

Evaluate Nurse's Practice Regarding Neonatal Resuscitation at Zagazig University Hospitals

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Abstract

Background: Neonatal resuscitation” defined as the practice of helping to initiate breathing for neonates who can’t breathe spontaneously at birth. It is a proven method for avoiding harm from intrapartum-related hypoxic events. **Aim of the study:** Evaluate nurse's practice regarding neonatal resuscitation at Zagazig university hospitals. **Subjects and method:** **Research design:** A descriptive design was utilized in the present study. **Setting:** The study was conducted at neonatal intensive care unit and delivery room at Zagazig University Hospitals. **Subjects:** A convenient sample of 90 nurses. **Tools of data collection:** one tool was used in this study; it was Structured interview questionnaire and it was divided into two main parts: The first part was characteristics of the studied nurses. The second was nurse's practice about neonatal resuscitation. **Results:** the study showed that total scores of nurses' practice were 47% and 31% of studied nurses had fair and poor while only 22% had good practice. **Conclusion:** It was conducted that more than three quarter of the studied nurses had poor and fairly score level of practice regarding neonatal resuscitation. qualification, age, years of experience and training courses had highly significant associated with nurse's total practice scores **Recommendation:** the nurse's practice regarding neonatal resuscitation be improved by continuous educational program and regular training.

Key words: Resuscitation, Neonatal, Nurses practice

INTRODUCTION

Neonatal resuscitation” defined as the practice of helping to initiate breathing for neonates who can’t breathe spontaneously at birth. It is a proven method for avoiding harm from intrapartum-related hypoxic events ⁽¹⁾. Approximately 3.7 million neonatal deaths and 3.3 million stillbirths' worldwide each year. during the first 28 days of life there are approximately 38% of deaths among children younger than 5 years of age occur, and 75% of the neonatal deaths occur during the first 7 days. Every year, 6 million neonates require help to breathe immediately after birth. Resuscitation training to help neonates breathe and prevent/manage birth asphyxia in hospital settings in high-income countries is well established; however, it is not routine in low-middle income countries ⁽²⁾

The important for the obstetric and neonate health care providers to coordinate care by establishing

effective communication. Before every birth, review the antepartum and intrapartum risk factors described in ask the following 4 pre-birth question: what is the expected gestational age is the amniotic fluid clear, how many neonates are expected and are there any additional risk factors. Defined risk factors that increase the like hood that the neonate will require support with transition or resuscitation. Although attention to these risk factors is helpful and will identify most neonates that require resuscitation after birth. Some neonates without any apparent risk factors will require resuscitation ⁽³⁾. Individuals who care for neonate infants must anticipate problems with the transition from fetal to neonate life and respond to such problems quickly. The most neonate infants will have no problem at the time of birth, it is important that clinicians are able to provide assistance when needed. The critical steps to providing adequate neonate resuscitation

support are Identification of the infants most likely to need resuscitation. This allow to the birth occur in an area where help can be obtained quickly and equipment can be prepared ahead of time preparation may be the most important side of running a smooth resuscitation. ⁽⁴⁾

Assessing the need to initiate and continue resuscitation should begin immediately after birth and proceed throughout the resuscitation. Evaluation and intervention are simultaneous processes, particularly when more than one resuscitator is present. For clearness this process is steps: neonate life support, cord clamping, initial assessment, supplement oxygen, positive pressure ventilation, chest compressions, endotracheal intubation and Drugs and fluids ⁽⁵⁾.

All health workers in deliveries should know how to perform all steps of neonatal resuscitation. Equipment should be readily available at all times and functioning property so can start resuscitation soon. Nurses start resuscitation as necessary and assist the physician or nurse practitioner with intubation, insertion of umbilical vein catheter, and administration of medication ⁽⁶⁾.

Neonatal resuscitation procedure is important and can affect to long term outcome, the resuscitation team need to do resuscitation and be familiar with the physiological problems the neonate is suffering. This need a good knowledge of the physiology, rapid assessment practices, effective communication between the team work and efficient execution of the neonatal resuscitation algorisms. ⁽⁷⁾

Expectation, appropriate preparation, accurate evaluation, and immediate initiation of support are critical for successful neonatal

resuscitation. At each delivery there should be at least one person whose primary responsibility is the neonate. This person must be qualified for initiating resuscitation, including administration of positive pressure ventilation (PPV) and chest compressions. Either that person or someone else who is promptly available should have the skills required to perform a complete resuscitation, including endotracheal intubations and administration of medications ^{(8) & (9)}

Significance of the study

According to World Health Organization, 20% of five million neonatal deaths each year are related to birth asphyxia. Consequently, competence in neonatal resuscitation could potentially influence one million neonates each year. Timely and accurate resuscitation improves the outcomes of asphyxiated neonates. Sufficient resuscitation at birth not only can lower neonatal mortality rates, but also can improve survival in neonates. Neonatal resuscitation is needed occasionally and relies on resolving respiratory problems rather than cardiac episodes ⁽¹⁰⁾.

In order to prevent the neonatal deaths, the staff nurses should perform resuscitation procedure at a high level of professional competence and thus, the staff nurses must be trained regarding proper skills and technique of routine care and neonatal resuscitation. Therefore, this study will be conduct to evaluate nurse's practice about neonatal resuscitation at zagazig university hospitals.

Aim of the study

This study was aim to:

Evaluate nurse's practice regarding neonatal resuscitation at Zagazig university hospitals.

Research Questions:

Is nurse's practice regarding neonatal resuscitation adequate or not?

Subjects and Methods:

Research Design:

A descriptive design was selected.

Study setting:

The study was conducted at Zagazig University Hospitals; one is located in neonatal intensive care unit (NICU) and delivery room at the Obstetric Hospital and other in neonatal intensive care unit at the Pediatric Hospital.

Subjects:

A convenient sample composed of 90 nurses were worked at neonatal intensive care unit (NICU) in the above-mentioned setting.

