above	8.7	3.7		

*Buddhism, Christianity,mushlim ** Dalit, Madhesi #p-value is taken from fisher Significance level at 0.05

Table 8 reveals that there was no statistically significant association between respondents' level of knowledge and work related variables.

Table 08: Association between Respondents' Level of Knowledge regarding Neonatal Resuscitation and Work related variables of Respondents

Variables	Level of knowledge			
	Good knowledge	Poor knowledge	x^2	p- value
Designation				
Staff nurses	71.3	3.8	2.557	0.110
Others*	20.0	5.0		
Current working area				
NICU	33.8	5.0		
Others**	57.5	3.8		0.258#
Total working experience				
Less than 2 year	21.3	1.3	0.005	0.943
More than 2 years	70.0	7.5		
Attended any training				
Yes	13.8	2.5	0.151	0.697
No	77.5	6.3		
Training specification				
BLS	28.6	21.4		0.096#
APLS	50	0.0		
No. of resuscitation performed				
> 5	20.0	1.3	0.222	0.637
< 5	71.3	7.5		

*medical officer, resident doctor **Labour room, neonate unit, #Fisher's Exact Test

Table 9 reveals that there was no statistically significant association between respondents' level of practice and socio demographic characteristics of respondent.

Table 09: Association between Respondents' Level of Practice regarding Neonatal Resuscitation and Socio-demographic Characteristics

Variables	Level of Practice		p-value
	Good (%)	Poor (%)	
Age			
More than 25 years	72.5	1.3	0.734 #
Less than 25 years	26.3	-	

Sex			
Female	77.5	1.3	0.787#
Male	21.3	-	
Religion			
Hinduism	78.8	-	0.212#
Others	20.0	1.3	
Ethnicity			
Bramin/ chettri	36.2	-	0.912#
Janjati	40.0	1.2	
Others**	22.5	-	
Marital status			
Married	45.0	-	
Unmarried	53.8	1.3	0.550#
Educational status			
PCL nursing	43.8	-	
Bachelors	42.5	1.2	0.562#
Masters and above	12.5	-	

*Buddhism, Christianity,mushlim ** Dalit, Madhesi # Fisher's Exact Test

Table 10 reveals that there was no statistically significant association between respondents' level of practice and work related variables.

Table 10: Association between Respondents' Level of Practice regarding Neonatal Resuscitation and Work related variables

Variables	Level of practice		P-value
	Good (%)	Poor (%)	
Designation			
Staff nurses	75%	-	0.250#
Others	23.8%	1.3%	
Current working area			
NICU	37.5%	1.3%	0.387#
Others	61.3%	-	
Total working Experience			
Less than 2 year	21.3%	1.3%	0.225#
More than 2 years	77.5%	-	
Attended any training			
Yes	16.3%	-	0.837#
No	82.5%	1.3%	
Training specification			
BLS	50%	-	
APLS	50%	-	
No. of resuscitation performed			
Less than 5	20%	1.3%	0.212#
More than 5	78.8%	-	

*medical officer, resident doctor **Labour room, neonate unit, # Fisher's Exact Test

Table 11 represent Pearson's correlation which was calculated to find out bivariate relationship among respondents' knowledge and practice score regarding neonatal resuscitation. It revealed that There was no statistically significant co-relation between level of knowledge and practice and the relationship was not significant with r=1.00.

