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Assessment of Clinicians' Knowledge and Practices on Management of Birth Asphyxia

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Abstract: A cross-sectional study was conducted at St. Theresa's Hospital in Nkoranza, Bono East Region of Ghana, to assess clinicians' knowledge and practice of neonatal resuscitation. This study examined clinicians' knowledge and practice in the management of birth asphyxia. A descriptive cross-section was employed in the analysis of the 42 participating clinicians working at maternity and postnatal units. Knowledge and practice are supposed to be two sides of the same coin. However, clinicians' knowledge of neonatal resuscitation did not reflect in their practice, even though in some areas they proved to be as proficient as they were supposed to be. Almost half of the clinicians were unable to indicate common indications for neonatal resuscitation, which made their practice very poor. There is no doubt that clinicians face challenges in the clinical setting that could be the cause of their poor performance. Neonatal resuscitation is a procedure that anticipation and preparation alone could do a halfway job, however, only 6(14.3%) were able to identify preparedness as salient point in neonatal resuscitation. However, doctors and midwives performed better than other clinicians did. Infrequent training makes CPR knowledge and skills decay within 3 to 12 months after training, whereas most of the respondents had their last training over a year ago. However, the study recommends that the government establish mechanisms to monitor and evaluate the quality of care provided for newborns with birth asphyxia. This can include regular audits, clinical supervision, and feedback sessions to identify areas for improvement and provide ongoing support to clinicians.

Keywords: Clinicians, birth asphyxia, clinicians' knowledge, neonatal resuscitation, Ghana

1. INTRODUCTION

An extraordinary gift from nature is the birth of a healthy newborn child. Even though the birth process only lasts a few hours, it is a particularly risky stage of life since it is associated with more fatalities than any other time. The newborn experiences adaptation from uterine life to life outside the uterus. The body's structures all experience various degrees of alteration. (Ezenduka, 2016). Less carbon dioxide in the blood triggers breathing. A baby should be breathing well the first minute of life, referred to as the golden minute. The inability of the new born to initiate and maintain regular breath cycles in the first and fifth minutes of life leads to asphyxia. It is a state in the neonate where there is hypoxaemia (reduced oxygen saturation) and academia (elevated acid) from retaining high levels of carbon dioxide and accumulating lactic acid in the blood. (Benjamin Atta Owusu, 2018). Birth asphyxia is recognized as a major cause of newborn distress and deaths especially in developing countries. With approximately 1 million babies affected annually, birth asphyxia continues to pose a grave clinical problem globally. In third world Nations, it is a major cause of mortality and acquired brain damage (Ezenduka et al., 2016).

Risk factors in the mother are factors that may be responsible for asphyxia in the newborn such as pre-eclampsia and or eclampsia, premature rupture of membrane, anaemia and maternal diabetes. Risk factors during labour include prolonged labour, breech presentation or other abnormal presentations, precipitous labour and cord prolapse. In addition, severe cardiopulmonary abnormalities or prematurity may be responsible for asphyxia in the newborn. (D.N.S, 2018). Expertise in emergency procedures focused on supporting neonates to breathe is dire in the units or settings to guarantee the safety and wellbeing of neonates. Millions of babies do not initiate breathing immediately at birth each year and among them, about 10% representing the majority require critical neonatal emergency manoeuvres**.** Perinatal asphyxia is a major contributor to neonatal deaths worldwide in resource-limited settings. Neonatal resuscitation in delivery rooms, neonatology units and paediatric intensive care units is successful only if clinicians are skilled and possess the knowledge needed to practice the skill. However, mistakes by caregivers can recur during neonatal resuscitation (Gebreegziabher et al., 2014). A major challenge that clinicians have to face is maintaining a balance in safety between a woman and her foetus. Even though a vaginal delivery is for the greatest part always safer for the mother, it may not be ideal for the baby. Incidents throughout childbirth can cause bad outcomes for the neonates in otherwise healthy or normal babies. (Shikuku, 2017). Birth asphyxia is a broad expression for neonatal encephalopathy arising from incidents at the time of labour and delivery. Albeit some cases of

birth asphyxia are avoidable, the capacity to foresee those foetuses in danger remains poor (Herrera & Silver, 2016).

Asphyxia during labour (Intrapartum) sufficient to result in irreversible organ and/or neurological injury in new-borns and sometimes intrapartum or neonatal death is termed as birth asphyxia. Life-long neurological incidents such as learning difficulties, motor disability and cerebral palsy may also be because of factors linked to birth asphyxia. Many intrapartum incidents may result in asphyxia (i.e., metabolic acidosis and hypoxia) resulting in the possibility of neurological damage. A screening tool used to evaluate foetal health in the labour room and to recognize the probability that asphyxia may occur is called cardiotocograph (CTG). A pathological trace i.e. abnormality of the CTG sometimes very serious is called foetal distress even though many foetuses with some traces may rarely have hypoxia and elevated acid levels(acidosis). In present practice, these incidents are termed acidotic PH or pathological CTG rather than foetal compromise (Chandraharan, 2007).

Over 4 million newborn deaths (WHO, 2015) recorded globally each year during the 1990s were hardly paid any attention in global health discussions, and new born care was deemed expensive, technical, and inadequate in cost-effective programs practicable for low-income Nations. Investment in newborn health was assumed expensive and that countries needed to have greater wealth and health systems that are more functional. In 1999, when Abhay Bang publicized results from rural India showing that interventions delivered by community health workers in a home-based package of maternal and newborn health (CHWs) could reduce neonatal mortality by 62%, these myths were challenged. The Bill & Melinda Gates Foundation funded Save the Children's Saving New Born Lives initiative in 2000, to develop policy, evidence, and programs to improve newborn survival globally.

2. MATERIAL AND METHODS

Background of the Study Area

St Theresa's Hospital is a municipal hospital for both Nkoranza north and south districts and receives referrals from neighbouring districts in Bono East and Ashanti regions. It currently has a total bed capacity of 100 and provide 24 hours service to patients. The Services the facility provide are; 24-Hour Emergency and Ambulance Services, Inpatient services, Operative services, Diagnostic services: i.e., Laboratory, X-ray, ultrasound, ECG, Blood transfusion services, HIV/AIDS Programs, Pastoral Care and Counselling services, TB control program, Reproductive and Child Health Services (RCH), Pharmaceutical Services, Specialist surgical services and Mortuary services. Theresa's hospital is chosen because it has a standard requirement for a hospital with the right characteristics of clinicians fit for the study.

Study Design and Type

The study design used was an observational study design; this study is the use of a simulation by using the pre-test and post-test technique of assessment employed in the helping babies breathe initiative. An institution-based observational study was conducted. Used for testing was a high-fidelity newborn baby simulator manikin. Facilitators were chosen and trained as simulation instructors. In observational studies, researchers do not attempt to influence participants or the surroundings. The goal is to observe and collect data on characteristics of interest without influencing the participant, environment, or a disease course. Observational studies can be longitudinal or cross-sectional. In longitudinal studies, researchers investigate changes over time, possibly in relation to an event, intervention, or treatment. In cross-sectional studies, researchers observe the subjects at a single point in time. A longitudinal study is like a movie, and a cross-sectional study is like a photo. We can divide observational studies into studies that primarily provide information to characterize an individual or population, and studies that aim to answer questions about the relationships between characteristics and disease outcomes.(Johnson, 2018).

Cross-sectional studies are observational studies that analyse data from a population at a single point in time. They are often used to measure the prevalence of health outcomes, understand determinants of health, and describe features of a population. Unlike other types of observational studies, cross-sectional studies do not follow individuals up over time. All covid-19 protocols were observed. The principal investigator advised and ensured that participants wore appropriate face masks. Veronica buckets were provided at the entrance to the conference room where the simulation was held. Participants were reminded to wash their hands before entering. Hand sanitisers were also provided for use during the simulation. A distance of 1 meter was ensured between the investigator and participants. Most importantly, the training took two days and participants were scheduled to prevent crowding and possible flouting of covid-19 protocols.

Study Population

The table below shows the clinical composition of staff of St Theresa's hospital where the study was carried out. The study population involved clinicians in St. Theresa's Hospital in Bono East Region. The target population were Doctors, Anaesthetists, and nurses of all categories who are employed by establishment and are working in the hospital in the maternity and postnatal units, the neonatal intensive care unit as well as anaesthetists.

