SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

DETERMINANTS OF QUALITY NEONATAL RESUSCITATION AMONG NURSES AND MIDWIVES AT THE GA WEST HOSPITAL

BY

JACINTA KORKOR DOSOO (10875473)

A DISSERTATION SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA, IN PARTIAL FULFILLMENT FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH (MPH) DEGREE

MARCH, 2022

DECLARATION

I, JACINTA KORKOR DOSOO, do hereby declare that apart from references that have been duly acknowledged, this proposal is the result of my efforts under able supervision. I take full responsibility for this work

..... 14/04/2022

JACINTA KORKOR DOSOO **DATE**

(Student)

..... 14/04/2022

DR. ERNEST TEI MAYA **DATE**

(Academic Supervisor)

DEDICATION

I dedicate this work to my family, and to all my loved ones who have been my source of encouragement and support all these years and most especially throughout this programme.

ACKNOWLEDGEMENT

I express my sincere gratitude to the Almighty God for His grace, mercy and protection upon my life most especially towards a successful completion of this research work.

Special thanks go to my supervisor, Dr. Ernest Tei Maya for all the support, guidance, encouragement, and tremendous patience throughout my research. I have been blessed to have learned and benefited from your rich experiences in academic profession.

To my research assistants who helped during the data collection period, I say I am grateful for the assistance.

My profound gratitude to the management of the Ga West Municipal Hospital for their approval and to the nurses and midwives at the labor ward and maternity theatre for their cooperation.

I wish to express my appreciation to my friend, Mr. Emmanuel Kyere Addai for his inspiration, encouragement and support contributed greatly through the research process.

I am indebted to the authors of the works I have cited in this research work.

With a grateful heart, I say, may God bless everyone who contributed in one way or the other to the successful completion of the entire programme.

ABSTRACT

Background: Asphyxia occurs in every two per thousand births in developed countries with ten times higher incidence rates in developing countries due to limited maternal and neonatal care. The competence of midwives and nurses in performing quality neonatal resuscitation is very crucial in helping babies initiate breathing hence reducing neonatal morbidity and mortality rates. .

Objective: The aim of this study is to assess the determinants of quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital.

Methods: The study employed a cross-sectional design including field observation of newborn resuscitation in the maternity theatre and labour unit to assess the practice, knowledge and factors influencing a quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital. Data was analyzed using STATA/MP 15 for windows with a simple logistic regression. All analysis were considered statistically significant at probability value less than 0.05 with these variables used for multiple logistic regression.

Results: Nurses and midwives had a high score (good) for drying/stimulation (75%), fair for bag and mask ventilation for breathing (71.0%) and poor for preparation for resuscitation (26.0%). Educational level (aOR = 34.33; 95% CI = 1.64 – 720.63; p = 0.023) and Training on the job (aOR = 183.25; 95% CI = 6.09 – 5516.96; p = 0.003) predicted the quality of NR (drying/stimulation). Years of experience is associated with good quality airway clearance (aOR = 5.06; 95% CI = 1.00 – 25.58; p = 0.050).

Conclusion: Majority of the midwives and nurses had inadequate knowledge of neonatal resuscitation (82.1%). Not all the nurses and midwives could indicate the correct order of preliminary steps of newborn resuscitation. Increased practice of NR increases the odds of quality NR among nurses/midwives.

TABLE OF CONTENTS

DECLARATION i
DEDICATION ii
ACKNOWLEDGEMENT iii
ABSTRACT iv
LIST OF FIGURES vii
LIST OF TABLES viii
LIST OF ABBREVIATIONS ix
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background of the Study 1
1.2 Statement of the Problem 2
1.3 Research Questions 3
1.4 Objectives of the study 3
1.4.1 General Objectives 3
1.4.2 Specific Objectives 4
1.5 Justification 4
1.6 Conceptual Framework Narrative 5
1.6.1 Conceptual Framework 6
CHAPTER TWO 7
2.0 LITERATURE REVIEW 7
2.1 Introduction 7
2.2 Theoretical Framework (The Donabedian Model of Quality of Care) 8
2.3 Knowledge of NR among nurses and midwives 9
2.4 Factors Affecting Neonatal Resuscitation 10
2.4.1 Socio-demographic Factors 10
2.4.1.1 Age 10
2.4.1.2 Marital Status 10
2.4.1.3 Educational Level 11
2.4.1.4 Number of Working Years 11
2.4.2 Training 12
2.5 Availability of Neonatal Resuscitation Facilities, Guidelines and Essential Equipment 12
CHAPTER THREE 14
METHODOLOGY 14
3.1 Introduction 14
3.2 Study Design 14
3.3 Study Setting 14

3.4 Study Population 15
3.4.1 Inclusion criteria 15
3.4.2 Exclusion criteria 16
3.5 Sampling and Sample size calculation: 16
3.6 Data Collection 17
3.7 Outcome variable: 17
3.8 Independent variables: 17
3.9 Data Analysis 18
3.10 Ethical Statement 19
3.11 Data Quality Control and Management: 19
CHAPTER FOUR 20
RESULTS 20
4.1 Socio-demographic characteristics of respondents 20
4.2 Knowledge of Neonatal resuscitation among Nurses/Midwives 21
4.3 Resuscitation steps and performance mean scores 23
4.4 Main steps of NR and their quality-of-care scores 26
4.5 Factors associated with NR processes (preparation for resuscitation) 26
4.6 Factors associated with NR processes (drying/stimulation) 28
4.7 NR processes factors (airway clearance) 30
4.8 Factors associated with NR processes (BMV) 32
4.9 Health Service Factors 33
CHAPTER FIVE 35
DISCUSSION 35
5.1 Knowledge of Neonatal resuscitation 35
5.2 Availability of NR equipment and Practice of Quality NR 35
5.3 Factors Associated with Quality Neonatal Resuscitation 36
5.4 Study Limitations 38
CHAPTER SIX 40
CONCLUSION AND RECOMMENDATIONS 40
6.1 Conclusion 40
6.2 Recommendations 41
REFERENCES 42
APPENDICES 45
APPENDIX I: PARTICIPANTS INFORMATION SHEET 45
APPENDIX II: CONSENT FORM FOR STUDY PARTICIPANTS 48
APPENDIX III: QUESTIONNAIRE 50
APPENDIX IV: ETHICAL CLEARANCE FROM GHANA HEALTH SERVICE 55

LIST OF FIGURES

Figure 1.1: Conceptual Framework for this Study (Adapted from the Donabedian model, 1980) 6

Figure 2.1: Donabedian (1980) Quality of Care Framework. 9

Figure 3.1: Map of Ga West Municipality (Source: GSS (2014) 15

Figure 4.1: Main steps in NR and their mean scores 24

Figure 4.2 Quality of care scores for NR processes.....26

LIST OF TABLES

Table 4. 1 Socio-demographic characteristics of respondents with distribution of new-.....20

borns resuscitated.....20

Table 4. 2 Knowledge of Neonatal resuscitation among Nurses/Midwives.....22

Table 4.3 Resuscitation steps and performance mean scores 25

Table 4.4 Factors associated with NR processes (preparation for resuscitation) 27

Table 4. 5 Factors associated with NR processes (drying/stimulation).....29

Table 4. 6 Factors associated with NR processes (airway clearance).....31

Table 4. 7 Factors associated with NR processes (BMV) 32

Table 4. 8 Availability of NR facilities and essential equipment 34

LIST OF ABBREVIATIONS

BMV	-	Bag and mask Ventilation
DHIMS	-	District Health Information Management System
GSS	-	Ghana Statistical Service
GWMA	-	Ga West Municipal Assembly
HCP	-	Health Care Professionals
NR	-	Neonatal Resuscitation
PI	-	Principal Investigator
RA	-	Research Assistants
WHO	-	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Neonates undergo rapid changes in the first four weeks of life in order to adapt to their new environment (United Nations Children's Fund, 2020). During these weeks, these babies are prone to a number of life-threatening conditions that may result in death, morbidity or disability if not properly managed (Gülmezoglu et al., 2016). According to the World Health Organization, approximately 6,700 neonates died per day in 2019 accounting for 2.4 million neonatal deaths that year. This critical period in the life of a neonate, demands quality and timely care for survival especially when neonatal danger signs are noticed (Okawa et al., 2015). These danger signs include poor feeding or inability to feed, convulsion, difficulty breathing, jaundice, vomiting, weak body movement, weak cries, diarrhoea and blood in stool, high or low temperature and local infection of the umbilicus (Abu-Shaheen et al., 2019). Aside these, birth asphyxia, prematurity and infections could also result in neonatal morbidity or mortality (Woldu et al., 2020). Birth asphyxia is a common birth disorder in which a neonate is unable to establish and/or maintain breathing during or after delivery, potentially resulting in irreversible brain abnormalities, multi-organ failure, or death. (Gillam-Krakauer & Gowen, 2020; Sintayehu et al., 2020). Asphyxia is believed to occur once every two thousand babies in countries that are developed, but it is ten times more common in underdeveloped countries due to inadequate maternal and neonatal care. (Gillam-Krakauer & Gowen, 2020). Asphyxia is the second leading cause of newborn death in Ghana, contributing for 28.3% of all mortalities in 2015. (United Nations Children's Emergency Fund, 2016). Neonatal resuscitation is not the sole but important procedure that when performed in a timely and competent manner, reduces neonatal mortality and morbidity significantly

(Woldu et al., 2020). Competence of midwives and nurses in performing quality neonatal resuscitation is very crucial in helping an estimated ten million babies initiate breathing through tactile stimulation, airway clearing, or positioning (Alhassan et al., 2019). This when done will greatly reduce neonatal morbidity and mortality rates in Ghana, Africa and around the globe.