Criteria of the studied nurses:

- 1) Provide direct care to neonates.
- 2) Had nursing certificate.
- 3) Accept to participate in the study
- 4) Had years of experience more than 6 months.

Tools for data collection:

One tool was used to collect the data, it was Structured interview questionnaire sheet.

Structured interview questionnaire sheet was used to collect the necessary data and it was developed by researcher and it was divided into two main parts:

Part 1: Characteristics of the studied nurses: it included close ended questions about age, gender, years of experiences, level of education or qualification, work place, Training courses about neonatal resuscitation they were attended, number of attendance and performing neonatal resuscitation.

Part 2: questions to assess nurse's practice regarding neonatal resuscitation

It consisted of 60 questions about: Preparation for neonatal resuscitation (the equipment, the team work and scenario of preparation) 8 items, initial steps care of neonatal resuscitation (open the air way, assessment the neonates, stimulate the neonate for breathing) 25 items, ventilation It was consisted of (the positive- pressure ventilation, intubation), 13 items, chest compression It was consisted of the correct position, correct depth and the coordination ratio of chest compression (9 items) and medication It was consisted of concentration, ways of administration the epinephrine and the volume expander (5 items). the Total score of practices about neonatal resuscitation was 84 marks

Scoring system for practicing about neonatal resuscitation

It was one score for correct answer and in correct answer was give zero score. The scores were classified as the following:

- Poor (Less than 60%)
- Fair (60% - 80%)
- Good (more than 80%)

Content validity and reliability

It was established for assurance content validity by three experts (Two professors of pediatric nursing from faculty of nursing Alexandria University and one professor of obstetrics nursing faculty of nursing Zagazig university). Reliability of tools was done by using Cronbach's Alpha test reliability coefficient to measure the internal consistency for the final scales. The reliability of Practice questionnaire was 0.813.

Field work:

Field work of this study was executed in six months starting from August 2019 to end of January 2020. The data were collected three days per week and following protective measure (Sunday, Tuesday and Thursday) beginning from 9:00 am to

1:00 pm. Each nurse was interviewed individually, the researcher started with introducing herself and explaining the aim of the study for the selected nurse and obtaining their oral consent, assured that collected data was confidential and would be used only to achieve the purpose of the study. The questionnaires were read, explained and the choices were recorded by the researcher. The time consumed to answer each sheet was ranged between 20–30 minutes.

Pilot study:

A pilot study for tools of data collection was carried on 10% of the study sample after the tools were developed and before starting the data collection to test the applicability, consistency, clarity and the feasibility of the study tools as well as to determine the required time to fulfill the tools. No modification was done to the tools.

Administrative design and Ethical consideration:

Submission of a formal letter was obtained from the Dean of Faculty of Nursing, to the responsible authorities of Pediatric hospital and Obstetric hospital at Zagazig University Hospitals to obtain their permission for data collection. The research approval was obtained from ethical committee before starting study. The researcher maintained an anonymity and confidentiality of the subject. The inclusion of subjects in the study was totally voluntary. The aim the study was explained to every nurse before participation and oral consent was obtained. The nurses were notified that they can withdraw at any stage of the research; also, they were assured that the information obtained during the study will be confidential and used for the research purpose only.

Statistical Design:

Data was analyzed using SPSS version 18. Data were presented by frequency tables with numbers and percentages for qualitative variables

and means and standard deviations for quantitative variables. The chi-square test was used to find the significant association between characteristics of the studied nurses and their total practice Cronbach's Alpha test was calculated to assess the reliability analysis by measuring of internal consistency of the tool. Statistical significance was considered at p-value <0.05 and highly statistical significance was considered at p-value <0.01.

Results

Table (1) indicates that mean age of studied nurses was 34.33 ± 6.95 years. Also, 100% of them were females, 36.7% had diploma of nursing education. In addition, mean of years' experience was 8.4 ± 3.16 years and 80% of nurses were married. Moreover, 66.7% of them worked at neonatal intensive care unit, while 50% of studied nurses received cardiopulmonary resuscitation programs.

Table (2): Nurses' practice regarding to preparation for neonatal resuscitation. 31.1% selected all the equipment those are important to be available at each birth. Moreover, 46.7% of studied nurses selected at least one qualified person should be present at delivery room to take care for the neonate. In addition, 45.6% of them answered at least two qualified people appropriate for the neonatal resuscitation team to treat the neonate at the event of birth hazards. While, only 22.2% selected Polyethylene bag used to cover the neonate less than 32 weeks quickly.

Table (3): Nurses' practice are the initial steps to care for the neonate immediately after birth. It was found that 45.6% of the studied nurses had answer Provide warmth, position the head and neck in the correct position and clear secretion if needed drying and stimulate for breathing. Moreover, 33.3% selected the neonate must be

Keep the neonate with the mother and be warmed and maintain the proper position to open the airway. In addition, 26.7% of the studied nurses answered the neonate must be placed on the radiant warmer because he may need rapid intervention. If the result of initial steps is within the first 30 seconds of a neonate's life (preterm, not cry and not breathe well). Also, 33.3% had the correct position of the neonate's head to open the airway. While 37.8% answered suction from the mouth then from the nose the correct way to suction the secretions to the neonate.

Table (4): Nurses' practice regarding initiate breathing for the neonate at birth. It was found that 23.3% of the studied nurses selected rub the neonate's back for stimulate the neonate for breathing if the neonate not breathing. In addition, 27.8% answered by Start positive pressure ventilation if the neonate stimulated to breathing for several seconds and he has not breath. In addition, only 10% answered bring the neonate to the radiant warmer and start the initial steps Provides suctioning before stimulation if there is meconium stained fluid and the neonate isn't breathing, while 14.4% start positive pressure ventilation if the neonate is still not breathing after 60 seconds from birth the neonate have warmed, opened the airway and the head in correct position, dried the neonate, and stimulated the neonate to breathe.

Table (5): Nurses' practice regarding to ventilation. It was found that 28.9% of the studied nurses answered If the neonate was apneic or gasping or heart rate is less than 100 b/m as indications for positive pressure ventilation. It was found that 55.6% had correct practice regarding preparation to start giving positive pressure ventilation.