Sampling Technique and Sample Size

The sampling method used in this study was a non-probability purposive sampling method given the target population for the study. Other clinicians who do not work with neonates were not included in this study since the results will not be representative

of the target population. A convenience sampling was implored. This means that participants who were readily available and easily accessible took part in the study.

The sample size for the study included the medical officers as well as midwives and all category of nurses working at the maternity and postnatal units as shown in Table 3.2 above. The anaesthesia department was not excluded in the study since in this setting; they resuscitate most of the babies needing care after caesarean section. Hence the sample size included a total of 48 clinicians, most of whom have been trained in neonatal resuscitation through the helping babies breathe program by the Program for Appropriate Technology in Health (PATH) and Ghana Health Service (GHS).

Study Variables

The variables in this study were dependent variable in this case, neonatal resuscitation and independent variable (risk factors of asphyxia). The independent variables were divided into social demographics, which includes age of the client, parity, educational level. Antepartum risk factors (care during pregnancy period) which includes birth history, abortion history, medication used during pregnancy. Intrapartum risk factors (care during labour and delivery) delivery outcome, labour duration, medications used and Foetal characteristic risk factors which include age at birth, Apgar score, birth weight, resuscitation etc. In this study, this model looks at the relationship between dependent and independent variables. Other independent variables are individual, knowledge and health system factors. These include training models, equipment for resuscitation, availability of adequate nurses, fast response resuscitation, adherence to standard protocol and procedures involved in resuscitation.

Data Collection Tool and Technique

The method employed in collection of data was the use of a questionnaire as well as a checklist for the practice of resuscitation. The practice was done through simulation by using the pre-test and post-test technique of assessment employed in the helping babies breathe initiative. The historical roots of simulation might be described with the broadest definition of medical simulation: “an imitation of some real thing, state of affairs, or process” for the practice of skills, problem solving, and judgment (Rosen, 2008).

Studies in cognitive psychology inform us that the recall of information and its application are best when it is taught and rehearsed in environments similar to workplace. The healthcare professions are heavily task- and performance-based where non-technical skills, decision making and clinical reasoning are important alongside integrity, empathy and compassion. Most of these attributes are difficult to teach and assess in the traditional classrooms (Khan et al., 2011).

Simulation is a method or technique to produce an experience without going through the real event. There are multiple elements to consider for a simulation programme, and technology is only one of the many dimensions. The ultimate goal is to engage learners to experience the simulated scenario followed by effective feedback and debriefing. Simulation is a useful modality to supplement training in real clinical situations because it enables control over the sequence of tasks offered to learners, provides opportunities to offer support and guidance to learners, prevents unsafe and dangerous situations, and creates tasks that rarely occur in the real world (So et al., 2019). The checklist for assessment was designed in alignment with the objectives of the study using the NRP guidelines and the checklist designed by the HBB program. Sociodemographic data, which include; the age, sex, educational level, clinician category, duration of work was collected for each staff. Every participant had to first perform NR on a simulator manikin and be scored according to the checklist (pre-test). Then after, participants were taken over the steps and trained. A post-test was scored after participants re-performed the resuscitation.

Data Analysis

The data was analysed using Statistical Package for Social Sciences version 21 and Excel version 2013. Data was analysed and the results presented in frequency tables, graphs as well as inferential analysis to draw conclusions.

3. RESULTS

Demographic Data

A total of 42 clinicians from both maternity and postnatal units participated in the survey.

Age distribution of respondents

In table 1, out of 42 respondents most 31(73.8%) were between the ages of 20 and 31, 8(19.0%) were from age 31 to 40 years, 2(4.8%) were also between 40 and 50 years, lastly only one respondent was above 50 years old.

Gender of participants

36(85.7%) females and 6(14.3%) males out of the 42 respondents as shown in table 1

Participants’ Duration of Practice (in years).

When participants were asked to indicate their duration of experience in the study area, the characteristics in table 1 below showed their responses. From the table majority 26(61.9%) were less experienced (1-3 years), 10(23.8%) had 4-6years experience in the study area, one respondent was within 7- and 9-years’ experience. However, most experienced (more than 10years) were 5 (comprising an anaesthetist, an Enrolled nurse, 2 Diploma midwives and one auxiliary staff) (11.9%) respondents out of 42.

Participants grade in practice
Table 1 also captured respondents' grades in practice. From the table a lot of them were Enrolled nurses 12(28.6%), a little closer to majority 10(23.8%) were also registered Midwives with diploma certificate, 9(21.4%) were Registered Midwives degree, 4(9.5%) Registered Nurses degree and one Registered Nurse diploma. The remaining 6 were equally distributed among medical officers, anaesthetist and others that were not specified.

Table 1: Demographic Data

Variable	Frequency	Percent
Age of respondents		
21-30	31	73.8%
31-40	8	19.0%
41-50	2	4.8%
51-60	1	2.4%
Total	42	100.0%
Gender		
females	36	85.7
males	6	14.3
Total	42	100%
Years of Professional Practice		
1-3 years	26	61.9
4-6 years	10	23.8
7-9 years	1	2.4
More than 10 years	5	11,9
Total	42	100.0%
Respondents Current Grade in Practice		
Medical officer	2	4.8%
Enrolled Nurse	12	28.6%
Registered Nurses (Diploma)	1	2.4%
Registered Nurses (Degree)	4	9.5 %
Registered midwife (Degree)	9	21.4%
Registered midwife (Diploma)	10	23.8%
Anaesthetist	2	4.8%
Others	2	4.8%
Total	42	100%

Respondent's Knowledge on Neonatal Resuscitation
A total of 42 out of the initial 48 clinicians responded on knowledge of neonatal resuscitation.

Neonatal Resuscitation practice
In Table 2, participants were asked if their daily practices involved Neonatal resuscitation and all the 42 (100%) participants responded yes.

Areas of Neonatal resuscitation training.
Table 2 shows the areas of training the 37(88.1%) out of 42(100%) participants have had training on neonatal resuscitation and the missing 5(11.9%) were those who have no training experience in neonatal resuscitation. Among the 88.1% who had training experience, most 31(73.8%) out of 42(100%) had their training in ''helping babies breathe initiative'' HBB by PATH foundation (an NGO) and Ghana Health Service, meanwhile none of the 37(88.1%) respondents received training from Europe, 4(9.5%) had training in ''American Paediatric Life Support (American PLS)'', only 1(2.4%) received training in ''Emergency

Triage Assessment and Treatment of critical ill children (ETAT)'', while 1(2.4%) also had training in other areas that was not specified. However, 5(11.9%) did not choose any of the above areas, this confirmed the results in figure 1 where 5(11.9%) said they have never received any form of training in neonatal resuscitation.

Number of trainings on neonatal resuscitation

Table 2 presents results on the number of training respondents have had in neonatal resuscitation. Most 14(33.3%) have had just a training, 10(23.8%) had 2 trainings, 5(11.9%) also had 3 trainings while 8(19%) had 4 or more trainings. However, 5(11.9%) were yet to be trained, though they practice resuscitation.

Last training time on neonatal resuscitation.

When participants were asked to indicate their last training period, the below table showed their responses. From the results most 19(45.2%) out of 37(88.1%) received their last training above 9 months, 8(19.0%) had their last training 4-6months ago, 6(14.3%) also were trained just 1-3 months ago while few of them 4(9.5%) had their last training within the past 7-9months. However, 5(11.9%) were yet to be trained.

First step in neonatal resuscitation

Table 2 below shows participants responses to first step in neonatal resuscitation. Majority of the respondents 19(45.2%) said the first step in neonatal resuscitation should be airway securing, drying baby after birth 16(38.1%), being prepared 6(14.3%) and assisted ventilation 1(2.4%).

Part of neonate left exposed after drying

Table 2 showed the parts of the neonate body that is left exposed after drying. The distribution showed that few of the respondents said arms 2(2.8%) are left exposed, 11(26.2%) said the neonate's head is left out after drying, 14(33.3%) also chose chest as part left exposed after drying the neonate, meanwhile all of the respondents said neonate legs should never be exposed no matter the reason after drying. However, majority of them chose none of the parts, signifying that no part of the neonate should be left exposed after drying.

Inspections during drying

The table below showed areas of inspection during drying. Majority (78.6%) will check umbilical cord colour during inspection, 6(14.3%) will check skin and muscle tone, 2(4.8%) also will check neonate for colour, while only a respondent chose to check neonate activity during drying. However, no respondent chose breathing as a parameter to inspect during neonate drying.