1.2 Statement of the Problem

Studies reveal higher number of neonatal deaths in low- and middle-income countries due to inadequacy of experienced personnel, equipment and facilities needed to handle neonatal cases (Chikuse et al., 2012; Mbonye et al., 2012; Kim et al., 2013; Enweronu-Laryea et al., 2015; Agbenohevi, 2018; Alhassan et al., 2019; Biset et al., 2019; Sintayehu et al., 2020; Namuguzi et al., 2020; Soti et al., 2021). Indications point to the fact that more than half of these deaths result from conditions such as asphyxia that could have otherwise been treated successfully (WHO, 2012). Previously, high numbers of asphyxia related neonatal mortality were seen in hospitals (Abdul-Mumin et al., 2021) all over Ghana including the Ga West Municipal Hospital. These deaths necessitated the gathering and training of health personnel on neonatal resuscitation for effective management of asphyxia through the Helping Babies Breathe program, a part of the Making Every Baby Count Initiative, 2015 - 2017 (Chinbuah et al., 2020). Reports indicate improved results translating into reduction in neonatal deaths (Bookman et al., 2010; Msemo et al. 2013; Brathwaite et al., 2020). However, in recent history of the Ga West hospital, they recorded 1, 2, and 4 neonatal deaths in 2017, 2018 and 2019 respectively according to DHIMS (2020). More so, unconfirmed reports indicate that cases of neonatal death at the facility are higher than reported on DHIMS. However, birth asphyxia may result in morbidities such as severe hypoxic ischemic organ damage in neonates, which can result in death or serious lifelong diseases. Severe damages frequently result in the development of neurodegenerative disorders, epilepsies and mental retardation. Mild damage can cause "minimal brain injury diseases" such as hyperactivity and attention deficiencies, but they

can also result in the development of life-long functional psychotic syndromes and schizophrenia. (Golubnitschaja, Yeghiazaryan, Cebioglu, Morelli, & Herrera-Marschitz, 2011). Studies confirming the neonatal deaths in Ghana are lacking (Alhassan et al., 2019; Sintayehu et al., 2020) necessitating the need for this present study. Researchers (Alhassan et al., 2019; Sintayehu et al., 2020) have emphasized the importance of facts on midwives' knowledge and practices on neonatal resuscitation in order to advise future policymaking on newborn care. Hence, the aim of this study is to assess nurses and midwives' knowledge and practices as well as factors that influence the quality of neonatal resuscitation done at the Ga West Municipal Hospital.

1.3 Research Questions

1. What level of knowledge do midwives and nurses at the Ga West Municipal Hospital have concerning quality neonatal resuscitation?
2. What is the practice among nurses and midwives at the Ga West Municipal Hospital to quality neonatal resuscitation?
3. What factors influence quality neonatal resuscitation among Ga West Municipal Hospital nurses and midwives?

1.4 Objectives of the study

1.4.1 General Objectives

The aim of this study is to investigate the determinants of quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital.

1.4.2 Specific Objectives

The exact goals of this study are as follows:

1. Assess the level of knowledge nurses and midwives at the Ga West Municipal Hospital have concerning quality neonatal resuscitation.
2. Assess the practice among nurses and midwives at the Ga Municipal West Hospital to quality neonatal resuscitation.
3. Determine the factors influencing quality neonatal resuscitation at the Ga West Municipal Hospital among nurses and midwives

1.5 Justification

The goal of this study is to assess the depth of knowledge nurses and midwives at the Ga West Municipal Hospital have concerning quality neonatal resuscitation. Knowledge implementation will also be assessed through the practices undertaken by the nurses and midwives at the hospital. This study will also explore possible factors that may influence the quality of neonatal resuscitation at the Ga West Municipal Hospital. Suggestions based on results from this study will be valuable in neonatal nursing care as it may influence future decision making by health authorities and training of health personnel. This study will also provide information that may be relevant in significantly improving the neonatal outcomes and quality of care given to neonates at the Ga West Municipal Hospital and across Ghana. Findings will contribute to expanding knowledge in neonatal health, neonatal resuscitation as well as nursing and midwifery care in Ghana. Study findings may also become a valuable comparative baseline for the organization of similar studies in Ghana.

1.6 Conceptual Framework Narrative

The elements that may influence the practice of neonatal resuscitation among nurses and midwives can be looked at from the angle of socio-demographic factors, knowledge, and other factors that border on training and the availability equipment.

Age, marital status, educational level, and years of experience are all socio-demographic factors that can influence neonatal resuscitation practice among nurses and midwives. Health workers who are younger of age may perform better than older health worker may because knowledge of steps and procedures may be still fresh in their minds (Chinbuah et al., 2020). However, older professionals may also have longer working experience, which may have enhanced their performance in neonatal resuscitation. Unmarried midwives and nurses are more likely than married ones to be knowledgeable about neonatal resuscitation. (Sintayehu et al., 2020). Educational level can also influence the level of knowledge as well as the practice of neonatal resuscitation among nurses and midwives. The capacity of Ghanaian midwives and nurses to execute neonatal resuscitation steps can declined with increasing length of service if no training is received (Alhassan et al., 2019).

Neonatal resuscitation training have been proven to increase the knowledge level of some Ghanaian nurses and midwives in neonatal resuscitation among some Ghanaian nurses and midwives (Alhassan et al., 2019). Availability and functionality of appropriate infrastructure and equipment is required for undertaking neonatal resuscitation due to the delicate state of babies with birth asphyxia.

1.6.1 Conceptual Framework

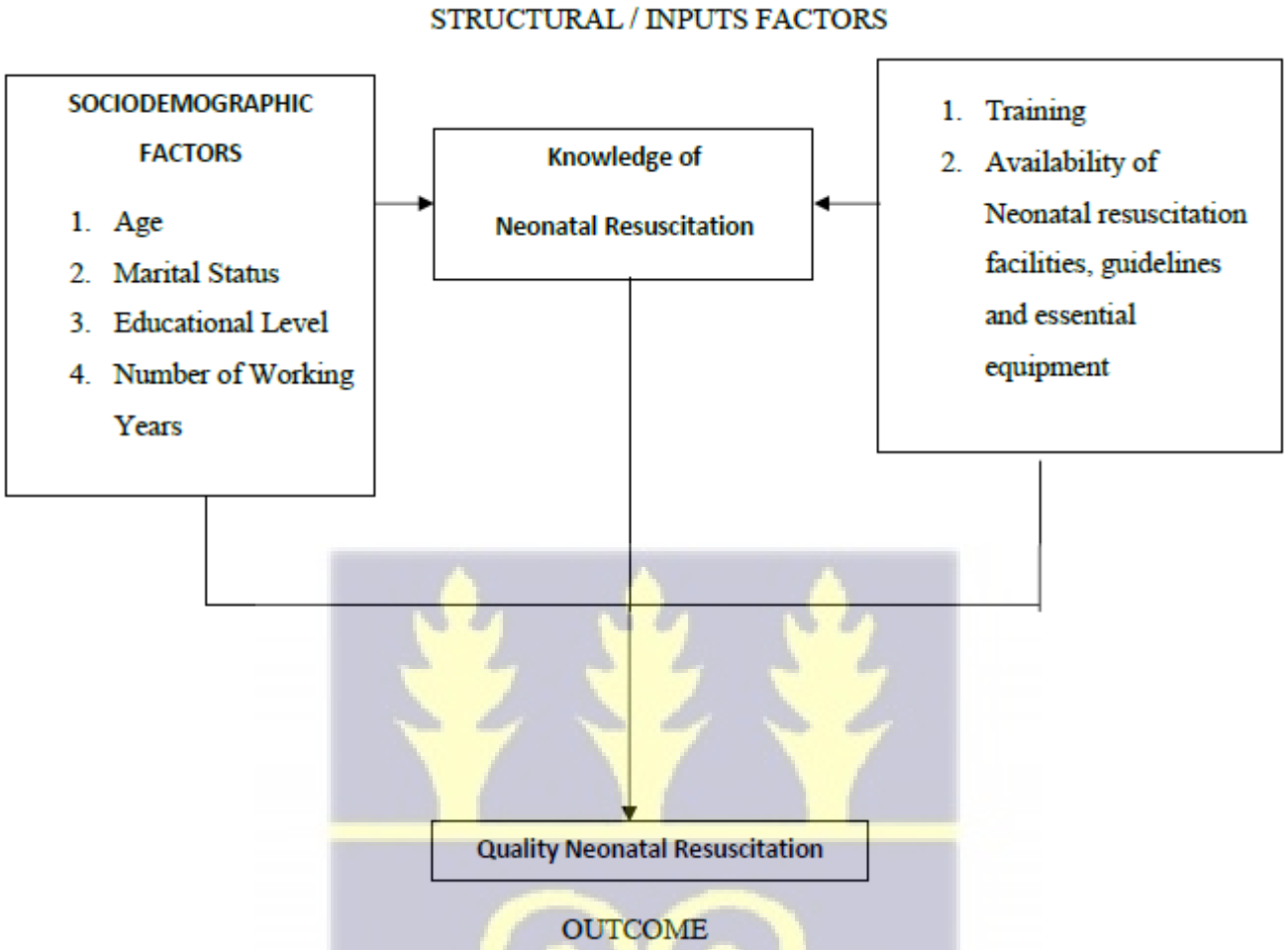

Figure 1.1: Conceptual Framework for this Study (Adapted from the Donabedian model, 1980)