Moreover, 27.8% selected do not pressure on the neonate's eyes as

precautions should be used when placing the mask on the neonate's face to give positive pressure ventilation, while 37.7% of the studied nurses assessed response to positive pressure ventilation by counting heart beats. 77.8% of the studied nurses used proper mask size for ventilation. Moreover, 38.9% know appropriate position for insertion of endotracheal tube

Table (6): Nurses' knowledge about chest compression and medication. It was found that 23.3% of studied nurses begin chest compression when heart less than 60 beats per minute, 55.6% selected place the fingers on the sternum bone below the line of the neonate's nipples when they giving chest compression. Moreover, 33.3% selected one-third of anterior-posterior (AP) diameter of the chest as answer the correct depth for chest compression. Meanwhile, 43.4% done 3 compressions to 1 ventilation/2 second as the ratio of chest compression to ventilation of the lungs. In addition, 33.3% had stand at the neonate's head during chest compression when inserting emergency umbilical vein catheter. Moreover, 34.4% of the studied nurses stop chest compression when the heart rate is 60 beat/ minute or more, it was found that 43.3% of the studied nurses give epinephrine through the umbilical vein.

Figure (1): shows Percentage distribution of studied nurses regarding their total nurses' practice score. It was found that 47% and 31% of studied nurses had fair practice and poor practice, but only 22% of them had good practice.

Table (7): Relation between characteristics of the studied nurses and their total practice reveals relation between characteristics of the studied nurses and their total practice. It was found that there was highly significant relation between the studied nurses'

age, marital status, qualification, training courses, thinking about training and their total practice at p value <0.01. While, there was a significant between experience, working place and their total practice at p value >0.05.

Discussion

The results of the present study showed that more than half of studied nurses their age above 30 years and more than one third of them was diploma of nursing education. All of them were female and majority of the studied nurses worked at neonatal intensive care unit. Most of studied nurses were married and more than half of them had experience more than ten years. These findings agree with a study done by **Abd El-Moniem et al.**,⁽¹¹⁾ who reported in thesis entitled "Performance of Health Care Providers regarding Helping Babies Breathe during Neonatal Resuscitation" in Egypt, that more than half of studied nurses aged above 30 years with Mean \pm SD 33.31 \pm 1.14 years and more than one third of them were diploma of nursing education. In the same field, **Suresh et al.**,⁽¹²⁾ who conducted study about "Evaluation of Knowledge and Practices on Neonatal Resuscitation among Nurses in Kanyakumari District Hospitals" in India, that all the studied nurses were female and the majority of them worked at neonatal intensive care unit. Also, **Ebrahimi et al.**,⁽¹³⁾ who mentioned in their study about "Effect of simulation-based CPR education on the knowledge and performance of neonatal intensive care unit nurses" in Iran, that all the studied nurses were female and more two thirds of them had experience more than ten years with mean 13.24 \pm 4/59 years. In the same field **Yousef & Hasan**⁽¹⁴⁾ who reported in thesis entitled "Assessment of Nurses Knowledge toward Neonate with Birth Asphyxia at Neonatal Intensive Care Unit in Pediatric

Hospitals at Babylon Governorate" at Iraq, that more than one third of them were diploma of nursing education and most of studied nurses were married.

According the present study findings, nearly one third of studied nurses had correct practice about prepared the equipment at each birth. This result was agreed with **Namuguzi et al.**,⁽¹⁵⁾ who maintained in their study about "Evaluating Neonatal Resuscitation Skills of Practicing Nurses and Midwives in Selected Hospitals in Central Uganda" that the same result regarding preparing the equipment at each birth. This similarity between the two studies may due to that the two studies performed in developing countries Egypt and Uganda and these countries similar in the same health care facilities and resources. In addition, near half of the studied nurses were given the correct answer Regarding identified helpers at delivery room before the resuscitation. That was in the same line with **Shikuku et al.**,⁽¹⁶⁾ who found in their study which done in Kenya to determine the quality of care during neonatal resuscitation, who found more than half of studied nurses had identified helpers before the resuscitation.

The present study clarified that Less than half of the studied nurses had correct answer about the neonatal resuscitation team in the event of birth hazards and regard the important equipment's should be prepared during each birth nearly one third of the studied nurses had correct answer these result might be due they did not follow neonatal resuscitation algorithms and essential equipment lists which recommended by international institutions as World Health Organization (WHO) and American Academy of Pediatrics (AAP). These results were in agreement with **Abd El-Moniem et al.**,⁽¹¹⁾ who was found the same result.

In the present study less than one quarter had correct answer about using

the polyethylene bag to dry the neonate for less than 32 weeks this might be due not using some equipment as polyethylene bag or not flow neonatal resuscitation program algorithm in the hospitals. This result was disagreement with **Cetinkaya et al.**,⁽¹⁷⁾ who found majority of studied nurses had the correct answer.

Regarding to initial steps of neonatal resuscitation were stated by less than half of the current study nurses. This result was gone in the same line with **Khalid et al.**,⁽¹⁸⁾ who reported in thesis entitled "Basic neonatal resuscitation, knowledge assessment at primary health care centers of district Sheikhpura in Pakistan -- a cross-sectional study" that less than half of studied midwives had correct order of initial resuscitation care of newborn.

According the present study findings, only one third of the studied nurses had correct answer for practicing initial steps within the first 30 seconds of a neonate's life: full term who cry and breathe well; this might be due lack of training programs regarding neonatal care. This disagreed with **Mersha et al.**,¹⁹ who reported in thesis entitled "Basic Newborn Resuscitation: Health Care Providers' Level of Knowledge and Factors Affecting in the Hospitals of Southern Ethiopia" that major of the study participants provided warm after 30 seconds if the neonate is breathing well.