Depth of suction catheter insertion in the airway

Table 2 revealed participants responses to depth of catheter insertion in the airway. From the table, majority 25(59.5%) said suction catheter should be inserted 1-5cm deep in the mouth, throat or nose during suctioning. A lot of them 10(23.8%) also said it should be inserted as it can be seen, while 5(11.9%) said it should be inserted as far as it can go. Few 2(4.8%) on equal distribution chose 4cm and 5cm as suction catheter insertion depth.

Correct indication for neonatal suctioning

Table 2 showed indications for neonatal suctioning. Participants were asked to indicate the correct indications for suctioning neonates and they gave their responses as follows; majority 22(52.4%) chose to suction if baby does not cry after drying, quite high number 13(32.0%) of them will suction neonates immediately after delivery, 4(9.5%) will only suction in the presence of meconium, 2(4.8%) will also perform suctioning in all neonates no matter the assessment findings, while 1(2.4%) participant will suction babies that have meconium in mouth and nose after first cry.

Number of inflations breathes to give

Table 2 shows responses on number of inflation breaths to give when spontaneous breathing is yet to begin. 16(38.1%) out of the 42 participants will give 3 inflation breathes per minute, 10(23.8%) chose to give 2 breathes before spontaneous breath initiates, 8(19.0%) will give 4 inflations, while 1 of them chose to give 5 inflations. However, 7(16.7%) had no count to the number of inflations breathes to give, they will give as many as they want to initiate spontaneous breathing.

Table 2 Respondent's Knowledge on Neonatal Resuscitation

Variable	*Frequency*	*Percent*
Neonatal resuscitation practices		
Yes	42	100%
No	0	0.00%
Total	42	100.0%
Areas of Neonatal resuscitation training.		

American Paediatric Life Support (American PLS)	4	9.5%
European Paediatric Life Support (European PLS)	0	0.00%
Helping Babies Breathe Initiative	31	73.8%
Emergency Triage Assessment and Treatment of critical ill children (ETAT)	1	2.4%
Others	1	2.4%
Have Not been trained	5	11.9%
total	42	100%
Number of trainings received on neonatal resuscitation		
1	14	33.3%
2	10	23.8%
3	5	11.9%
4	4	9.5%
>4	4	9.5%
No training	5	11.9%
Total	42	100.0%
Last training time on neonatal resuscitation.		
1-3 months ago	6	14.3%
4-6 months ago	8	19.0%
7-9 months ago	4	9.5%
More than 9 months	19	45.2%
Had no training	5	11.9%
Total	42	100.0%
First step in neonatal resuscitation		
Securing airway	19	45.2%
Assisted Ventilation	1	2.4%
Drying	16	38.1%
Being prepared	6	14.3%
Total	42	100.0%
Part of neonate left exposed after drying		
Head	11	26.2
Chest	14	33.3%
Legs	0	0.0%
Arms	2	4.8%
None	15	35.7%
Total	42	100.0%
Inspections *areas* during drying		
Colour	2	4.8%
Activity	1	2.4%
Breathing	0	0.00%
Tone	6	14.3%

Umbilical cord colour	33	78.6%
Total	42	100.0%
Depth of suction catheter insertion in the airway management		
1-5cm	25	59.5%
As far as it can go	5	9.5%
As far as it can be seen	10	23.8%
4cm	1	2.4%
5cm	1	2.4%
total	42	100.0%
Correct indication for neonatal suctioning		
Baby not crying after drying	22	52.4%
Meconium, after first cry	1	2.4%
In all cases of meconium	4	9.5
In all neonates	2	4.8
Immediately after delivery before clamping the umbilical cord	13	31.0%
Total	42	100.0%
Number of inflations breathes to give		
2	10	23.8%
3	16	38.1%
4	8	19.0%
5	1	2.4%
As many as one wants	7	16.7%

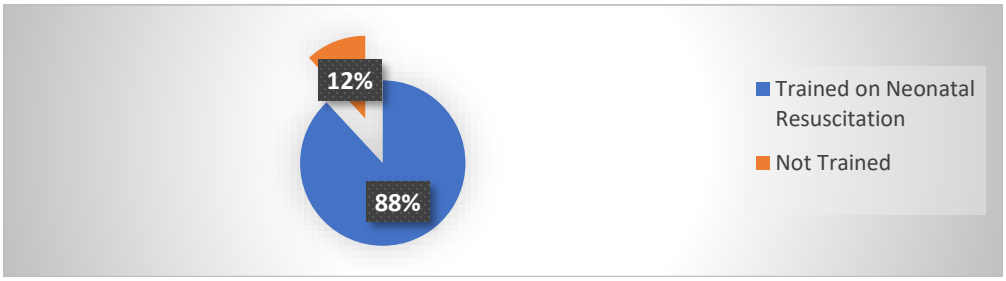

Figure 1: Neonatal resuscitation training received by participants

Figure 1 shows the distribution of respondents that had been trained on neonatal resuscitation and those with No training. 37(88.1%) have been trained already, while 5(11.9%) had no training but were practicing the procedure.

Inflation breathes statistics

Table 3. Moreover, figure 1 measure the central tendency on inflations' breaths. The average number of inflations breathes (mean) were 2.50, the middle observation for the data set (median) were 2.00, the most occurring number of inflation breaths that clinicians perform (mode) were also 2, while standard deviation 1.348 spread out the data. From the statistical collations, P-value of 0.042 were recorded, this value shows that the results were significant. Thus, clinicians' knowledge has significant association with the number of inflations' breaths they will give when the need arises. From figure 2, the distribution curve skewed to right than left, and it is a positive Skewness with value 0.816 and 1.348 as standard deviation. The right skewed distribution curve implies that, clinicians are likely to increase

(right skew) the number of inflation breaths than to decrease (left) it.

Table 3 Inflation breathes statistics

Statistics

Number of inflation breaths to give when spontaneous breathing has not begun

N	Valid	42
	Missing	0
P value		0.042
Mean		2.50
Median		2.00
Mode		2
Std. Deviation		1.348
Skewness		0.816
Std. Error of Skewness		0.365

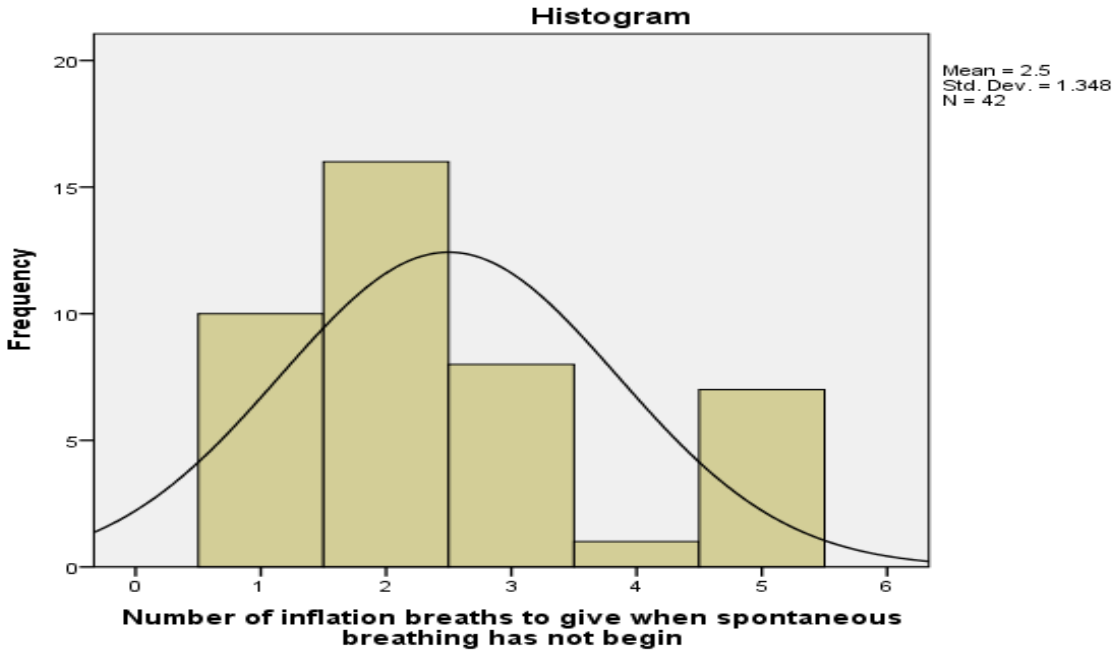

Figure 2: Histogram showing distribution curve of inflation breaths

Correlation between number of inflations and indications of neonatal airway suctioning

Table 4 shows Pearson's r is 0.204, and since this is closer to zero than one, it satisfies a weak correlation between the two variables. Sig (2-tailed) on the other hand is 0.196, this shows statistically no significant correlation between the number of inflations to give and correct indications for neonatal airway suctioning.