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Neonatal resuscitation is a component of important newborn care that tackles the essential components of thermal management, lactation, infection prevention, detection of danger symptoms, and management of suspected infection. (Niermeyer et al., 2018). According to Médecins Sans Frontières (2019), neonatal resuscitation procedure must be documented and must occur in a heated room since low body temperatures can negatively affect successful resuscitation. Steps involved in the procedure include:

1. Tactile stimulation by drying the baby to trigger spontaneous breathing.
2. Clear the airway by laying the neonate on the back with the head in a neutral position or gently and quickly suctioning with a bulb syringe in cases of excessive secretion.
3. Stimulate the neonate by rubbing the back and the soles of the feet vigorously but not roughly.
4. If not already done, clamp and cut the cord.
5. Perform bag-mask ventilation at a rate of 30 to 60 breaths per minute for 60 seconds until there is spontaneous respiratory effort. Avoid excessive ventilation pressure.
6. Have an assistant connect oxygen after 2 minutes of ventilation setting it at a 2 liters/minute flow rate.

Several studies conducted around the globe have emphasized the positive effects or advantages of neonatal resuscitation training among birth midwives (Bookman et al., 2010; Alhassan et al., 2019; Brathwaite et al., 2020; Woldu et al., 2020). A study conducted in Tanzania made similar reports revealing positive live saving outcomes after a number of skilled Tanzanian birth attendants were trained on how to administer neonatal resuscitation (Msemo et al., 2013). Results showed a drastic reduction in neonatal mortality by approximately 47%. Despite these

results more has to be done to improve training access as some studies have recorded very low level of knowledge and practice among healthcare workers concerning neonatal resuscitation (Agbenohevi, 2018; Alhassan et al., 2019; Biset et al., 2019; Sintayehu et al., 2020; Namuguzi et al., 2020; Soti et al., 2021). According to Alhassan et al. (2019), 98.1 percent of midwives in Tamale, Ghana's Northern region, lacked understanding of newborn resuscitation. Only 9.8 percent of Ethiopian nurses and midwives were knowledgeable about newborn resuscitation. (Sintayehu et al., 2020). Another study of 143 nurses in the northeastern part of Ethiopia found that just 32.9 percent of participants had adequate knowledge, while only 24.5 percent had appropriate practices for neonatal resuscitation. (Biset et al., 2019). An Indian study found that 64.6 percent of the 130 nurses who participated in the study had little expertise of newborn resuscitation. (Soti et al., 2021). Despite the fact that Namuguzi et al. (2020) indicated a good level of knowledge among Ugandan nurses and midwives, more than half of these participants demonstrated poor new born resuscitation procedures. In the study, 68.2 percent failed to inspect equipment and choose the correct mask, 45.5 percent failed to make a strong seal while putting the mask, 72 percent failed to breathe at the required breathing rate per minute, and 18.2 percent failed to monitor chest movement. (Namuguzi et al., 2020). Agbenohevi (2018) also reported low level of knowledge among midwives at the 37 Military Hospital in Accra where midwives failed to recognize when there is the need to immediately restore spontaneous respiration in new-borns.

2.2 Theoretical Framework (The Donabedian Model of Quality of Care)

To determine the quality of NR in the study environment, the Donabedian (1980) model of quality-of-care study will be applied. In the context of quality of care, three major dimensions, namely structure, process, and result, are interrelated, according to Donabedian (1980). A good system enhances the likelihood of good procedures, which raises the likelihood of good results, such as NR quality. (Donabedian, 1980). Figure 2.1 depicts the Donabedian model, which will

be used in this investigation since it has evidential basis for its ability to create information from which quality of care conclusions can be formed. (Donabedian, 1980;) – (Sardasht, Shourab, Jafarnejad, & Esmaily, 2013).

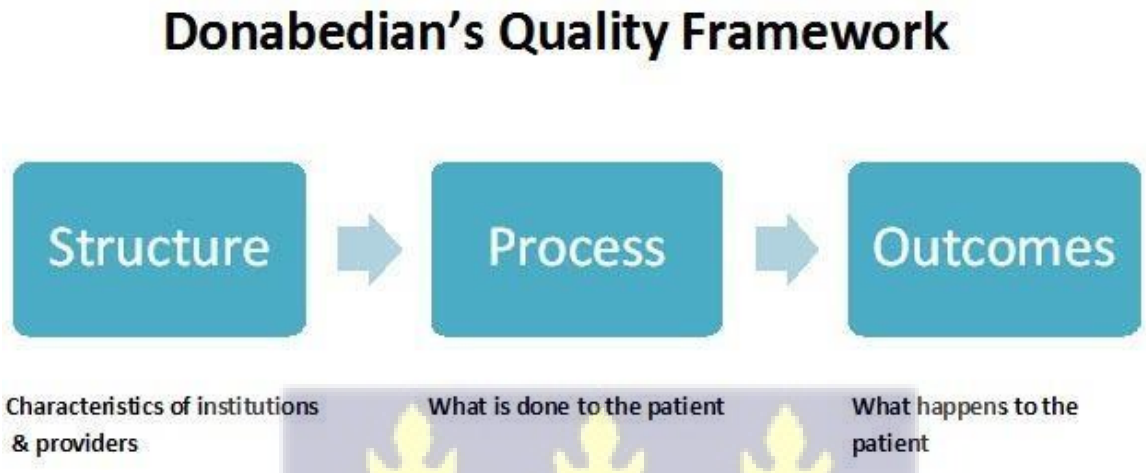

Figure 2.1: Donabedian (1980) Quality of Care Framework.

2.3 Knowledge of NR among nurses and midwives

Sintayehu et.al (2020) reported only a 9.8% good knowledge among 427 nurses and midwives. Out of 240 midwives across three different study sites in Tamale, Alhassan et.al (2019) reported 98.1% of the midwives had insufficient knowledge of NR. In northwest Ethiopia, Gebreegziabher, Aregawi and Getinet (2014) reported a consistent finding of low levels of knowledge among midwives at a university teaching hospital. All these studies found training on NR as to positively influence NR knowledge among nurses and midwives. However, another study conducted in Nigeria reported 78% adequate knowledge of NR among nurses (Ogunlesi et. al., 2008).

2.4 Factors Affecting Neonatal Resuscitation

2.4.1 Socio-demographic Factors

2.4.1.1 Age

Age has been found to affect the level of knowledge as well as practice of neonatal resuscitation among health workers. Health workers under the age of 40 did much better than health workers beyond the age of 40. They reported that older midwives performed poorly when tested on both knowledge and practice, revealing that only 11.8% of the midwives aged 40 years and above initiated effective ventilation compared with 88.2% of midwives aged below 40 years (Chinbuah et al., 2020). In another study, midwives were categorized according to age groups –36 years, below, and above 36 years. The survey, on the other hand, found that high knowledge levels were evenly divided between the two age groups, with 50.7 percent aged 36 years and under and 49.3 percent aged 36 years and beyond. Analysis, however, showed no significant relationship between age and level of knowledge or practice of newborn resuscitation (Namuguzi et al., 2020). Again, Soti et al. (2021) found no significant relationship between age, knowledge and practice of neonatal resuscitation.

2.4.1.2 Marital Status

According to Sintayehu et al. (2020), unmarried midwives and nurses were 2.36 times more likely to be knowledgeable about neonatal resuscitation than the married ones. This, they argued is probably because most of the unmarried midwives and nurses have more time at their disposal to read and update or keep abreast with new information on neonatal resuscitation than the married midwives and nurses. They also attributed to the fact that unmarried midwives and nurses may be younger than married ones implying that the younger ones may have graduated from school not too long ago and may have a better capacity to retain what they may have read or trained on (Sintayehu et al., 2020). However, Soti et al. (2021) found no significant

relationship between marital status, knowledge and practice of neonatal resuscitation.

2.4.1.3 Educational Level

Educational level was also found to influence the level of knowledge as well as the practice of neonatal resuscitation among nurses and midwives. In Tamale, nurses and midwives who had a first-degree qualification in midwifery as well as those with a post-diploma or Post-Nurse Assistant-Clinical/Nurse Assistant Preventive midwifery certificate had higher knowledge than those with a diploma in midwifery (Alhassan et al., 2019). Analysis of results showed a significant association. Similarly, another study reported that midwives and the nurses who had a bachelor's degree and above were 2.67 times more likely to be knowledgeable about neonatal resuscitation compared to those who had a diploma in nursing or midwifery. These they attributed to the fact that those with the degree and above may have had a better chance of evidence-based reviewed information and practice compared to those with diploma (Sintayehu et al., 2020).