The finding of the current study revealed that majority of the studied nurses had in correct answer regarding the correct intervention if the result of initial steps within the first 30 seconds of a neonate's life was (preterm, not cry and not breathe well). This result was in the same line with **Taha**,²⁰ who reported in thesis entitled "assessment of knowledge, attitude and Practices of nurse midwives toward immediate care of the newborn in Khartoum state teaching hospitals" that most of the studied nurses had wrong

answer. That similarity between the two studies might be due to the most of studied nurse's lack training courses about immediate care of neonates and lack of hospitals protocols that dealing with neonatal resuscitation at birth.

The result of the present study shown only one third of the studied nurses were stated the correct position to open the airway. This result disagreed with **Negussie et al.**,⁽²¹⁾ who reported in thesis entitled "evaluating neonatal resuscitation skills of practicing nurses and midwives in selected hospitals in Central Uganda" that two thirds of nurses' had correct way to open the airway. that might be due to lack of training courses and lack of practicing of neonatal resuscitation by nurses as the general concept in our hospital that practicing neonatal resuscitation is the responsibility of physician not the nurse.

The study result revealed that, more than one third of the studied nurses had correct knowledge about the correct technique for suctioning the secretions. that might be due to lack of direct supervision during care of the neonate at birth. This result was disagreement with **Taha**,⁽²⁰⁾ who found that more than two third of studied nurses had answered suctioning the mouth before the noes.

the present study clarified that the most of studied nurse had in correct answer about the steps that should started if the neonate is not breathing for several seconds after stimulating for breathing. This result disagreed with **Arba & Zana**,⁽²²⁾ who reported in thesis entitled "Knowledge of Essential Newborn Care and Associated Factors among Nurses and Midwives: A Cross-Sectional Study at Public Health Facilities in Wolaita Zone, Southern Ethiopia" that more than two thirds of the studied nurses had correct answer about the steps that they do if the neonate is not breathing for several seconds after stimulating for breathing. that might be due to the studied nurses

in the present study not follow neonatal resuscitation algorithm.

The finding of the current study revealed that the majority of studied nurses had in correct answer about the step that should be started if a neonate born with meconium stained and not crying or breathing. This result was disagreed with **Kogi et al.**,⁽²³⁾ who reported in thesis entitled "nurses' related factors determining compliance of nurses to national neonatal resuscitation guidelines among nurses at Pumwani maternity hospital, Kenya" that the most of studied nurses had correct answer by starting the initial steps, provided warmer and suctioning before stimulation.

In the present study less than one third of the studied nurses had correct knowledge about started ventilation with bag and mask. This result was disagreed with **Noor et al.**,⁽²⁴⁾ who reported in thesis entitled "observational study on standard practices of nurses in birth asphyxia management at a tertiary care hospital, Lahore, Pakistan" that more than three quarter of the study participants had started ventilating with bag and mask if the neonate is not breathing, apneic or has gasping respirations or heart rate of less than 100 beats/min. that may be due to different sample size and level of education.

The result of the current study clarified that more than half of studied nurses had correct practice regarding preparation for ventilation this result was disagreed with **Abd El-Moniem et al.**,⁽¹¹⁾ who found that only less than one third of studied nurses were competent to do preparation for ventilation.

The majority of the studied nurses had correct practice regarding the way and the precautions for applying the mask on the neonate's face to give positive pressure ventilation. This result was agreed with **Namuguzi et al.**,⁽¹⁵⁾ who found more than half of studied nurses had applied the mask to make a

firm seal (Extend the head, place mask on the chin, then over the mouth and nose).

The finding of the current study revealed that more than one third of studied nurses had correct answer regarding the method and the time of assess neonate's response to PPV. That might be related to lack of regular training in the healthcare system. These results were disagreed with **Brathwaite et al.**,⁽²⁵⁾ who reported in thesis entitled "evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana" that less than one third of studied nurses pre training and more than half of them post training had correct answer. This highlights the need for regular training.

In the present study more than three quarter of studied nurses used proper mask size for ventilation this result was in accordance with **Noor et al.**,⁽²⁴⁾ who found that more than three quarters of studied nurses selected appropriate mask size to cover the chin, mouth and nose and check that the mask is properly sealed over the neonate's nose and mouth.

More than one third of studied nurses had correct answer about correct position for insertion of endotracheal tube. This finding agreed with **Ding et al.**,⁽²⁶⁾ who reported in thesis entitled "evaluation of a neonatal resuscitation training programme for healthcare professionals in Zanzibar and Tanzania" that more than one third of participants on 2017 had appropriate position for insertion of endotracheal tube. This agreement may due to that insertion of endotracheal tube is the responsibility of anesthesia doctors not nurse.

The finding of the present study showed that only less than one quarter of studied nurses begin chest compression when heart rate less than 60 beats per minute and more than three quarter had incorrect answer this may be due to absence of attended

programs for neonatal resuscitation, this result was disagreed with **Brathwaite et al.**,⁽²⁵⁾ who found that two third of studied nurses had correct answer before training course and half of studied nurses had correct answer post training course.

In the present study more than half of studied nurses had correct answer about the position of the hands when giving chest compression. This result was agreed with the results achieved by **Kwiecień- Jagus et al.**,⁽²⁷⁾ who reported in thesis entitled "a cross-international study to evaluate knowledge and attitudes related to basic life support among undergraduate nursing students-a questionnaire study" that the same results and they related this results to overcrowded classes and lack of stimulating training courses on neonatal resuscitation for these students.

Regarding to the correct depth for chest compression only one third of studied nurses had correct answer this result was disagreed with **Ding et al.**,⁽²⁶⁾ who was found major of participants had correct answer on 2017 and 2018 pre-training courses that might be due to small sample and participants composed of nurses and doctors and the result improved, this indicates that refresher courses might improve knowledge. While, their results agree with the current study regarding inadequate practicing of the correct ratio of chest compression to ventilation of the lungs as it stated by one third of the studied nurses in the both studies.

In the present study one third of study nurses had correct knowledge about standing position of the person who giving chest compression. That might be related to a lack of exposure to an adequate number of cardiopulmonary resuscitation cases. This result was disagreed with **Carlo et al.**,⁽²⁸⁾ who reported in thesis entitled "Educational impact of the neonatal resuscitation program in low-risk delivery centers in a developing

country" that more than two thirds of participants had correct knowledge.