Table 4 Correlation between number of inflations and indications of neonatal airway suctioning

Correlations

		Number of inflation breaths to give when spontaneous breathing has not begun	Chose correct indication to neonatal airway suctioning
Number of inflation breaths to give when spontaneous breathing has not begun	Pearson Correlation	1	.204
	Sig. (2-tailed)		.196
	N	42	42
Chose correct indication to neonatal airway suctioning	Pearson Correlation	.204	1
	Sig. (2-tailed)	.196	
	N	42	42

Resuscitation guidelines

The figure below shows participants exposure to national resuscitation guidelines. Majority of the respondents 31(73.8%) out of the 42 were aware of the existence of national guidelines on neonatal resuscitation. However, 11(26.2%) were not aware of its existence.

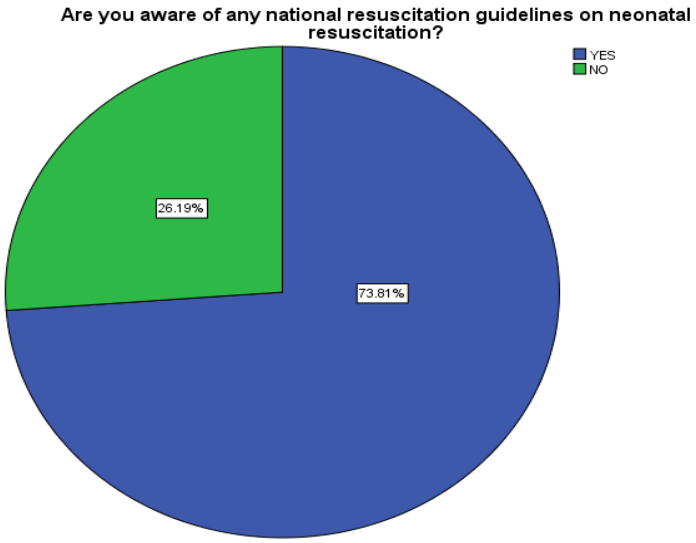

Figure 3: Participant's response on resuscitation guidelines

Assessment of Respondent's Practice on Neonatal Resuscitation

Bag and Mask ventilations

Table 4 shows responses from participants when they were asked to choose the number of mask or bag ventilations they would give to neonates during labile respiration. Most 24(57.1%) of them chose to give 40-50 ventilations, 6(14.3%) would give 10-20 ventilations, 4(9.5%) also chose to give 30-35 ventilation while few as 2(4.8%) respondents would give 60-80 ventilations per minute to correct a labile respiration. However, 6(14.6%) respondents said the number of ventilations to give per their understanding is not clearly defined, as the majority think. Therefore, they would continue to give bag and mask ventilations until reversed or irreversible outcome is observed.

When to give chest compressions

Table 3 shows responses on when start given chest compressions in a lone presence. This is to assess participant's individual knowledge without supervision nor support. Majority 24(57.1%) will start chest compressions when there is no cardiac activity, 11(26.1%) will perform chest compressions when heart rate is less than 60 beat per minute, after giving inflation breathes 4(9.5%) will start compressions. However, 3(7.1%) will never try

chest compression on neonates when they are alone, no matter the assessment findings.

Indications of chest compressions
Table 4 above reveals that, heart rate greater than 100 beat per minute is not an indication for chest compressions in neonates as indicated by majority 36(85.8%) of respondent. 5(11.9%) also said absence of cardiac activity could mean a different thing but not a complication to chest compressions, while only a respondent said heart rate less than 60 beat per minute should not also be regarded as an indication for neonatal chest compressions.

Ratio of breathes to cardiac compressions
Table 4 indicates that the correct ratio of breathes to chest compressions is 1:3 as majority 28(66.7 %|) thought, 4(9.5%) also thought ratio of breathes to chest compressions should be 2:30, 2(4.8%) said the ratio should be 1:5, while a respondents chose 1:15 as the correct ratio of breathes to chest compressions. However, 7(16.7%) out of the 42 respondents said the correct ratio is not well established.

Neonatal assessment
When respondents were asked to indicate how often neonatal reassessment should the done in table 4 below, most 16(38.1%) out of the 42 respondents chose to reassess neonates every 5-10 minutes, quite a high number of them 15(35.7%) chose to do reassessment after each intervention, 7(16.7%) will also do reassessment every 1-2 minutes, while 3(7.1%) thought reassessment should be done within 20-30 minutes after each intervention on a neonate. However, a respondent also thought reassessment should never be done if interventions are performed correctly.

Indications for ventilation breathes
In table 4 respondents were asked to choose an odd from list of indications for ventilation breathes. Majority 35(83.3%) said there shouldn't be ventilation breathes when respiratory rate is between 40-50 cycles per minute, 5(11,9%) also said a floppy cyanotic neonate could be indication for different intervention but not ventilation breathes, while 2(4.8%) out of the 42 respondents said clinicians shouldn't be dedicated to perform ventilation breathes on neonates if no cardiac activity or spontaneous cry/breathing is observed.

Head positioning during neonatal airway assessment
Table 4 reveals neonatal head positioning during airway assessment. Most of the respondents 31(73.8%) said the head of a neonate should be in a sniffing position during airway assessment, less than one-third of the respondents 10(23.8%) also thought the head should be in a neutral position, while the remaining respondent said it should be in any position possible for airway assessment.

APGAR score that indicates asphyxia in the first minute
In table 4. respondents were asked to indicate the APGAR score that will alarm for resuscitation. Almost all the respondents chose 0-3 APGAR score as asphyxiating point in neonates, while the remaining 2(2.8%) chose none of the listed APGAR scores.

Indications for birth asphyxia in fifth minute
The results in table 4. Shows indication for birth asphyxia in fifth minute. From the results few of them chose APGAR score of 0 (2.4%), 9-10 (2.4%), and 0-7 (40.5%) while half 21(50.0%) of the 42 respondents chose 0-3 APGAR score as most indicative for birth asphyxia in fifth minute. However, 2(4.8%) also thought APGAR scores were not parameters to justify asphyxiation.

What to do when a baby has secretions in the mouth
The results in Table 4 above showed what clinicians would do in the presence of secretions in neonate's mouth. From the table, almost all the respondents 40(95.2%) will suction secretions out of baby's mouth to make the airway patent for adequacy in respiration. Two of the respondents will perform different procedure but not suctioning

Skills in suctioning
The Table 4 above shows how participants will suction a neonate. Majority of the respondents 35(83.3) said it is better to suction baby's mouth before the nose, while 7 respondents will also do the reverse.

Neonatal ventilation
In table 4, respondents were asked to indicate incorrect steps for ventilation of neonates. From the table majority said ventilation in neonates should not be stopped until goal is achieved, a respondent also said checking tongue position during ventilation is inappropriate. Another respondent also chose not to reapply ventilator mask to form good seal during ventilation. However, all the respondents thought it appropriate to reposition neonates head and check mouth for secretion and suction if applicable during neonatal ventilation.