2.4.1.4 Number of Working Years

According to Chinbuah and colleagues (2020), the ability of Ghanaian nurses and midwives to perform neonatal resuscitation steps correctly declined with increasing length of service. They revealed that 86.8% of nurses and midwives with less than one year of experience, 81.7% with 1–5 years of experience, 78.8% with 6–10 years of experience, 67.6% with 11–15 years of experience, and 54.1% with > 15 years of clinical experience performed the steps correctly. This trend displayed a decrease in efficiency as the years go by. The vast majority of HWs with less than 1 year of clinical experience passed the resuscitation test on first attempt (98.9%) as the pass rate declined with increasing clinical experience, midwives with longer years of clinical experience had significantly lower scores (Chinbuah et al., 2020). However, Alhassan and colleagues (2019) found no statistical correlation between knowledge, practice of neonatal

resuscitation and years of practice as a midwife. They stated that more than half of the participants were not able to perform neonatal resuscitation correctly; attributing this to the short duration participants had spent so far as midwives. They noted that median length of practice was 3 years, which maybe too short a duration to master resuscitation skills correctly (Alhassan et al., 2019).

2.4.2 Training

Newborn resuscitation training has been proven to improve the knowledge level of some Ghanaian nurses and midwives in the Northern area. The study concluded that more training opportunities for midwives in newborn resuscitation are needed, as training was linked with improved overall knowledge and practical expertise. (Alhassan et al., 2019). Analysis of study results revealed that nurses and midwives who got on-the-job training on new-born resuscitation were 3.79 times more likely to be knowledgeable about neonatal resuscitation than their counterparts who were not taught, according to Sintayehu et al. (2020). Similarly, a cross-sectional study assessing the capacity for new-born resuscitation and factors associated with providers' knowledge and skills discovered that training was associated with increased knowledge and practical or clinical skills in neonatal resuscitation among Afghan nurses and midwives. (Kim et al., 2013).

2.5 Availability of Neonatal Resuscitation Facilities, Guidelines and Essential Equipment

A number of researchers have emphasized the need for the provision, availability and functionality of appropriate infrastructure and equipment for undertaking neonatal resuscitation due to the delicate state of babies with birth asphyxia (Chikuse et al., 2012; Kim et al., 2013; Enweronu-Laryea et al., 2015). In Afghanistan, medical centres of all cadres were well equipped, with no discernible difference in the availability of supplies or equipment by institution type. Resuscitation guidelines were available at 81% to 100% of the institutions

evaluated, and 90% to 100% of the facilities had a new born-sized bag, mask, and mucus extractor. A newborn resuscitation table was available in fewer facilities (from 72.1 percent to 90 percent). Suction apparatus were found in all regional and specialized hospitals, compared to 72.1 % of community health centers and district hospitals and 88 percent of provincial hospitals. (Kim et al., 2013). A report by Mbonye et al. (2012), however indicated inadequacies in neonatal resuscitation equipment stating that only 15% of hospitals employed in the study had all neonatal resuscitation equipment. Namuguzi et al. (2020) also assessed the availability and functionality of equipment in Ugandan hospitals, showing insufficient neonatal resuscitation equipment in poor operating condition. They attributed this to inconsistencies between managerial supplies and real demand, as well as a lack of general monitoring to ensure the availability of equipment in excellent operating order at all times.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section presents the methodology that was used to arrive at findings to the objectives of this research. In an outline, this section encompasses the research approach and design, study population and sample size and the sampling technique that was used with their justifications. It also presents the proposed data sources and data collection instruments used. The proposed data gathering procedures, mode of data analysis, and ethical considerations were also discussed.

3.2 Study Design

In this study, a cross-sectional study design was adopted, including field observation of newborn resuscitation in the maternity theatre and labour unit. This was a nonintrusive approach, which allowed the nurses and midwives to go about their care provision process in their natural fashion without any interruptions or disturbance from the observer. Nurses and midwives, who were observed, were approached to fill questionnaires on their knowledge of neonatal resuscitation.

3.3 Study Setting

The study was conducted at the labour ward, neonatal intensive care unit, and the theatre recovery ward of the Ga West Municipal Hospital. The Ga West Municipal Hospital provides general services including maternal and labour services, outpatient department, surgical pediatrics, obstetrics and gynecology services, herbal and alternative medicines and radiology among others. The hospital is located within Amasaman opposite the Ga West Municipal Assembly. It is the sole government hospital between the Nsawam Government Hospital in the Eastern Region and the Ga North Municipal Hospital in the Greater Accra

Region. The Ga West Municipal Hospital was designated as a Municipal Hospital in the year 2008 after it was established as a health center in the year 1984. It is a level B facility offers general services. For that reason, taking into account all these factors, the Ga West Municipal Hospital serves as the ideal location to investigate the determinants of quality neonatal resuscitation among nurses and midwives.

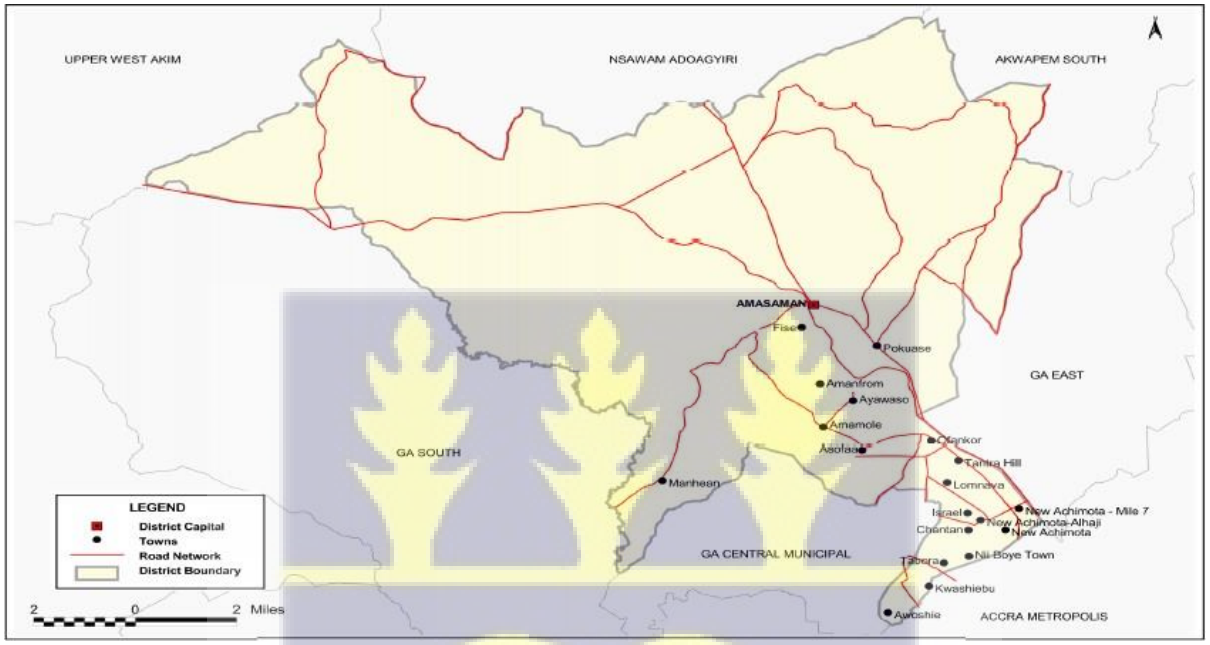

Figure 3.1: Map of Ga West Municipality (Source: GSS (2014)

3.4 Study Population

The study population was nurses and midwives in the Ga West Municipal Hospital whose current post at the time of the study was either the maternal ward, neonatal intensive care unit and labour recovery ward.

3.4.1 Inclusion criteria

Nurses and midwives who have been involved in resuscitating a newborn and agreed to take part in the study.

3.4.2 Exclusion criteria

Nurses and midwives who refused to take part in the research.

3.5 Sampling and Sample size calculation:

All newborns who required NR shortly after birth and met the inclusion criteria were selected using the consecutive sampling approach until the attained sample size According to studies, around one in every ten babies requires assistance breathing soon after birth, highlighting the importance of a prompt examination after birth. (Van Heerden, 2012).

The sample size was determined using the Kish Leslie's formula. Where:

- N = required sample size
- Z^2 = standard normal deviate for two tailed-test based on 95% confidence level = 1.96
- p = proportion of babies who require neonatal resuscitation = 10%. = 0.1 (Van Heerden, 2012)
- q = 1 – p = proportion of babies who require neonatal resuscitation = 1 - 0.1 = 0.9
- e= margin of error = 5% = 0.05
- Therefore, the sample size was calculated as follows

$$N = \frac{Z^2 pq}{e^2}$$

$$N = \frac{1.96^2 \times 0.1\,(1-0.1)}{0.05^2}$$

$$N = \frac{3.8416 \times 0.1 \times 0.9}{0.0025}$$

- N = 138.29 = 140 new born resuscitations to be observed

3.6 Data Collection

Data was collected using a structured direct observation checklist and questionnaire to capture the characteristics of the nurses and midwives (the processes, neonatal resuscitation process with items based on the principal areas of the neonatal resuscitation process as per the national guidelines, preparation for resuscitation, drying/stimulation, airway clearance and maintenance, and bag and mask ventilation), structural characteristics and the health facility. Four research assistants (nurses or midwives) were hired to monitor neonatal resuscitation during both day and night shifts. To reduce the Hawthorne effect, these study assistants were selected from the hospital's antenatal clinic. This was based on the notion that when nurses and midwives were seen by another nurse or midwife on the exact unit rather than an investigator from a different unit, they were less likely to change their practices (Sedgwick, 2012). Formal training and experience were used to choose these research assistants. The principal investigator together with the research assistant conducted two practical observations to confirm that the checklist was used in the same way.