In the present study more than one third of studied nurses had correct answer Regarding to when stop chest compression. This result was disagreed with **Kogi et al.**,⁽²³⁾ who found more than half of studied nurses had correct answer.

The result off the current study showed that less than one third of studied nurses had the correct answer about the two routes of epinephrine administration. this result was in the same line with **Ding et al.**,⁽²⁶⁾ who was found little more than one third on 2017 pre-training that may be due to small of their sample size than the current study and on 2018 pre-training less than two thirds but post-training more than two thirds of participants. This indicates that refresher courses might improve knowledge.

The present study revealed that more than half of the studied nurses had fair practice regarding preparing for neonatal resuscitation and initial steps while, less than one half had poor practice regarding practicing of ventilation and chest compression. Moreover, less than half of them had fair practice regarding giving medication during neonatal resuscitation. That might be due to lack of policy to regulate training programs and monitor employee competences.

These results matched with a study performed to evaluate nurses' practices toward neonatal resuscitation in the delivery room by **Hasson et al.**,⁽²⁹⁾ who found that more than two third of studied nurses had fair practice regarding neonatal resuscitation supplies and equipment and more than half of them had poor practice regarding chest compression. While, half of them had fair practice regarding medication during neonatal resuscitation. Also, **Suresh et al.**,⁽¹²⁾ was reported the same result regarding chest compression nurses' practice. But this result was disagreed with **Kogi et**

al.,⁽²³⁾ who found the most of studied nurses had performing chest compressions this difference between the two studies might be related to the small sample size they used.

The result of the present study revealed that there was a significant relation between experience and their total practicing regarding neonatal resuscitation that might be due to that the senior nurses who had several years of experience were worked as the administrative role and delegated nursing activities to the junior nurses so, they were far away from practical work and their skills were decreased. This goes in line with **Gauro**,⁽³⁰⁾ who reported in thesis entitled "Knowledge and skill of newborn resuscitation among nurses working in maternity ward" that there was significant association between the level of skill regarding newborn resuscitation and total working experience.

The current study revealed that there was highly significant relation between attended training course of the studied nurses and their total practice these results matched with **Negussie et al.**,⁽²¹⁾ who found that there was significant difference between those who trained and not trained. This result might be related to the attendance training program necessary to increasing knowledge and improving nursing skills.

Conclusion

According to the results of the present study. It can be concluded that almost of the studied nurses had poor and fairly score level of practice regarding neonatal resuscitation. Neonatal resuscitation practice is good among nurses who got training courses, single, age less than 40 year, years of experience less than 10 years and had qualification bachelor.

Recommendations

Based upon the results of this study, the following are suggested:

- Stimulating and continuous training courses for nurses in delivery room and neonatal intensive care unit to improve their knowledge regarding neonatal resuscitation
- Proper practicing of neonatal resuscitation should be one of the basic qualification for selection of nurses to work in neonatal intensive care unit and delivery room.
- The nurse managers in the departments should select a qualified team leader to provide good supportive supervision on adherence to resuscitation guidelines. This will improve adherence to neonatal resuscitation guidelines to prevent neonatal complications and neonatal mortalities.
- The hospital management in collaboration with the Continuing Training Center should organize for regular training and national and international educational program that designed and implemented to improve nurse's knowledge about neonatal resuscitation.

Table (1): Characteristics of the studied nurses.

Characteristics	No=90	%
Age / year		
- 20 -	28	31.1
- 30-	40	44.4
- 40- 50	22	24.5
Mean ± S.D	34.33±6.95	
Gender		
- Female	90	100
Education level		
- Diploma of nursing	33	36.7
- Technical institute of nursing	30	33.3
- Bachelor of nursing	25	27.8
- Postgraduate	2	2.2
years of experience		
- > 5 years	18	20
- 5 - 10 years	26	28.9
- < 10 years	46	51.1
Mean ± S.D	8.4±3.16	
Marital status		
- Single	18	20
- Married	72	80
Workplace inside the hospital		
- NICU	60	66.7
- Delivery room	30	33.3
-		
Have you received courses or programs on cardiopulmonary resuscitation of neonates?		
- yes	45	50
- No	45	50
Have you ever performed neonatal resuscitation?		
- Yes	57	63.3
- No	33	36.7

Table (2): Nurses 'practice regarding preparation for neonatal resuscitation

Nurses' practice	No=90	%
What the equipment those are important to be available at each birth? *		
- Suction equipment	18	20
- The positive pressure ventilation equipment	9	10
- Intubation equipment	12	13.3
- Umbilical vessel catheterization supplies and medication	19	21.1
- All of the above	28	31.1
- I don't know#	4	4.5
How many personnel should be present at the delivery room?		
- At least one qualified person can take care of the neonate	42	46.7
- One qualified person who take care for both mother and neonate#	40	44.4
- I do not know#	8	8.9
How many people are appropriate for the neonatal resuscitation team in the event of birth hazards?		
- At least three qualified individuals#	20	22.2
- One qualified person and assistant#	19	21.1
- At least two qualified people to treat a neonate and also according to hospital rules and the number of babies	41	45.6
- I don't know#	10	11.1
Drying the neonate for less than 32 weeks is not necessary because you should cover the neonate quickly first with?		
- Warm blanket#	51	56.7
- Blanket#	19	21.1
- Polyethylene bag	20	22.2

Table (3): Nurses' practice regarding the initial steps to care for the neonate immediately after birth