Table 4. Assessment of Respondent's Practice on Neonatal Resuscitation

Variables	Frequency	Percentage
Number of Ventilations to give per minute		
10-20 Ventilations	6	14.3%
30-35 Ventilations	4	9.5%
40-50 Ventilations	24	57.1%
60-80 Ventilations	2	4.8%
Not clearly defined rate	6	14.3%
Total	42	100.0%
When to give chest compressions		
When < 60bpm	8	19.0
After giving inflation breaths	4	9.5%
No cardiac Activity	24	57.1%
On arrival of help, if heart rate < 60bpm	3	7.1%
Never	3	7.1%
Total	42	100.0%
Indications of chest compressions		
No cardiac activity	5	11.9%
Heart rate < 60bpm	1	2.4%
Heart rate > 100bpm	36	85.8%
Total	42	100.0%
Ratio of breathes to cardiac compressions		
1:3	28	66.7%
1:5	2	4.8%
2:15	1	2.4%
2:30	4	9.5%
No established ratio	7	16.7
Total	42	100.0%
Neonatal assessment (How often?)		
Every 1-2 minutes	7	16.7%
Every 5-10 minutes	16	38.1%
Every 20-30 minutes	3	7.1%
After each intervention	15	35.7%
Never	1	2.4%
Total	42	100.0%
Indications for ventilation breathes		
A floppy cyanotic neonate	5	11.9%
No spontaneous cry/breathing effort	1	2.4%
No cardiac activity	1	2.4%
Respiration rate of 40-50/minute	35	83.3%
Total	42	100.0%
Head positioning during neonatal airway assessment		
Neutral position	10	23.8%
Sniffing Position	31	73.8%
Any position	1	2.4%
Total	42	100.0%
APGAR score that indicates asphyxia in the first minute		
0-3	40	95.2%
0-7	0	0.00%
10	0	0.00%
None of above	2	4.8%

Total	42	100.0%
Indications for birth asphyxia in fifth minute		
0	1	2.4%
0-7	17	40.5%
0-3	21	50.0
9-10	1	2.4
None	2	4.8
Total	42	100.0%
What to do when a baby has secretions in the mouth		
Suction the secretion	40	95.2%
Do not suction	1	2.4%
Wipe baby's mouth with cot sheet	0	0.00%
None of the above	1	2.4%
Total		
Skills in suctioning		
Suction mouth before nose	35	83.3
Suction nose before mouth	7	16.7%
Total	42	100%
What to do when Neonatal ventilation's goal is not achieving		
Check tongue position in the mouth	1	2.4%
Stop ventilating babies	40	95.2%
Reapplies mask to form good seal	1	2.4
Reposition baby head	0	0.0%
Check baby's mouth for secretion and suction	0	0.0%
Total	42	100.0%

Necessity of oxygen for neonatal resuscitation

Figure 3 below reveals the responses on necessity of oxygen for neonatal resuscitation. Almost all the respondents 41(97.6%) said it is very necessary to give oxygen in neonatal resuscitation, while just a respondent doesn't see it necessity.

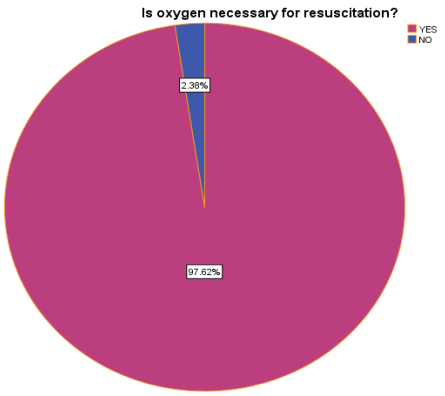

Figure 4: Participant's response on necessity of oxygen for neonatal resuscitation

Four Factors That Affect Neonatal Resuscitation

Neonatal resuscitation equipment accessibility

The table below shows the accessibility of equipment for neonatal resuscitation. Half of the clinicians 21(50.0%) said neonatal resuscitation equipment are occasionally available for use at the clinical setting, while almost another half also said it's always available. However, a respondent also said it is always not available therefore, are not accessible.

Resuscitation equipment influence on neonatal care

From table 5, most of the participants 32(76.2%) strongly agreed that resuscitation equipment has influence on neonatal resuscitation, while 10(23.8%) also agreed to the influence

neonatal equipment have on neonatal care. However, none of the respondents disagreed nor was uncertain about those influences.

Access to neonatal equipment
From table 4, more than half of the respondent said resuscitation equipment are accessible, while the remaining 17(40.5%) chose not easily accessible

Checking guidelines during neonatal resuscitation
Table 5 showed how often clinicians refer to guidelines during neonatal resuscitation. Most of the participated clinicians13 (31.0%) do refer to guidelines but not always. Quite a high number of them 24(57.4%) on equal distribution 12(28.6%) do refer to guidelines most at-times or all the time, while 5(11.9%) rarely refer to neonatal resuscitation guideline, probably because they know better or unavailable guidelines to refer.

Motivation to refer to resuscitation guidelines
Table 5 shows motivational factors for resuscitation guidelines referents. From the results, the presence of guidelines on the wall motivates most 24(57.1%) out of the 42 respondents. The presence of supervisors, simplicity of guidelines and others also motivates 7(16.7%), 8(19.0%), and 3(7.1%) of the respondents respectively.

Non-use of resuscitation guidelines
Table 5 showed results from participants when they were asked to indicate influential factors to non-use of resuscitation guidelines. From the results, just a respondent chose lack of commitment as a barrier to resuscitation guidelines, few 3(7.1%) also said lack of supervision is a paramount barrier. The results also showed that, clinicians do not refer to guidelines because they have probably mastered the guidelines and see no need to be wasting time around it anymore. However, majority 33(78.6%) chose lack of proper orientation on guideline as the most barrier to clinicians and use of resuscitation guidelines.

Maternal risk factors of birth asphyxia
Clinicians' knowledge was assessed on maternal risk factor to birth asphyxia, and table 5 shows their responses. The results were as follows; anaemia 2(4.8%), maternal diabetes 1(2.4%), and eclampsia/preeclampsia 11(26.2%). However, most of the respondents 28(66.7%) selected all the above indicators as maternal parameters for birth asphyxia.

Foetal risk factors of birth asphyxia
Table 5 showed fetal risk factors for birth asphyxia. Respondents were asked to indicate 'YES' and 'NO' to either agree or disagree with the listed factors. The following statistics showed their responses; Low birth weight: 10(23.8%) YES 32(76.2%) NO, congenital anomalies: 20(47.6%) YES 22(52.4%) NO, infection: 17(40.5%) YES 25(59.5%) NO, respiratory distress syndrome: 28(66.7%) YES 14(33.3%) NO, and low APGAR score: 22(52.4%) YES 20(47.6%). From the above statistics and table, more than half of the respondents disagree with low birth weight, congenital abnormalities, and infection as fetal risk factors to birth asphyxia. However, a lot than half also agree to respiratory distress syndrome and low APGAR score as fetal risk factors to birth asphyxia.

Intrapartum risk factors of birth asphyxia

Table 5 showed results on intrapartum risk factors of birth asphyxia. The following statistics were the clinicians' responses; prolonged labor: 32(76.2%) YES 10(23.8%) NO, breech presentation: 24(57.1%) YES 18(42.9%), cord prolapse: 25(59.5%) YES 17(40.5%) NO, medication: 16(38.1%) YES 26(61.9%) NO, PROM: 20(47.6%) YES 22(52.4%) NO. From the statistics, more than half of the respondents agree with prolong labor, breech present, cord prolapse and PROM as prime risk factors for birth asphyxia during intrapartum life. Medication taken during intrapartum life were disregarded as intrapartum risk of asphyxia.

Table 5: Factors That Affect Neonatal Resuscitation

Variables		Frequency	Percentage
Neonatal resuscitation equipment accessibility			
	Always available	20	47.6
	Occasionally available	21	50.0
	Not available	1	2.4
	Total	42	100.0
Resuscitation equipment influences neonatal care			
	Strongly agree	32	76.2%
	Agree		23.8%
	Uncertain		0.00%
	Disagree		0.00%
	Strongly disagree		0.00%
	Total	42	100.0%
Access to neonatal equipment			
	Easily accessible	25	59.5%

Not easily accessible		40.5%
Total	42	100.0%
Checking guidelines during neonatal resuscitation		
All the time	12	28.6%
Most of time	12	28.6%
Sometimes	13	31.0%
Rarely	5	22.9%
Total	42	100.0%
Motivation to refer to resuscitation guidelines		
The presence of the guidelines on the wall	24	57.1
The presence of supervisor	7	16.7
The simplicity of the guidelines	8	19.0
Others	3	7.1%
Total	42	100.0%
Why Non-use of resuscitation guidelines		
Lack of orientation on guidelines	33	78.6%
Mastery knowledge by clinicians	5	11.9%
Lack of commitment	1	2.4%
Lack of supervision	3	7.1%
Total	42	100.0%
Maternal risk factors of birth asphyxia		
Anaemia	2	4.8%
Maternal diabetes	1	2.4%
Eclampsia/Preeclampsia	11	26.2%
All the above	28	66.7%
Total	42	100.0%
Fatal risk factors of birth asphyxia		
Low birth weight YES	10	23.8
Low birth weight NO	32	76.2
Congenital anomalies YES	20	47.6
Congenital anomalies NO	22	52.4
Infection YES	17	40.5
Infection NO	25	59.5
Respiratory distress syndrome YES	28	66.7
Respiratory distress syndrome NO	14	33.3
Low APGAR score YES	22	52.4
Low APGAR score NO	20	47.6
Intrapartum risk factors of birth asphyxia		
Prolonged labour YES	32	76.2
Prolonged labour NO	10	23.8
Breech presentation YES	24	57.1
Breech presentation NO	18	42.9
Cord prolapses YES	25	59.5
Cord prolapses NO	17	40.5
Medications YES	16	38.1
Medications NO	26	61.9
PROM YES	20	47.6
PROM NO	22	52.4

Relationship between Clinicians' work experiences and practice of neonatal resuscitation

Cross tabulation of clinicians' current grade in practice vs number of Bag and Mask ventilations clinicians would give when ventilating neonates per minute.