3.7 Outcome variable:

The outcome variable of this study was quality of care during neonatal resuscitation, measured as a continuous variable and dichotomized into a binary outcome variable. A total of 13 step items based on the four principal areas of neonatal resuscitation (drying/stimulation, checking airway, initial bag and mask ventilation, and advanced bag and mask ventilation) were used.

3.8 Independent variables:

Structural/input factors (Age, Marital Status, Educational Level, Number of Working Years, Knowledge of Neonatal Resuscitation, Availability of Neonatal resuscitation facilities, guidelines and essential equipment), qualifications and experience of nurses and midwives, support staff supervision and neonatal resuscitation training were the independent variables considered.

3.9 Data Analysis

Data was entered into Microsoft Office Excel program and was cleaned. The data was analyzed using STATA/MP version 15 as was analyzed by Shikutu, Milimo, Ayebare, Gisore & Nalwadda, 2018). The 13 step items are based on 4 major areas of neonatal resuscitation which ultimately defines quality of care was dichotomized into 'yes (performed) - 1' and 'no (not performed) - 0'. Higher quality of care was reflected in higher scores of the nurses and midwives. Descriptive statistics of process indicators was summarized using means and standard deviation. Nurses and midwives' quality of care was classified as good (if they performed all the recommended steps), fair (if they performed half the recommended), and poor (if they performed less than half of the recommended steps). Quality of care was measured by summing all scores attained under each principal area. This was done to indicate an overall score of a nurse or midwife who attended to a specific neonate for all of the individual steps that the neonate received under the principal steps. The obtained score was classified as good, fair, or poor quality. A precise scoring system was implemented due to the differences in the steps under each of the four principle areas. For drying/stimulation and airway clearance (0–3), quality of care was categorized as good if all the three steps, fair if two steps, and poor if one or none of the steps under principal area was performed. For initial bag and mask ventilation (0–2), quality of care was either good if all two steps or poor if one or none of the steps was performed. For advanced/supportive bag and mask ventilation (0–5), quality of care was either good if four or all five steps, fair if three, or poor if only two or less steps were performed. However, neonates who did not respond to care in the primary stages of the resuscitation process proceeded to the subsequent levels of resuscitation. The quality of care was computed for each of the four principal steps as the number of neonates kept reducing from one level of care to the next.

Under each principal area, the quality of NR was dichotomized into two levels 'quality (nurses

and midwives who performed all the steps accurately)' and not quality (nurses and midwives who missed any step in the resuscitation procedure).

The descriptive statistics of the nurses and midwives was also computed using frequencies and percentages. A multiple logistic regression was used to determine characteristics of the nurses and midwives associated with quality of care NR for each principal area. Crude and adjusted odds ratios were reported with their 95% confidence interval and p-values < 0.05 were considered statistically significant.

3.10 Ethical Statement

The Ghana Health Service Ethical Review Committee was consulted for ethical approval. Protocol ID: GHS-ERC: 028/12/21. The University Of Ghana School Of Public Health issued an introductory letter to the authorities of the Ga West Municipal Hospital of which permission was granted to collect data. Study participants recruited for the study gave consent by signing an informed consent form. Participants were informed of no direct benefit and risk associated with the study and that participation in the study was voluntary and could withdraw at any point. They were assured of confidentiality of any information provided, that information was used for the purpose of research only, and data was solely anonymous. The records of the study will be kept at the University of Ghana**.**

3.11 Data Quality Control and Management:

Questionnaires were pretested to verify question clarity and to allow for needed revisions. Four field assistants were taught on how to give questionnaires correctly. The principal investigator checked all completed surveys on the field for errors, inconsistencies, to ensure accuracy

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of respondents

Table 4.1 displays the demographics statistics of the healthcare professionals in this study. More than half of the respondents (57.1%) were aged 29 to 36 years. Most of the nurses/midwives (53.6%), had worked at their post for 1 to 5 years and had provided more than half (75/140) of the NR. Eighteen of the nurses/midwives (64.3%) were registered nurses with a diploma and 35.7% were registered nurses with a bachelor's degree or a masters' degree. Nurses/midwives with a diploma provided sixty four percent (90/140) of the NRs. Nurses/midwives trained on NR on the job (60.7%) provided a similar proportion of NRs (85/140). Majority of the nurses/midwives (72.7%) who had practiced NR also cared for 40 (72.7%) new-borns at the time of study. Most of the nurses/midwives (64.3%) had also performed NR more than 5 times.

Table 4. 1 Socio-demographic characteristics of respondents with distribution of new-borns resuscitated

Variables	Frequency (n = 28)	Percentage (%)	New-borns resuscitated (n = 140)	Percentage (%)
Age of nurses/midwives (years)				
29 to 36	16	57.1	80	57.1
> 36	12	42.9	60	42.9
Years at post				
1 to 5 years	15	53.6	75	53.6
> 5 years	13	46.4	65	46.4
Educational level				
Registered nurse (diploma/certificate)	18	64.3	90	64.3
Registered nurse (degree/masters)	10	35.7	50	35.7
Trained on neonatal resuscitation on the job				
Yes	17	60.7	85	60.7
No	11	39.3	55	39.3

Training type				
Emergency obstetric and new born care (EMONC)	15	88.2	75	88.2
Emergency triage assessment and treatment plus (ETAT+)	2	11.8	10	11.8
Ever practiced NR				
Yes	8	72.7	40	72.7
No	3	27.3	15	27.3
Time interval from last training	3.33 ± 2.29			
Number of times NR was performed				
Never	6	21.4	30	21.4
1 - 5times	4	14.3	20	14.3
> 5 times	18	64.3	90	64.3

4.2 Knowledge of Neonatal resuscitation among Nurses/Midwives

Majority of the nurses and midwives had inadequate knowledge of Neonatal resuscitation (82.1%). Not all the nurses and midwives could indicate the correct order of preliminary steps of newborn resuscitation

Table 4. 2 Knowledge of Neonatal resuscitation among Nurses/Midwives

Knowledge of Diagnosing birth asphyxia	Frequency	Percent (%)
Depressed breathing		
No	1	3.6
Yes	27	96.4
Heart rate below 100 beats per minutes		
No	2	7.1
Yes	26	92.9
Floppiness		
No	3	10.7
Yes	25	89.3
Central cyanosis (blue tongue)		
No	4	14.3
Yes	24	85.7
Knowledge of preliminary steps of new-born resuscitation		
Correct order	0	0.0
Incorrect order	28	100.0
Knowledge of process of resuscitation using a bag and mask		
Correct order	6	21.4
Incorrect order	22	78.6
Steps to take when there is no sign of respiratory difficulty		
Keep baby warm		
No	0	0.0
Yes	28	100.0
Initiate breastfeeding		
No	5	17.9
Yes	23	82.1
Continuous monitoring of baby		
No	0	0.0
Yes	28	100.0

Steps to take when there is intercostal retraction		
Continue to ventilate		
No	2	7.1
Yes	26	92.9
Administer oxygen, if available		
No	0	0.0
Yes	28	100.0
Assessing the need for special care		
No	0	0.0
Yes	28	100.0
Explanation to mother		
No	0	0.0
Yes	28	100.0
Refer baby to higher level care services		
No	2	7.1
Yes	26	92.9
Overall knowledge of NR		
Adequate knowledge	5	17.9
Inadequate knowledge	23	82.1

4.3 Resuscitation steps and performance mean scores

The mean score for nurses and midwives preparation for resuscitation was 0.62 ± 0.36SD. The least performed item under preparation for resuscitation was preparation of resuscitation area (0.48 ± 0.50SD).

Nearly all babies were well dried by gently rubbing their back. The mean performance score for drying /stimulation was 0.92 ± 0.14SD. However, about 18% of the babies did not have their towels removed.

One hundred and twenty seven of the babies who did not respond to stimulation had their airway cleared to get rid of any form of airway secretion. The overall mean score for performing airway clearance was 0.89 ± 0.16SD.

Bag and mask ventilation was initiated for all 109 babies who did not start breathing after their airways were cleared. BMV was started within the golden one minute in 85 out of the 109 babies (78.0%). For all babies who did not breathe after initial BMV, help was called for. Out of those who did not respond to initial BMV, they were ventilated using bag and mask with the recommended 30 to 50 breaths per minute. Babies' heart rates were checked either with a stethoscope or pulsating umbilical cord. Heart rates were evaluated for new born (n = 81) who required improved ventilation.

Chest compressions conducted for 42 babies who had poor or no breathing with heart rates less than 60bpms.