Nurses' practice	No=90	%
What are the initial steps to care for the neonate immediately after birth?		
- Dry the neonate, correct position of the head and neck and suction the mouth and nose#	20	22.2
- Provide warmth, position the head and neck in the correct position, clear secretion if needed drying and stimulate for breathing	41	45.6
- Dry, provide warmth, correct position of the head and neck and clear secretion if needed#	23	25.5
- I don't know#	6	6.7
What do you do when the result of initial steps within the first 30 seconds of a neonate's life: full term, cry and breathe well?		
- The neonate must be placed on the radiant warmer away from the mother because he may need rapid intervention#	50	55.5
- Keep the neonate with the mother and be warmed and maintain the proper position to open the airway	30	33.3
- Transfer the neonate to the neonatal intensive care unit#	5	5.6
- I don't know#	5	5.6
What do you do when the result of initial steps is within the first 30 seconds of a neonate's life (preterm, not cry and not breathe well)?		
- The neonate must be placed on the radiant warmer away from the mother because he may need rapid intervention	24	26.7
- Keep the neonate with the mother to be warmed and maintain the proper position to open the airway #	4	4.4
- Transfer the neonate to the neonatal intensive care unit #	50	55.6
- I don't know #	12	13.3
Which of the following images show the correct position of the neonate's head to open the air way?		
- 	22	24.4
- 	30	33.3
- 	38	42.3
What is the correct way to suction the secretions to the neonate?		
- Suction from the nose only#	10	11.1
- Suction from the mouth then from the nose	34	37.8
- Suction from the nose and the mouth#	40	44.4
- I don't know#	6	6.7

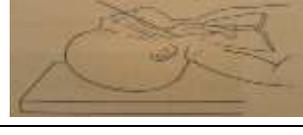
*more than one answer

#wrong answer

Table (4): Nurses' practice regarding initiate breathing for the neonate at birth

Nurses' practice	N=90	%
If the neonate is not breathing, what the ways are for stimulate the neonate for breathing? *		
- Rains the neonate with drops of warm water to alert him#	5	5.5
- Perform tactile stimulation	15	16.7
- Shake the neonate#	12	13.3
- Rub the neonate's back	21	23.3
- A, C #	18	20
- B, d	19	21.1
What you should do for the neonate if stimulated him to breathing for several seconds and he has not breath?		
- Continue stimulate the neonate until breathing #	10	11.1
- Insert endotracheal tube directly #	40	44.4
- Start positive pressure ventilation	25	27.8
- I don't know #	15	16.7
What do you do if there is a meconium stained fluid and the neonate isn't breathing?		
- Bring the neonate to the radiant warmer and start the initial steps Provides suctioning before stimulation	9	10
- Place the neonate on an oxygen#	29	32.2
- Stimulate the neonate to breathe#	16	17.8
- Insert endotracheal tube for the suction first#	36	40
What do you do if the neonate has warmed, opened the airway and the head in correct position, dried the neonate, and stimulated the neonate to breathe and now 60 seconds after birth the neonate is still not breathing?		
- Stimulate the neonate to breathe with a severe massage of the back and limbs #	40	44.4
- Give him an oxygen by the free flow#	28	31.2
- Start positive pressure ventilation	13	14.4
- I don't know#	9	10

Table (5) Nurses' practice regarding to ventilation.

Nurses' practice	No= 90	%
What are the indications for positive- pressure ventilation?		
- If the neonate isn't breathing with stimulation within the first 10 second of neonate's life #	39	43.3
- If the neonate was apneic or gasping or heart rate is less than 100 b/m	26	28.9
- If the neonate's limbs are blue #	25	27.8
What is your preparation to start giving positive pressure ventilation? *		
- By removing the secretions from the airway	13	14.4
- Position of the person giving positive pressure ventilation at the neonate's head	17	18.9
- Head and neck position	10	11.1
- All of above	50	55.6
What precautions should be used when placing the mask on the neonate's face to give positive pressure ventilation? *		
- Do not press firmly over the neonate's face with the mask	19	21
- Do not pressure on the neonate's eyes	25	27.8
- Do not pressure on the neonate's neck	15	16.7
- I don't know #	6	6.7
- A, B and C	25	27.8
How can you assess neonate's response to positive pressure ventilation during neonatal resuscitation?		
- By counting breathing #	46	51.1
- By counting heart beats	34	37.7
- By observing the level of consciousness #	16	17.8
- I don't know #	4	4.4
Which of the following images show the proper mask size for the neonate?		
 #	18	20
	70	77.8
 #	2	2.2
Which position is appropriate for insertion of endotracheal tube?		
	30	33.3
 #	25	27.8

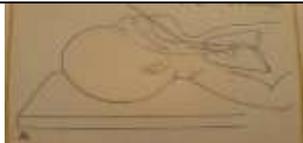
	35	38.9
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Table (6) Nurses' practice regarding to chest compression and medication

Nurses' practice	No= 90	%
When you should begin chest compression?		
- When the heart rate is less than 10 beat/minute #	39	43.3
- When the heart rate is less than 60 beat/minute	21	23.3
- When the neonate is not breathing and the heart rate is normal #	28	31.1
- I don't know #	2	2.2
What is the position of the hands when giving chest compression?		
- Place the fingers on the sternum bone below the line of the neonate's nipples	50	55.6
- The thumbs on the left side of the chest #	30	33.3
- The thumbs on the xiphoid #	8	8.9
- I don't know#	2	2.2
What is the correct depth for chest compression?		
- A quarter of the chest's back front depth of the chest #	19	21.1
- One-third of anterior-posterior (AP) diameter of the chest	30	33.3
- Half the back-front depth of the chest #	32	35.6
- I don't know#	9	10
What is the ratio of chest compression to ventilation of the lungs?		
- 15 compressions to 2 ventilation / 1 minute #	22	24.4
- 3 compression to 1 ventilation/2 second	39	43.4
- 2 compression to 2 ventilation / 30 second #	20	22.2
- I don't know #	9	10
Where the person giving chest compression should stand during inserting emergency umbilical vein catheter?		
- At the neonate's head	30	33.3
- Next to the neonate on the right side #	15	16.7
- Next to the neonate from the left side #	41	45.6
- I don't know #	4	4.4
When chest compressions should stop?		
- When the heart rate is 40 b/min #	28	31.2
- When the heart rate is 50 b/min #	22	24.4
- When the heart rate is 60 b/m or more	31	34.4
- I don't know #	9	10
The epinephrine can give to the neonate through...? *		
- The umbilical vein	39	43.3
- The bone	21	23.3
- The trachea	4	4.4
- The intramuscular injection #	5	5.6
- A, B and C	19	21.2
- I don't know #	2	2.2