From table 5, most (6) of the nurses (17) will give 40-50 ventilations in a minute, 5 will give 10- 20 ventilations, 1 will give 30-35 ventilations, and 2 will also give 60-80 ventilations. Three of the nurses said number of ventilations to be given to neonates are not clearly defined therefore can be given anyhow depending on the clinician's choice after neonatal assessment. Out of the 19 midwives, 15 will give 40-50 ventilation breathes within a minute, 2 will give 30-35 ventilations, another 2 said ventilations are not clearly stated, while 1 said giving 10-20 ventilations is enough. The 2 medical officers and an Anaesthetist chose to give 40-50 ventilations. Another Anaesthetist said there is no clearly defined ventilations for neonates during birth asphyxia. The other 2 whose ranks were not stated too chose 30-35 and 40-50 ventilations. Generally, midwives and medical officers had satisfactory knowledge about the number of ventilations to be given during birth asphyxia, but the rest of the clinicians showed low level of Knowledge.

Chi-Square values

The Chi-Square tests in table 5 showed Pearson Chi-Square value of 42.156 with P-value of 0.042 (Asymptotic significance, 2-sided). This means that the result is significant. The data suggest that the valuables, number of bag and mask ventilation, and clinicians' current grade in practice are associated with each other.

Crosstabulation of clinicians' current grade in practice and correct ratio of breathes to cardiac compressions

From the results in the table 5., most of the clinicians chose 1:3 a correct ratio of breathes to cardiac compressions, 2 chose 1:5, chose 2:15 while 4 out of the 42 clinicians chose 2 breathes is to 30 compressions. However, 7 of them were not aware of any established ratio of breathes to cardiac compressions. The Chi-Square tests in table 5 showed Pearson Chi-Square value of 20.708[a] with P-value of 0.837 (Asymptotic significance, 2-sided). Since the P-value (0.837) is greater than the designated alpha level (0.02), it means that the result is statistically insignificant. The data suggest that the variables; current grade in practice and ratio of ventilations breathes to cardiac compressions has no association with each other. Therefore, the increases/decrease of one does not reflect any change in the other. Moreover, table 5 showed no significant correlation between the variables (Pearson correlation of -0.089).

Crosstabulation on length of suction catheter insertion during neonatal suctioning and correct indications for neonatal airway suctioning

Table 5 showed a Crosstabulation on length of suction catheter insertion during neonatal suctioning and correct indications for neonatal airway suctioning. From the crosstabulation, most of the respondents (25) that chose to insert 1-5cm length of catheter during section perform this action when a baby does not cry after drying (12), but in total, 22 out of 42 respondents perform suctioning when babies do not cry after drying. Only a respondent performs suctioning after babies' cry, while 13 respondents also perform suction immediately after delivery before cutting umbilical cord. Four of the respondents perform neonatal suctioning when there is meconium and the 2 others do suction in all neonates. Generally, respondents' practice was distorted due to low knowledge level probably because of infrequent training at clinical setting. However, most of the respondents that knew the correct length of catheter insertion (1-5cm) also knew when to suction neonates (No cry after drying and immediately after delivery before clamping the umbilical cord) to prevent asphyxia. Therefore, the probability of a respondent knowing a current length of suction catheter insertion is slightly related to knowing when to suction.

On the other hand, the Chi-Square tests in table 5 showed Pearson Chi-Square value of 6.984 with P-value of 0.974 (Asymptotic significance, 2-sided). This means that the result is insignificant. The data suggest no association between the valuables, length of catheter insertion, and indication for neonatal airway suction. Respondents' knowledge in identifying common indications for neonatal suctioning did not reflect in their practice since quite a substantial number of them had challenges with the length of catheter insertion. Therefore, clinicians' knowledge has no association with their practice.

Neonatal suctioning practices

The results in table 5 revealed that most of the respondents practiced the standard way of suctioning neonates, as 35(83.3%) chose to suction neonates' mouth first before their nostrils. Though quite a good number of the clinicians are perfect, however, some 7(16.7) think suctioning nostrils before mouth is appropriate. Looking at the results from the crosstabulation (table 5) it also revealed that 14 nurses, 15 midwives, the 2 anaesthetists and a medical officer were adequate in their practices (suctioning the mouth first before the nose). The 2 other auxiliary staffs were also perfect in their decisions. However, 2 nurses, 4 midwives and a medical officer chose to suction nose before mouth. This practically confirm the hypothesis that clinicians at St. Theresa's Hospital practices on neonatal resuscitation are not up-to standard. Also, a Chi-Square value of 9.080[a] in table 5 with least expected count of 0.17 and P value of 0.2476 showed no significance in the variables' association (current grade and how to suction).

Clinicians' experience and practice

Experiences can be related to number of years in service but not merely to rank in service. However, both rank and duration in service can determine someone's proficiency in clinical skills, therefore table 5, presented data on duration of clinical practice and how clinicians suction neonates when secretion is present in mouth and airway during childbirth. From the results, 35 out of 42 constituting 83.3% performed standard neonatal suctioning (suction mouth before nose). Seven constituting 16.7% also deemed it right to suction the nose first before mouth. In standard practice, it is very appropriate to suction neonates' mouth first before nose simply to prevent neonates from suckling secretions or from risk of aspiration. Experiences as in duration of practice did not have much impact on neonatal suctioning. Clinicians' duration of practice was evenly distributed in neonatal suctioning. The result of the Chi-Square test in table 5 also revealed no significance in the variables association since the P-value (0.057) is slightly higher than the designated alpha level (0.05). On the other hand, table 5 revealed a negative correlation between the variables with Pearson correlation of -0.037. This means that as clinicians' duration in practice advances, their neonatal suction skills decrease.

Table 5. Clinicians' work experiences and practice of neonatal resuscitation

Crosstabulation between current grade and Bag and Mask Ventilations

	Number of Bag and Mask ventilations when ventilating a neonate per minute					
Clinicians' current grade in practice	10-20 Ventilations	30-35 Ventilations	40-50 Ventilations	60-80 Ventilations	Not clearly defined rate	Total
Enrolled Nurse	3	1	5	1	2	12
RN(Diploma)	0	0	0	1	0	1
RN(Degree)	2	0	1	0	1	4
RM(Diploma)	1	2	7	0	0	10
RM(Degree)	0	0	7	0	2	9
Medical officer	0	0	2	0	0	2
Anaesthetists	0	0	1	0	1	2
Others	0	1	1	0	0	2
Total	6	4	24	2	6	42

Chi-Square Tests 1	Value	df	Asymptotic. Significance. (2-sided)
Pearson Chi-Square	42.156[a]	28	0.042
Likelihood Ratio	30.939	28	0.320

Linear-by-Linear Association	0.545	1	0.460
N of Valid Cases	42		

1. 37 cells (92.5%) have expected count less than 5. The minimum expected count is 0.05

Crosstabulation of clinicians' current grade in practice and correct ratio of breathes to cardiac compressions

Clinicians' current grade in practice	Ratio of breathes to cardiac compressions						
	1:3	1:5	2:15	2:30	No ratio	Established	Total
Enrolled Nurse	8	0	0	2	2		12
RN(Diploma)	1	0	0	0	0		1
RN(Degree)	1	1	0	0	2		4
RM(Diploma)	7	1	1	0	1		10
RM(Degree)	6	0	0	1	2		9
Medical officer	2	0	0	0	0		2
Anaesthetist	2	0	0	0	0		2
Others	1	0	0	1	0		2
Total	28	2	1	4	7		42

Chi-Square Tests 2	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.708[a]	28	.837
Likelihood Ratio	20.258	28	.855
Linear-by-Linear Association	.323	1	.570
N of Valid Cases	42		

a. 37 cells (92.5%) have expected count less than 5. The minimum expected count is .02.