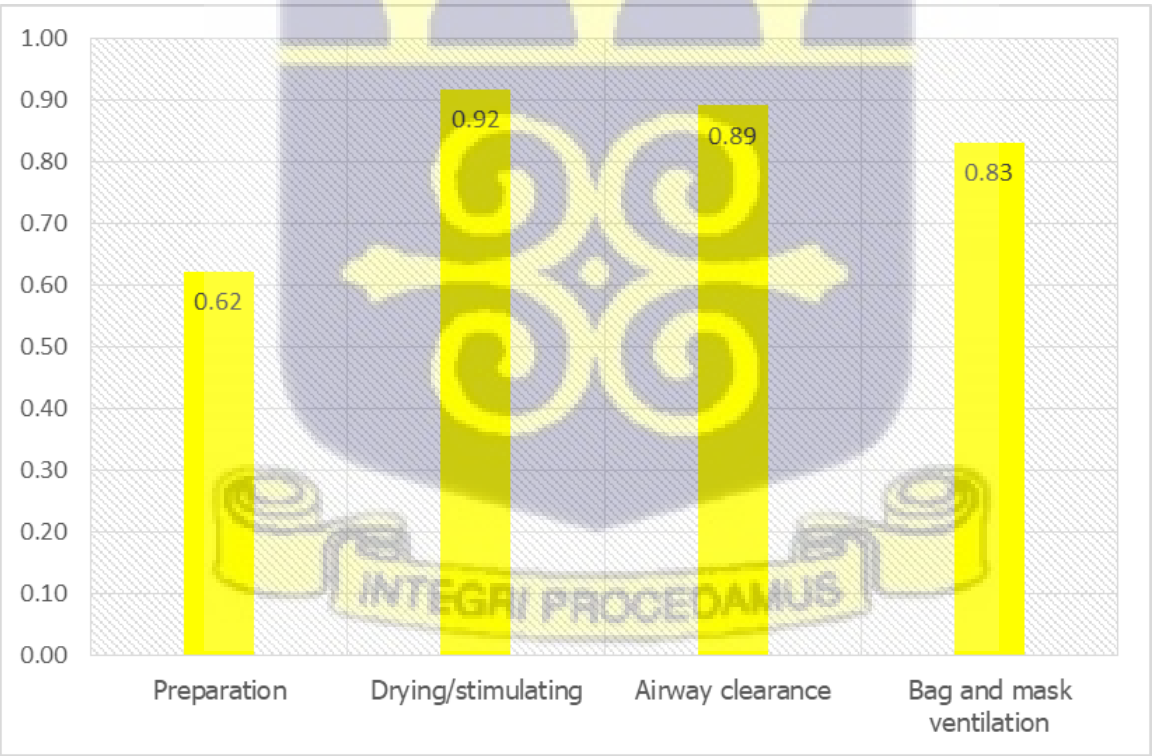

Figure 4.1: Main steps in NR and their mean scores

Table 4.3 Resuscitation steps and performance mean scores

Steps in NR	N	Mean Score	SD(±)
Preparation for resuscitation			
Preparation of resuscitation area	140	0.48	0.50
Check NR equipment availability	140	0.75	0.43
Check NR equipment functioning	140	0.72	0.45
Identify a helper	140	0.54	0.50
Overall mean score		0.62	
Drying/stimulation			
Baby dried thoroughly by gently rubbing the back	140	0.94	0.23
Wet cloth removed	140	0.81	0.39
Baby kept warm	140	0.99	0.08
Overall mean score		0.92	
Airway clearance			
Looked into airway	127	0.97	0.18
If meconium, suctioning done before stimulation	118	0.83	0.38
Airway cleared with suction bulb if unresponsive	127	0.96	0.20
Baby's head in neutral position	127	0.81	0.39
Overall mean score		0.89	
Bag and mask ventilation for breathing			
Initial			
BMV initiated	109	1.00	0.00
BMV initiated within the Golden minute	109	0.78	0.42
Advanced (n = 82)			
HCP call for help	81	0.75	0.43
Correct mask size used during BMV	81	0.74	0.44
Chest movements observed with each ventilation	81	0.74	0.44
BMV rate within 30–50 breaths/minute	81	0.70	0.46
Baby's HR checked at 1 min	81	0.79	0.41
Advanced ventilation (n = 42)			
Effective breath with chest compressions	42	0.74	0.45
Supportive oxygen	42	0.76	0.43
Overall mean score		0.83	

4.4 Main steps of NR and their quality-of-care scores

From figure 4.2 below, nurses and midwives had a high score (good) for drying/stimulation (75%), fair for bag and mask ventilation for breathing (71.0%) and poor for preparation for resuscitation (26.0%).

Figure 4.2 Quality of care scores for NR processes

4.5 Factors associated with NR processes (preparation for resuscitation)

The results from an ordered logistic regression of factors associated with the first NR process among nurses/midwives is illustrated in table 4.4. Nurses/midwives aged more than 36 years old were less likely to provide quality NR service (preparation for resuscitation) as compared to those aged 29 to 36 years (cOR = 0.52; 95% CI = 0.28 – 0.98; p = 0.043). However, after adjusting for all other variables (Years at post, Educational level, Trained on neonatal resuscitation on the job, Training type, Time interval from last training, Number of times NR

was performed, Knowledge of NR) there was no statistically significant association between the preparation made for resuscitation and the age of nurses/midwives.

Registered nurses/midwives with a bachelor or masters' degree had , significantly, a less likelihood of providing quality NR service in terms of preparation for resuscitation as compared to nurses/midwives with a diploma (cOR = 0.43; 95% CI = 0.22 – 0.82; p = 0.011). This association was no longer significant after adjusting for all other variables.

Respondents who were trained on the job had a highly significant likelihood of providing quality NR service (preparation for resuscitation) as compared to those who were not trained on the job (cOR = 2.35; 95% CI = 1.24 – 4.47; p = 0.009). After adjusting for all other variables, this association was no longer found to be significant.

Table 4.4 Factors associated with NR processes (preparation for resuscitation)

Variables	cOR(95% CI)	p-value	aOR(95% CI)	p-value
Age of nurses/midwives (years)				
29 to 36	1.00		1.00	
> 36	**0.52(0.28 – 0.98)**	**0.043***	0.59(0.15 - 2.42)	0.468
Years at post				
1 to 5 years	1.00		1.00	
> 5 years	0.83(0.45 – 1.53)	0.540	0.94(0.31 - 2.84)	0.908
Educational level				
Registered nurse (diploma/certificate)	1.00		1.00	
Registered nurse (degree/masters)	**0.43(0.22 – 0.82)**	**0.011***	0.21(0.04 - 1.09)	0.064
Trained on neonatal resuscitation on the job				
No	1.00		1.00	
Yes	**2.35(1.24 – 4.47)**	**0.009***	0.52(0.07 - 3.76)	0.517

Training type				
Emergency obstetric and new born care (EMONC)	1.00		1.00	
Emergency triage assessment and treatment plus (ETAT+)	0.34(0.05 – 2.40)	0.278	2.56(0.08 - 78.49)	0.590
Time interval from last training	0.97(0.82 – 1.15)	0.720	1.15(0.90 - 1.48)	0.270
Number of times NR was performed				
Never	1.00		1.00	
1 - 5times	0.83(0.29 – 2.30)	0.718	3.27(0.54 - 19.91)	0.199
> 5 times	1.39(0.65 – 2.96)	0.396	2.65(0.71 - 9.95)	0.148
Knowledge of NR				
Inadequate knowledge	1.00		1.00	
Adequate knowledge	1.52(0.72 – 3.23)	0.270	1.05(0.18 - 5.96)	0.957

*(statistically significant, p≤0.05)

4.6 Factors associated with NR processes (drying/stimulation)

From table 4.5 below, registered nurses/midwives with a bachelor or masters' degree had a highly significant likelihood of providing quality NR service (drying/stimulation) as compared to nurses/midwives with a diploma (aOR = 34.33; 95% CI = 1.64 – 720.63; p = 0.023).

Adjusting for all other variables, performing NR (drying/stimulation) effectively was significantly increased by 183 folds among nurses/midwives who were trained on the job compared to those who were not trained on the job (aOR = 183.25; 95% CI = 6.09 – 5516.96; p = 0.003).

Respondents who had performed more than 5 NR were significantly more likely to provide quality NR service (drying/stimulation) compared to those who had never performed NR after adjusting for all other variables (aOR = 12.17; 95% CI = 1.97 – 75.12; p = 0.007).

Table 4. 5 Factors associated with NR processes (drying/stimulation)

Variables	cOR(95% CI)	p-value	aOR(95% CI)	p-value
Age of nurses/midwives (years)				
29 to 36	1.00		1.00	
> 36	1.37(0.62 – 3.01)	0.431	0.17(0.02 - 1.32)	0.090
Years at post				
1 to 5 years	1.00		1.00	
> 5 years	1.21(0.56 – 2.62)	0.625	1.99(0.41 - 9.60)	0.392
Educational level				
Registered nurse (diploma/certificate)	1.00		1.00	
Registered nurse (degree/masters)	1.09(0.49 – 2.43)	0.839	**34.33(1.64 - 720.63)**	**0.023***
Trained on neonatal resuscitation on the job				
No	1.00		1.00	
Yes	1.67(0.77 – 3.61)	0.196	**183.25(6.09 - 5516.96)**	**0.003***
Time interval from last training	0.96(0.78 – 1.19)	0.712	0.71(0.48 - 1.05)	0.087
Number of times NR was performed				
Never	1.00		1.00	
1 - 5times	0.44(0.13 – 1.47)	0.184	19.79(0.44 - 898.65)	0.125
> 5 times	1.45(0.56 – 3.80)	0.444	**12.17(1.97 - 75.12)**	**0.007***
Knowledge of NR				
Inadequate knowledge	1.00		1.00	
Adequate knowledge	2.40(0.96 – 5.99)	0.061	15.00(0.38 - 585.00)	0.147

*(statistically significant, p≤0.05)

4.7 NR processes factors (airway clearance)

The likelihood of providing quality NR service (airway clearance) was found not to be significantly associated with the number of years nurses/midwives had spent at their post. However, after controlling for all other factors, the chances of providing quality NR service (airway clearance) significantly increased by 5 folds among nurses/midwives with more than 5 years working experience as compared to nurses/midwives with 1 to 5 years working experience (aOR = 5.06; 95% CI = 1.00 – 25.58; p = 0.050).