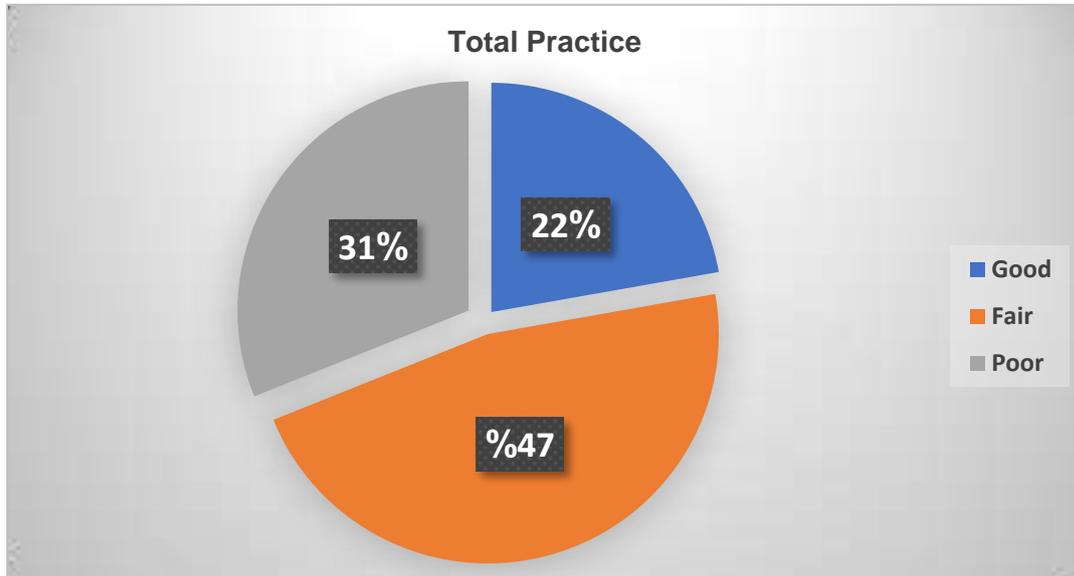


Figure (1): Percentage distribution of studied nurses regarding their total Nurses' practice score (N=90).

Table (7): Relation between characteristics of the studied nurses and their total practice.

Items		Total Practice						X ²	P-Value
		Good		Fair		Poor			
		N	%	N	%	N	%		
Age	20 - <30	10	50	16	38.1	2	7.1	8.644	.009**
	30 - <40	7	35	22	52.4	11	39.3		
	40 - 50	3	15	4	9.5	15	53.6		
Marital status	Single	11	55	4	9.5	3	10.7	10.913	.006**
	Married	9	45	38	90.5	25	89.3		
Qualifica-tion	Diploma	0	0	11	26.2	22	78.6	14.222	.003**
	Technical	3	15	23	54.8	4	14.3		
	Bachelor	15	75	8	19	2	7.1		
	Postgraduate	2	10	0	0	0	0		
Years of Experience	< 5 years	9	45	7	16.7	2	7.2	6.119	.013*
	5 - 10 years	8	40	12	28.6	6	21.4		
	>10 years	3	15	23	54.7	20	71.4		
Working place	NICU	15	75	27	64.3	18	64.3	5.838	.015*
	Delivery room	5	25	15	35.7	10	35.7		
Training Courses	Yes	18	90	14	33.3	3	10.7	9.747	.007**
	No	2	10	28	66.7	25	89.3		
Thinking about importance of training	Yes	20	100	41	94.6	25	89.3	18.461	.000**
	No	0	0	1	5.4	3	10.7		

*significant at p < 0.05.