Table 11: Correlation among respondents' Knowledge and Practice Scores Regarding Neonatal Resuscitation

Score	Knowledge	Practice
Knowledge score	1.0	0.035
Practice score	0.035	1.0

3.2 Discussion

The finding was supported by a descriptive study conducted in kenya descriptive study was conducted to assess the knowledge of neonatal resuscitation among health care providers, only 68 (35.4%) of the participants scored above 85%. More than 70% of them considered their knowledge about neonatal resuscitation is inadequate [19]. It is found that skills of midwives, nurses, pediatrics residents, and obs-gyn residents were insufficient in northwest Ethiopia [20]. In the study of Haryana, India, showed poor knowledge and practices of neonatal resuscitation among the healthcare personnel, only 16% knew all the initial steps of resuscitation [21]. A study conducted in Pakistan at tertiary care hospital among nurses and doctors, 85% health care providers did not follow all steps of resuscitation, although 90% had knowledge about resuscitation equipment and common resuscitation drugs [22]. In Tamale, almost all participants in this study (98.1%) had insufficient knowledge on neonatal resuscitation. The data shows that health care providers generally have insufficient knowledge on neonatal resuscitation as a whole [23]. A Study conducted on maternity ward of nongovernmental health institution of Parsa District of Nepal, it was found that 93% respondents had inadequate knowledge and 90.7% respondents had insufficient skill on Newborn Resuscitation [24]. In Nepal, a descriptive, cross sectional study conducted in nurses to assess knowledge regarding neonatal resuscitation, more than half of the respondents 64.6% had inadequate knowledge. Most of the nurses were found to have inadequate level of knowledge [25]. In this study, level of practice is classified into two categories on the basis of obtained score where less than 80.0% had poor level of practice and more than 80.0% had good level of practice.in this study found that 98.8% respondents had good level of practice whereas only 1.2% respondents had poor level of practice [26]. A cross-sectional study was done on 75 midwives and nurses in Uganda to Evaluating Neonatal Resuscitation Skills. Nurses and midwives showed a poor skill regarding neonatal resuscitation skills [27]. Likewise, in Zambia an observational study was conducted in 78 health professionals to assess the Newborn Resuscitation knowledge and Skills., the study demonstrated that newborn resuscitation knowledge and skill was Inadequate among most participants [28]. The present study showed that there was there was statistically significant association between respondents' level of knowledge and the education status (p-0.014). While the rest of sociodemograhic characteristics were no significant between respondents' knowledge level, socio-demographic characteristics: age (p=0.884), sex (0.325), marital status (p=0.613), ethnicity (p=0.875), religion (p=0.340). Similarly, there was no significant association between knowledge level and work related characteristics: designation (p=0.110), area of work (p=0.258), total working experience (p=0.258), received any training (p=0.697), no.of resuscitation performed (p=0.637) [29]. The study revealed that there was no statistically significant between practice, socio-demographic characteristics and work related variables like

age, sex, marital status, religion, ethnicity, working area ,working experience ,training and number of neonatal performed [30].

4. CONCLUSIONS

The study concluded that 91.2% had poor level of knowledge and 8.8% had good level of knowledge, whereas 98.8% respondents had good level of practice and 1.2% had poor level of knowledge regarding neonatal resuscitation among health care workers in tertiary care hospital. There was significant association between respondents' knowledge level and educational status of respondents (p=0.014), while the rest of socio-demographic and work related characteristics were not significantly associated with knowledge. Whereas, there was no significant association between respondents' practice level with socio-demographic and work related characteristics. Thus, on the basis of the findings, the researcher concluded that there was poor knowledge, and good practice among most of the health care workers.

5. RECOMMENDATION

Following are the recommendation according to the finding of the study:

- Ministry of health should strengthen long-term training programs in neonatology and pediatric fields for health care providers. Because specialization in these fields can improve knowledge and practice towards neonatal resuscitation.
- Strengthen continuous and regular training on neonatal resuscitation for health care providers.
- Hospital managers and decision makers also need to provide periodic supportive supervision and refreshment training for updating knowledge and practice.
- Neonatal intensive care units and delivery units should fulfil all equipment and supplies which are important for neonatal resuscitation including resuscitation guidelines.
- Further observational study on knowledge and practice should be conducted to assess the quality of care and appropriateness of practice toward neonatal resuscitation.
- Health care providers should update their knowledge and practice toward resuscitation through continuous and regular reading and practicing.

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