Correlations between current grade in practice and correct ratio of breathes to cardiac compressions

Correlations

		What's your current grade in practice	What is the correct ratio of breathes to cardiac compressions
What's your current grade in practice	Pearson Correlation	1	-.089
	Sig. (2-tailed)		.576
	N	42	42
What is the correct ratio of breathes to cardiac compressions	Pearson Correlation	-.089	1
	Sig. (2-tailed)	.576	
	N	42	42

Crosstabulation on length of suction catheter insertion during neonatal suctioning and correct indications for neonatal airway suctioning

	Correct indication for neonatal airway suctioning					
How deep should suction catheter go during neonatal suction	Baby not crying after drying	Meconium, after first cry	In all cases of meconium	In all neonates	Immediately after delivery before clamping the umbilical cord	Total
1-5cm	13	1	2	2	8	26
As far as it can go	4	0	0	0	1	5
As far as it can be seen	4	0	2	0	4	10
4cm	1	0	0	0	0	1
Total	22	1	4	2	13	42

Chi-Square Tests 3

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.984[a]	16	.974
Likelihood Ratio	8.815	16	.921
Linear-by-Linear Association	.328	1	.567
N of Valid Cases	42		

a. 22 cells (88.0%) have expected count less than 5. The minimum expected count is .02.

How do you suction a neonate that has secretions in mouth and nose

	Frequency	Percent	Cumulative Percent
Suction mouth before nose	35	83.3	83.3
Suction nose before mouth	7	16.7	100.0
Total	42	100.0	

Crosstabulation of Current grade in practice * How do you suction a neonate that has secretions in mouth and nose

		Suction mouth before nose	Suction nose before mouth	Total
Current grade in practice	Enrolled Nurse	11	1	12
	RN(Diploma)	0	1	1
	RN(Degree)	4	0	4
	RM(Diploma)	8	2	10
	RM(Degree)	7	2	9
	Medical officer	1	1	2
	Anaesthetist	2	0	2

Others	2	0	2
Total	35	7	42

Chi-Square Tests 4

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.080[a]	7	0.247
Likelihood Ratio	8.648	7	0.279
Linear-by-Linear Association	0.089	1	0.765
N of Valid Cases	42		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .17.

Duration of practice * How to suction neonate that has secretions in mouth and nose Crosstabulation

		Suction mouth before nose	Suction nose before mouth	Total
Duration of practice	1-3years	21	5	26
	4-6years	10	0	10
	7-9years	0	1	1
	>10years	4	1	5

	Total	35	7	42

Chi-Square Tests 5

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.163[a]	3	.067
Likelihood Ratio	7.386	3	.061
Linear-by-Linear Association	.042	1	.837
N of Valid Cases	42		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .17.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Interval by Interval	Pearson's R	.032	.175	.203	.840[c]
Ordinal by Ordinal	Spearman Correlation	-.037	.166	-.231	.818[c]
N of Valid Cases		42			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

4. DISCUSSION

The researchers set out to assess the knowledge and practices of clinicians on management of birth asphyxia at St Theresa's Hospital, Nkoranza. A critical analysis of the results and comparison of the results with similar studies has been done in the discussion. Concerning the demographic Data of the respondents, it was observed in the current study that majority, 73.8% of the respondents ranged between the ages of 21 to 30 years and another majority 85.7% constituted females. This correspond with that of Abine et al., (2014), where majority of their respondents were females between the ages of 20 to 30 years. The female majority also obeys the 2010 Ghana population census figures where females were the majority according to Ghana statistical service. This again confirms the assentation by Ghana Registered Nurses and Midwives report in 2019 that had over 50% female nurse and midwives across the country. The similarities between the studies and reports might be for the fact that nursing from ancient time were female job, and again for the fact that Ghana practice Female midwifery.

Respondents Knowledge and Practices of Neonatal Resuscitation

The study results reveal that all the 42 clinicians that took part in the survey perform resuscitation during birth asphyxia. Quite high number of the respondents 37(88.1%) had been trained in neonatal resuscitation already. The areas of their training were; helping babies breathe initiative 31(73.8%), American Paediatric Life Support (American PLS) 4(9.5%), Emergency Triage Assessment and Treatment of critical ill children (ETAT) 1(2.4%), and others 1(2.4%) that was not specified. The trained majority (88.1%) in this current study obeys with WHO assertation in 2006 that recommended all countries to train clinicians in standardized Emergency Obstetric and neonatal Care (EmONC). The Centre developed this training package in 2006 for Maternal and Newborn Health at the Liverpool School of Tropical Medicine in partnership with the World Health Organization (WHO) and Royal College of Obstetricians and Gynaecologists (Broek, 2007). The course was designed to include the essential knowledge and skills required by skilled birth attendants to recognize and manage the major causes of maternal and newborn death in low- and middle-income countries (LMIC) and included all EmONC signal functions (WHO, 2009). Though from the study, most of the study participants 37(88.1%) had been trained already, however, 5(11.9%) of the respondents comprising 4 nurses and a midwive still lack training in this area while performing resuscitation (This is supported by). The probable reason could be that the 11.9% had finished school before EmONC policy was implemented in Ghanaian schools. This lack of training among 11. 9% responders who practice neonatal resuscitation confirms the assertion by Aziz et al., (2020) that says, Sub-optimal care in neonates is predominant in developing countries and this contributes massively to maternal and neonatal deaths as a result of lack of training at clinical setting. Similarly, another study by Arlington et al., (2017) had almost half of healthcare providers lacking training at clinical setting, which caused inability of healthcare providers to recognize and manage gestational and childbirth complications in a timely and effective manner. The consistency of the current study with previous studies could be for the fact the studies were conducted in developing countries where standards in healthcare are low as compared to developed countries.

Further in the study, neonatal resuscitation trainings were found low and infrequent as most of the respondents 14(33.3%) had just a training within 3 years period, while only 6(14.3%) had required training thus within 1-3months. A study in America by Escobedo at al. (2020) concluded that neonatal resuscitation training in facilities reduces term intrapartum-related deaths by 30%. Yet, coverage of this intervention remains low in countries where most neonatal deaths occur and is a missed opportunity to save lives. Expert opinion supports similar association of neonatal resuscitation training and preterm mortality in facilities and at community level. Meanwhile experts that handle the job has no access to frequent training. It is of no doubt that further evaluation is required for impact, cost and implementation strategies in various contexts. Lee at al. (2017) also associated effective neonatal resuscitation performance to knowledge, skills and behaviors of clinicians. Moreover, adult, pediatric, and neonatal studies suggest that infrequent training makes CPR knowledge and skills decay within 3 to 12 months after training, meanwhile most of the respondent had their last training over a year. In practice, short, frequent trainings (booster training) have been shown to improve neonatal resuscitation outcomes globally as stated by WHO, 2011.

With regards to the first most important step in neonatal resuscitation, only 6(14.3%) out of the 42 respondents were able to identify preparedness as basic and unavoidable step in resuscitation. An increased risk of breathing problems may occur in babies who are preterm born after long traumatic labor born to mothers who received sedation during the late stages of labor. This should be kept in mind that any baby may have breathing difficulty at birth. Therefore, it is important to anticipate and prepare for resuscitation in all deliveries. Newborn resuscitation requires anticipation and preparation by providers who have been trained individually and as teams. It is estimated that approximately 10% of newly born infants need help to begin breathing at birth, and approximately 1% need intensive resuscitative measures to restore cardiorespiratory function. Perlman and Risser, (1995) associated resuscitation anticipation and preparation to the fallen trend in neonatal mortality rate in the United States and Canada from almost 20 per 1000 live births in the 1960s to the current rate of approximately 4 per 1000 live births. Similarly, the present study is consistent with Wall and Lee, (2009) study on neonatal resuscitation in low resource setting

where more than half of respondents missed salient steps to proper resuscitation. The agreement in both studies could be for the fact that they were conducted in a less resource area.