Performing NR (airway clearance) effectively was significantly increased by 3 folds among nurses/midwives who were trained on the job compared to those who were not trained on the job (cOR = 2.80; 95% CI = 1.27 – 6.18; p = 0.011). After controlling for all other covariates, this association was no longer significant.

A one year increase in the interval from last training significantly increased the likelihood of nurses/midwives proving quality NR service (airway clearance) (cOR = 1.48; 95% CI = 1.06 – 2.05; p = 0.020). This association was still significant after adjusting for all other variables (aOR = 2.21; 95% CI = 1.28 – 3.82; p = 0.004).

Adjusting for all other variables, nurses/midwives who had performed NR 1 – 5 times were significantly more likely to provide quality NR service (airway clearance) as compared to those who had never performed NR (aOR = 22.81; 95% CI = 1.18 – 439.29; p = 0.038).

Table 4. 6 Factors associated with NR processes (airway clearance)

Variables	cOR(95% CI)	p-value	aOR(95% CI)	p-value
Age of nurses/midwives (years)				
29 to 36	1.00		1.00	
> 36	0.63(0.29 – 1.36)	0.239	0.25(0.03 – 2.05)	0.195
Years at post				
1 to 5 years	1.00		1.00	
> 5 years	1.26(0.58 – 2.69)	0.559	**5.06(1.00 – 25.58)**	**0.050***
Educational level				
Registered nurse (diploma/certificate)	1.00		1.00	
Registered nurse (degree/masters)	0.98(0.44 – 2.18)	0.961	0.04(0.00 – 1.99)	0.109
Trained on neonatal resuscitation on the job				
No	1.00		1.00	
Yes	**2.80(1.27 – 6.18)**	**0.011***	0.38(0.01 – 16.30)	0.611
Training type				
Emergency obstetric and new-born care (EMONC)	1.00		1.00	
Emergency triage assessment and treatment plus (ETAT+)	0.45(0.03 – 7.55)	0.581	**251.62(1.44 – 43908.33)**	**0.036***
Time interval from last training	**1.48(1.06 – 2.05)**	**0.020***	**2.21(1.28 - 3.82)**	**0.004***
Number of times NR was performed				
Never	1.00		1.00	
1 - 5times	1.24(0.33 – 4.71)	0.755	**22.81(1.18 – 439.29)**	**0.038***
> 5 times	1.35(0.55 – 3.32)	0.516	3.79(0.59 – 24.55)	0.161
Knowledge of NR				
Inadequate knowledge	1.00		1.00	
Adequate knowledge	1.25(0.47 – 3.37)	0.652	0.08(0.01 – 7.28)	0.267

*(statistically significant, p≤0.05)

4.8 Factors associated with NR processes (BMV)

Nurses/midwives aged more than 36 years old were less likely to provide quality NR service (advanced BMV) as compared to those aged 29 to 36 years (cOR = 0.07; 95% CI = 0.01 – 0.61; p = 0.016).

Providing quality NR service (advanced BMV) was significantly reduced among nurses/midwives who had spent more than 5 years at their work post compared to those who had spent 1 to 5 years at their work post (cOR = 0.13; 95% CI = 0.02 – 0.72; p = 0.019).

However, based on the distribution of the children who had advanced BMV among nurses/midwives, convergence was not achieved in the multiple ordered logistic regression and none of the individual characteristics of the nurses/midwives was found to have a significant association with the provision of quality NR (BMV).

Table 4. 7 Factors associated with NR processes (BMV)

Variables	cOR(95% CI)	p-value	aOR(95% CI)	p-value
Age of nurses/midwives (years)				
29 to 36	1.00		1.00	
> 36	**0.07(0.01 – 0.61)**	**0.016***	OMITTED	
Years at post				
1 to 5 years	1.00		1.00	
> 5 years	**0.13(0.02 – 0.72)**	**0.019***	1.89(0.06 – 55.01)	0.711
Educational level				
Registered nurse (diploma/certificate)	1.00		1.00	
Registered nurse (degree/masters)	0.30(0.03 – 2.74)	0.285	OMITTED	
Trained on neonatal resuscitation on the job				
No	1.00		1.00	

Yes	2.14(0.39 – 11.81)	0.382	OMITTED	
Time interval from last training	1.01(0.71 – 1.43)	0.958	2.36(0.66 – 8.39)	0.185
Number of times NR was performed				
Never	1.00		1.00	
1 - 5times	0.60(0.04 – 8.73)	0.708	10.53(0.12 – 949.59)	0.305
> 5 times	1.42(0.24 – 8.48)	0.700	1	
Knowledge of NR				
Inadequate knowledge	1.00		1.00	
Adequate knowledge	1.00(0.17 – 6.03)	1.000	OMITTED	

*(statistically significant, p≤0.05)

4.9 Health Service Factors

The table 4.8 below shows the availability of NR facilities and essential equipment. All the nurses/midwives indicated that there were self-inflating bag and mask of appropriate size for small and normal babies, suction device and a clock or watch to measure heart rate and length of time ventilation. Nearly seventy nine percent (78.6%) of the nurses/midwives indicated that there was a heat source and pre-warmed towels to dry a baby. Also, 74.1% stated there was documentation that resuscitation was required, progress, and outcome. In addition, 92.9% stated that there was a neonatal resuscitation guideline in the facility.

Table 4. 8 Availability of NR facilities and essential equipment

Items	Frequency	Percent (%)
Self-inflating bag and mask of appropriate size for normal babies	28	100*
Self-inflating bag and mask of appropriate size for small babies	28	100*
Heat source and pre-warmed towels to dry baby	22	78.6*
Suction device	28	100*
Clock or watch to measure heart rate and length of time ventilation	28	100*
Documentation that resuscitation was required, progress, and outcome	20	74.1*
Neonatal resuscitation guideline in the facility		
Yes	26	92.9
I don't know	2	7.1

*multiple response

CHAPTER FIVE

DISCUSSION

5.1 Knowledge of Neonatal resuscitation

Majority of the nurses and midwives, in this study, had inadequate knowledge of Neonatal resuscitation (82.1%). All the nurses and midwives could not indicate the correct order of preliminary steps of new-born resuscitation. Studies on knowledge of nurses and midwives on neonatal resuscitation have shown very poor knowledge amongst these professionals in recent times. Sintayehu et.al (2020) reported only a 9.8% good knowledge among 427 nurses and midwives. Out of 240 midwives across three different study sites in Tamale, Alhassan et.al (2019) reported 98.1% of the midwives had insufficient knowledge of NR. In northwest Ethiopia, Gebreegziabher, Aregawi and Getinet (2014) reported a consistent finding of low levels of knowledge among midwives at a university teaching hospital. All these studies found training on NR as beneficial predictor of NR knowledge. Hence, there is a need for extensive and intermittent training of nurses and midwives on NR. On the contrary and earlier study in Nigeria, reported 78% adequate knowledge of NR among nurses (Ogunlesi et. al., 2008).

5.2 Availability of NR equipment and Practice of Quality NR

Neonatal resuscitation is a very important skill that all health care professionals (HCPs) especially nurses and midwives who are part of the process of childbirth must have. The needed NR equipment to warm new born, clear and maintain their airway, and ventilation were present, accessible and usable at the Ga West municipal Hospital. There were more than two sets of equipment available as seen during the observation, as suggested by the WHO (2009), in case there was concurrent multiple births, or if a set was faulty. In addition, nearly all the nurses indicated availability of NR guidelines and action plans at the resuscitation points in the Ga West municipal Hospital to ensure that all neonates delivered with birth asphyxia follow standardized NR procedures. Clearly, the Ga West Hospital is ready and prepared for NR

services even though nurses and midwives still failed to perform key steps of resuscitation care: preparation for resuscitation, removal of wet cot sheet after drying the newborn, suctioning meconium before stimulation/drying the newborn, and initiation of BMV within the Golden minute. It was not surprising that nurses/ midwives failed to perform very important steps because findings in this study regarding nurses and midwives' knowledge of NR revealed that 8 in 10 nurses and midwives had inadequate knowledge of NR. According to studies, thorough training of HCPs with the necessary equipment is required for increased NR performance. (Bhurji, 2014; Gichogo, 2014)

5.3 Factors Associated with Quality Neonatal Resuscitation

In this study, the likelihood of providing good quality airway clearance was significantly 5 times as high among nurses/midwives with more than 5 years working experience at post as compared to nurses/midwives with 1 to 5 years working experience. This finding is consistent with Shikuku, Milimo, Ayebare, Gisore, and Nalwadda (2017). In a study conducted at a county general hospital in Kenya, the number of years an HCP worked in maternity was found to be associated with good quality drying and airway maintenance. (Shikuku, Milimo, Ayebare, Gisore, & Nalwadda, 2017). They contended that more years of experience in a high-risk tertiary hospital in a specific labor ward improves healthcare delivery, self-efficacy, and proficiency in NR skills, all of which improve neonatal outcomes. (Bookman, Engmann, Srofenyoh et al., 2010).