**highly significant at p < 0.01.

References

1. Schmölzer GM, Morley CJ and Kamlin OC: Enhanced monitoring during neonatal resuscitation. *Seminars in Perinatology journal*. 2019; doi: 10.1053/j.semperi.2019.08.006.
2. Logan JW, Shepherd EG and Tobias JD): Neonatal resuscitation: An update. *International journal of Anesthesiology Pain & Intensive Care* .2019; 18(4):386-396.
3. American Academy of Pediatrics [AAP] and American Heart Association [AHA]: Textbook of Neonatal Resuscitation Progame (NRP). American Academy of Pediatrics. 7th library of congress: United States of America .2016 .p.978.
4. Leone TA: Neonatal Resuscitation. In: Polin RA and Yoder MC (Eds). *Workbook in Practical Neonatology*, 5th ed, Elsevier Saunders Com, Philadelphia. 2015. PP 1-18.
5. Fishman CE, Weinberg DD, Murray A and Foglia EE: Accuracy of real-time delivery room resuscitation documentation. *Archives of Disease in Childhood-Fetal and Neonatal Edition journal*.2020;105(2):222-224.
6. McKinney ES: The High-Risk Newborn: Acquired and Congenital Conditions. In: McKinney ES, James SR, Murray SS, Nelson K and Ashwill J (Eds). *Maternal-Child Nursing*, 6th ed. Elsevier com, USA.2021. PP:645-661.
7. Jordache R, Doherty C, Kenny C and Bowie P. Preliminary Adaptation, Development, and Testing of a Team Sports Model to Improve Briefing and Debriefing in Neonatal Resuscitation. *Pediatric quality and safety journal*.2020 ; 5(1): 1-6.
8. Wyckoff M, Aziz K, Escobedo M, Kapadia V, Kattwinkel J, Perlman J and et al.,: Part 13: Neonatal Resuscitation 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation journal*.2015; 132(18 suppl 2). S543-S560.
9. De Carolis MP, Casella G, Serafino E, Pinna G, Cocca C and De Carolis S: Delivery room interventions to improve the stabilization of extremely-low-birth-weight infants. *The Journal of Maternal-Fetal & Neonatal Medicine*.2019 ;34(12):1925-1931.
10. Malekzadeh J, Erfanian F and Khadivzadeh T. Evaluating Neonatal Resuscitation Skills of Nursing and Midwifery Students Using Objective Structured Clinical Examination (OSCE). *Journal of Midwifery and Reproductive Health*.2015; 3(3): 418-423.
11. Abd El-Moniem II, Tantawi HR and Ibrahim AM: Performance of Health Care Providers regarding Helping Babies Breathe during Neonatal Resuscitation. *Egyptian Journal of Health Care*.2018; 9(4): 288-301.
12. Suresh PM, Kumar RT, Nagalekshmi R and Anandan H : Evaluation of Knowledge and Practices on Neonatal Resuscitation among Nurses in Kanyakumari District Hospitals. *International Journal of Scientific Study*.2017; 5(1): 166-168.
13. Ebrahimi HK, Sohrabi S, Ashtiyani FZ, Hafize F, Esmaeilian S and Jafarnejad S: Effect of simulation-based CPR education on the knowledge and performance of neonatal intensive care unit nurses. *Journal of Critical Reviews*.2020; 7 (7): 1135-1140.
14. Yousef SA and Hasan AA. Assessment of Nurses Knowledge toward Neonate with Birth Asphyxia at Neonatal Intensive Care Unit in Pediatric Hospitals at Babylon Governorate. *Medico legal Update journal*.2020; 20(3): 1099-1104.
15. Namuguzi M, Drake K, Ekong EN, and Asuquo E: Evaluating Neonatal Resuscitation Skills of Practicing Nurses and Midwives in Selected Hospitals in Central Uganda. 2019. Available at: <https://doi.org/10.21203/rs.2.9932/v1>. Accessed on [June 6, 2019].
16. Shikuku D N, Milimo B, Ayebare E, Gisore P and Nalwadda G: Quality of Care during Neonatal Resuscitation in Kakamega County General Hospital, Kenya: A Direct Observation Study. *BioMed research international journal*.2017; DOI: 10.1155/2017/2152487
17. Cetinkaya S, Turkoglu B, Dogan E, and Kara M: Examining the Knowledge Level of the Nurses and Midwives Had Neonatal Resuscitation Program (NRP) Practitioner Training Course. *Journal of multidisciplinary healthcare*.2022; 15(1):281-288.

18. Khalid N, Ahmad M, Tahir A, Mahmood H, Saleem, S, and Saleem, S: Basic neonatal resuscitation, knowledge assessment at primary health care centers of district Sheikhpura in Pakistan -- a cross-sectional study. *The Journal of the Pakistan Medical Association*.2015; 65(9):990-994.
19. Mersha A, Shibiru S, Gultie T, Megersa N and Bante A: Basic Newborn Resuscitation: Health Care Providers' Level of Knowledge and Factors Affecting in the Hospitals of Southern Ethiopia. *Journal of Neonatology*.2021; 34(1): 1-9.
20. Taha FAN: Assessment of knowledge, Attitude and Practices of nurse midwives towards immediate care of the newborn in Khartoum state teaching hospitals (2011). *Journal of American Science*.2013; 9(9): 263-270.
21. Negussie BB, Hailu FB and Megenta AD: Knowledge and Practice of Essential Newborn Care and Associated Factors among Nurses and Midwives Working at Health Centers in Jimma Zone, Ethiopia, 2016. *Journal of Nursing and Care*.2018; 7(1): 1-10.
22. Arba A and Zana, Z (2020): Knowledge of Essential Newborn Care and Associated Factors among Nurses and Midwives: A Cross-Sectional Study at Public Health Facilities in Wolaita Zone, Southern Ethiopia. *International Journal of Pediatrics*; doi.org/10.1155/2020/3647309.
23. Kogi JWM, Karonjo, and Muya: Nurses' Related Factors Determining Compliance of nurses to National Neonatal Resuscitation Guidelines among Nurses at Pumwani Maternity Hospital, Kenya. *Global scientific journal*.2020; 8(5):1211-1221.
24. Noor S, Praveen K, Hussain M, Afzal M and Gilani SA: Observational Study on Standard Practices of Nurses in Birth Asphaxia Management at a Tertiary Care Hospital, Lahore, Pakistan. *National Journal of Health Sciences*.2020; 5(1): 24-29.
25. Brathwaite K P, Bryce F, Moyer LB, Engmann C, Twum-Danso N, Kamath-Rayne B D and et al.,: Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation plus journal*.2020; 1-2(1): 1-6.
26. Ding X, Wang L, Msellem MI, Hu Y, Qiu J, Liu S and et al.,: Evaluation of a Neonatal Resuscitation Training Programme for Healthcare Professionals in Zanzibar, Tanzania: A Pre-post Intervention Study. *Frontiers in pediatrics journal*.2021; 9(1): 1-8.
27. Kwiecień-Jaguś K, Mędrzycka-Dąbrowska W, Galdikienė N, Via Clavero G, and Kopeć M: A Cross-International Study to Evaluate Knowledge and Attitudes Related to Basic Life Support among Undergraduate Nursing Students-A Questionnaire Study. *International journal of environmental research and public health*.2020; 17(11): 1-11.
28. Carlo WA, Wright LL, Chomba E, McClure EM, Carlo ME, Bann CM and et al.,: Educational impact of the neonatal resuscitation program in low-risk delivery centers in a developing country. *The Journal of pediatrics*.2009;154(4):504-508.
29. Hasson S, Eqbal G, and Ali Ma'ala E: Evaluation Nurses' Practices toward Neonatal Resuscitation in the Delivery Room.2020. Available at: https://www.researchgate.net/publication/341180201_Evaluation_Nurses%27_Practices_toward_Neonatal_Resuscitation_in_the_Delivery_Room. Accessed on [December 29, 2020].
30. Gauro P, Saha A, and Adhikari B: Knowledge and skill of newborn resuscitation among nurses working in maternity ward. *International Journal of Health Sciences and Research*.2018; 8(2):149-154.