In addition, the study results revealed satisfactory knowledge level amongst the clinicians in identifying common indicators for neonatal resuscitation. A little above half (52.4%) also showed adequate knowledge level on indications for neonatal airway suctioning. Results on indications for ventilation breathes, 83.3% showed adequate knowledge level. 85.8% were also accurate in their responses on indication for neonatal chest compressions. In addition, P-value of 0.042 was recorded in a crosstabulation on clinicians' current grade and the number of bag and mask ventilation to give neonates in birth asphyxia. This means that the result was significant, suggesting the valuables, (number of bag and mask ventilation, and clinicians' current grade in practice) been well associated with each other.

However, crosstabulation on number of ventilations breathes to be given neonates and indication for suctioning neonates airways showed weak correlation with Pearson Correlation of 0.204 and P values recorded 0.196 signifying insignificant association between the variables. This means that the probability of a clinician identifying a correct indication for neonatal suctioning were not correlated to the correct number of ventilations breathes that same clinician will give during birth asphyxia. Furthermore, results on length of catheter insertion in the airway during neonatal suctioning also revealed incorrect responses among almost half of the clinicians. Thereby creating insignificant association (P values 0.974) between the variables (length of catheter insertion, and indication for neonatal airway suctioning). This support Bertram, Lauer, De Joncheere, Edejer, Hutubessy and Kieny (2017) whose findings revealed no link between knowledge in different procedures. Therefore, one's knowledge in a procedure does not guarantee same knowledge in different clinical procedure. Since respondents' knowledge in identifying common indications for various neonatal resuscitation procedures did not reflect in their practices, it is very emphatic to say clinicians at the study area has challenges discharging their duties in neonatal resuscitation. Hence, clinicians' knowledge has no association with their practices. Employers and facility managers are therefore advisable to organize periodic and at least, quarterly in-service training to always keep clinicians updated on current practices in neonatal resuscitation and healthcare at large.

Factors That Affect Neonatal Resuscitation.

Important programmatic considerations for resuscitation training in resource-limited settings include the benefit of teaching advanced procedures, provider competency, and skill maintenance. Studies reviewed included some aspects of advanced neonatal resuscitation; however, advanced procedures are more complex to teach (i.e., chest compressions, intubation, or medications) and are required for about 2% of all babies who do not breathe at birth, and fewer than 1% of all babies born (WHO, 2016). Basic neonatal resuscitation is sufficient for most babies who would be saved by resuscitation in low-middle income settings, and the additional benefit of advanced procedures is likely to be low. For the purposes of this estimate, the effect of facility based neonatal resuscitation was assumed to be achievable with basic neonatal resuscitation, which is the clear priority for rapid scale up in facilities in low- and middle-income countries, given feasibility, skills required, and equipment costs.

Furthermore, training programs should emphasize routine assessment of provider knowledge, competency and skill maintenance. Provider knowledge and performance skills to conduct resuscitation decline significantly over time (Kim et al, 2013). Regular refresher training programs, practice drills, and DVD videos of resuscitation are methods of ensuring skill maintenance and program effectiveness (Stanton, Lawn, Rahman, & Wilczynska-Ketende, Hill, 2008). Factors associated with knowledge and skills analysis examined facility and provider characteristics associated with providers' knowledge and clinical skills. Providers' knowledge of newborn resuscitation was insignificantly associated with their practices. Most identified barriers were lack of in-service training, poor access to resuscitation equipment, and lack of resuscitation guidelines and complex nature of few available guidelines. In 2016, WHO gave similar findings and associated facility-based training to reduction in neonatal mortality. Another study in Afghanistan by Lee et al (2013) assessed the capacity for newborn resuscitation and factors associated with providers' knowledge and skills, and had strong association (P values 0.001) between in-service training and adequate resuscitation practices.

However, their study concluded that even though equipment is very necessary in resuscitation, but lack of equipment did not pose major barrier to newborn resuscitation in their study area, rather providers' knowledge and skills need strengthening, as these were the most barriers they identified. In contrast to Afulani et al (2020), revealed more than half (52.2%) of clinicians haven irregular access to resuscitation equipment and associated it to their poor performance in neonatal resuscitation. The results of this analysis suggest that, among the variables examined, training and equipment availability exert the greatest influence on providers' knowledge and skills regarding newborn resuscitation. Other studies have drawn similar conclusions (Kim et al, 2013; Berglund, Bacci, Blyumina, and Lindmark, 2010; Nelson, Simonsen, Henry, Wilder, and Rose, 2010). However, the analysis of this study did not distinguish between pre-service and in-service training. However, clinicians' proficiency in newborn resuscitation, despite the limitations of their pre-service education, suggests that in-service training may be more effective. In contrast to training, providers' experience (as

measured by their current grade in practice) was not entirely associated with knowledge or clinical skills in the multivariable analysis. Experience may be more strongly related with confidence than either knowledge or skills. In actuality, the longer providers have been in practice, the more likely it is that standards of care have changed in the interim, leaving them out of date. Experienced providers may become so confident in their skill set that they are less adaptable and more reluctant to change. Interestingly, the facility setting seems to have an impact on providers' knowledge, but not skills. Critique

It is therefore, imperative to improve on the skills of clinicians by organizing refresher trainings for clinicians, pasting of guidelines at vantage points of neonatal resuscitation and ensuring accurate supervision during the procedure. The study results were also very emphatic on resuscitation guidelines imposing a major challenge on neonatal resuscitation. Almost half of the respondents had challenges referring to resuscitation guidelines during procedures. Their reasons were lack of guidelines, complex nature of the available guidelines, lack of supervision and lack of commitments. However, 11.9% of clinicians said they have mastered the guidelines and therefore see no need to waste time further on it. Findings of a direct observation study in Kenya on practice and outcomes of neonatal resuscitation for newborns with birth asphyxia at Kakamega County General Hospital, (Shikuku, Milimo, Ayebare, Gisore and Nalwadda, 2018) support this study as most of their observations identified resuscitation guidelines as good catalyst for adequate resuscitation. Another study by Opiyo and English (2015) also support the availability of resuscitation guidelines for referencing during birth asphyxia. In Ghana, a study by Willcox et al (2017) though did not present data on resuscitation guidelines but did recommend neonatal resuscitation guidelines for all clinicians. The similarities in all studies reviewed could be that most of the studies setting were at less resource areas and for the fact that the studies involved clinicians that offer similar services.

5. CONCLUSION RECOMMENDATION

This research looked at the expertise and methods used by professionals to treat birth asphyxia. The examination of the 42 participating doctors who worked in maternity and postnatal units used a descriptive cross section. Practice and knowledge are meant to be two sides of the same coin. Even while certain areas showed that doctors were skilled as they should be, their understanding of newborn resuscitation did not reflect in their practice. The majority of the practitioners' practice was good since they could not identify typical newborn resuscitation reasons. There is no doubt that clinicians face challenges at the clinical setting that could be the soul attribute to their poor performance. Neonatal resuscitation is a procedure that anticipation and preparation alone could do a halfway job, however, only 6(14.3%) were able to identify preparedness as salient point in neonatal resuscitation. Some of the barriers to neonatal resuscitation identified in this study were lack of neonatal resuscitation guidelines, lack of resuscitation equipment, infrequent in-service training, and lack of supervision during resuscitation procedures.

Generally, clinicians' knowledge and practice were poor; but medical officers and midwives showed satisfying knowledge than non-physicians and non-midwives. The poor performance of nurses in this study is factually due the misplaced duty area against their job description. Midwifery is a specialty and thus should be handled by specially trained personnel; therefore, if general nurses were found in this area, definitely their practice would not be as midwifery professionals. Going forward, facility managers should assign requisite personnel to their designated clinical areas for adequate practices to take its place. Further, there should be frequent training of staff in the form of unit clinical meetings, open-book approach, workshops, seminars, etc. Again, workload of medical officers and midwives should be curtailed to normalcy so they could work efficiently and always give support to the less experienced. Babies that do not breathe at birth still have chance to survive but that sometimes depend solely on where the baby was born. However, no matter where a baby is born, if systematically advanced policies and programs are kept in place waiting for the doom, then there will be reduced number of the inevitable. There are many investments in obstetrics, but much of these investments are keenly channelled to initial trainings in schools and universities in disperse of facility-base trainings. Clinicians at various departments lack some kind of knowledge in practice due to infrequent clinical trainings to update their skills on current practices.

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Data Availability
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