Accordingly, it was found in this study that nurses/midwives who had performed NR 1 – 5 times were significantly more likely to provide quality NR service (airway clearance) as compared to those who had never performed NR. In addition, Respondents who had performed more than 5 NR were significantly more likely to provide quality NR service (drying/stimulation) compared to those who had never performed. Clearly, the experienced

hands working in the unit are expected to pass on their expertise and abilities to nurses and midwives who join the service along the continuum through apprenticeship. (Murila, Obimbo, and Musoke, 2012). Therefore, it was not surprising for this study to report that performing NR (drying/stimulation) effectively was significantly increased among nurses/midwives who were trained on the job compared to those who were not trained on the job. The findings, however, demonstrate no statistically significant relationship between the nurses /midwives' past NR training and the quality of NR care at resuscitation steps such as airway clearance. Chinbuah and colleagues (2020), on the other hand, hypothesize that the capacity of Ghanaian nurses and midwives to conduct neonatal resuscitation stages accurately declines with increasing time of service. They discovered that 86.8 % of nurses and midwives with less than one year of experience, 81.7 % with one to five years of experience, 78.8 % with six to ten years of experience, 67.6 % with eleven to fifteen years of experience, and 54.1 % with more than fifteen years of practical experience conducted the stages properly. This pattern demonstrated a reduction in efficiency over time. The great majority of HWs with less than one year of healthcare practice passed the resuscitation test on the first effort (98.9 percent), but as clinical experience increased, the pass rate decreased. Midwives with more years of practical experience had considerably lower pass rates. (Chinbuah et al., 2020). However, Alhassan and colleagues (2019) found no statistical correlation between knowledge, practice of neonatal resuscitation and years of practice as a midwife. They stated that more than half of the participants were not able to perform neonatal resuscitation correctly; attributing this to the short duration participants had spent so far as midwives. They noted that median length of practice was 3 years, which maybe too short a duration to master resuscitation skills correctly (Alhassan et al., 2019).

Another finding made in this study is educational level was also found to influence practice of drying/ simulation among nurses and midwives. Registered nurses/midwives with a bachelor or masters' degree had a highly significant likelihood of providing quality NR service

(drying/stimulation) as compared to nurses/midwives with a diploma. Nurses and midwives with a first-degree certification in midwifery, as well as those with a post-diploma or Post-Nurse Assistant-Clinical/Nurse Assistant Preventive midwifery certificate, had more knowledge in Tamale than those with a diploma. (Alhassan et al., 2019). The analysis of the results revealed a substantial relationship. Another study found that midwives and nurses with a bachelor's degree or higher were 2.67 times more probable to be knowledgeable about newborn resuscitation than those with a diploma in nursing or midwifery. This was ascribed to the fact that degree holders or above may have had a better probability of receiving evidence-based verified information and practice than diploma holders. (Sintayehu et al., 2020). However, knowledge was not associated with practice of quality NR in this study. Meanwhile, many researchers have emphasized that training courses in NR can effectively increase the competency of health professionals in conducting NR and decreasing the possibility of harmful practices (Opiyo & English, 2015; Noor, Raza, & Haq, 2014 ; Carlo, L. L. Wright, E. Chomba et al., 2009).

5.4 Study Limitations

Observers (research assistants) who were nurses from the same facility may have felt obligated to assist during resuscitation, putting the study at risk of observer bias. This was reduced by training the research assistants on the study processes and their duty as RAs. The nurses were aware that they were being observed, and as a result, a behavioral change was anticipated because of the researchers' presence. It was believed that nurses and midwives would work in a natural manner a few minutes into the process, therefore the necessity to capture more resuscitations per nurse or midwife to assist limit this risk. To reach the sample size of the resuscitation seen, a few nurses and midwives involved in resuscitation were observed five times each. As a result, while evaluating results, the small sample size should be taken into account.

Besides these limitations, the study was conducted with all ethical considerations in check, and statistical methods employed in the data analysis are statistically sound.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Majority of the midwives and nurses had inadequate knowledge of neonatal resuscitation (82.1%). Not all the nurses and midwives could indicate the correct order of preliminary steps of newborn resuscitation

Nurses and midwives had a high score (good) for drying/stimulation (75%), fair for bag and mask ventilation for breathing (71.0%) but poor for preparation for resuscitation (26.0%).

Educational level, trained on neonatal resuscitation on the job, training type, time interval from last training, and number of times NR was performed, Knowledge of NR) showed no statistically significant association between the preparation made for resuscitation and the age of nurses/midwives.

Educational level predicted the quality of NR (drying/stimulation) among nurses/midwives registered nurses/midwives with a bachelor or masters' degree were more likely to provide quality NR service (drying/stimulation) as compared to nurses/midwives with a diploma.

Training on the job is a significant input to ensure quality NR outcomes. Performing NR (drying/stimulation) effectively was significantly increased among nurses/midwives who were trained on the job compared to those who were not trained on the job.

Years of experience at the unit was a significant predictor of quality NR the likelihood of providing quality NR service (airway clearance) significantly increased among nurses/midwives with more than 5 years working experience as compared to nurses/midwives with 1 to 5 years working experience.

A one-year increase in the interval from last training significantly increased the likelihood of nurses/midwives proving quality NR service (airway clearance)

Increased practice of NR increases the odds of quality NR among nurses/midwives

6.2 Recommendations

The management of the Ga West Municipal Hospital should embark on periodic training for nurses and midwives on neonatal resuscitation.

The nurses/midwives at the Ga West Municipal Hospital with higher educational qualifications should be paired at post with nurses with lower educational background and be encouraged to share knowledge of NR with their counterparts on the job.

The Authorities at the Ga West Municipal Hospital should be deliberate about paring on duty nurse/midwives with more years of experience with nurses who have less years of experience on the job and be tasked to train their counterparts on the job on neonatal resuscitation.

REFERENCES

Abdul-Mumin, A., Cotache-Condor, C., Owusu, S.A., Mahama, H., & Smith, E.R. (2021). Timing and causes of neonatal mortality in Tamale Teaching Hospital, Ghana: A retrospective study. *PLOS ONE* 16(1): e0245065. https://doi.org/10.1371/journal.pone.0245065

Abu-Shaheen, A., AlFayyad, I., Riaz, M., Nofal, A., AlMatary, A., Khan, A., & Heena,H. (2019).Mothers' and Caregivers' Knowledge and Experience of Neonatal Danger Signs: A Cross-Sectional Survey in Saudi Arabia. *BioMed research international*, *2019*, 1750240.https://doi.org/10.1155/2019/1750240

Agbenohevi, D.U. (2018). Experiences of Midwives in Neonatal Resuscitation withinthe Immediate Postnatal Period at the 37 Military Hospital, Accra.Unpublished Thesis.Retrieved from: http://ugspace.ug.edu.gh/

Alhassan, A., Fuseini, G., Osman, W., & Adam, A.B. (2019). Knowledge and Experience of Neonatal Resuscitation among Midwives in Tamale. *Nursing Research and Practice*, vol. 2019, 8 pages. https://doi.org/10.1155/2019/3652608

Bhurji, J. K. (2014). Determination of the adherence of nurses to national neonatal resuscitation guidelines at Pumwani maternity [MMED Dissertation]: University of Nairobi.

Biset, G., Bizuwork, K., Habte, T., Birkie, M., & Woday, A. (2019). The extent ofKnowledge and practice toward neonatal resuscitation among nurses and midwives in public hospitals of South Wollo, northeast Ethiopia: Cross sectional study. Retrieved from:

Bookman, L., Engmann, C., Srofenyoh, E., Enweronu-Laryea, C., Owen, M.,Randolph, G., Price,W., & Barker, P. (2010). Educational impact of a hospital-based neonatal resuscitationprogram in Ghana. *Resuscitation*, *81*(9), 1180–1182.

Brathwaite, K.P., Bryce, F., Moyer, L.B., Engmann, C., Twum-Danso, N.A.Y.,Kamath-Rayne,B.D., Srofenyoh, E.K., Ucer, S., Boadu, R.O., & Owen, Medge D. (2020). Evaluation of two newborn resuscitation training strategies in regional hospitals in Ghana. *Resuscitation Plus*, Volumes 1 2. https://doi.org/10.1016/j.resplu.2020.100001

Chikuse, B., Chirwa, E., Maluwa, A., Malata, A. & Odland, J. (2012) Midwives' adherence to guidelines on the management of birth asphyxia in Malawi. *Open Journal of Nursing*, **2**,351-357. DOI: 10.4236/ojn.2012.24052.

Chinbuah, M.A., Taylor, M., Serpa, M., Kwarah, W., Dawson, S., & Cofie, P.K. (2020). Scaling up Ghana's national new-born care initiative: integrating 'helping babies breathe' (HBB), 'essential care for every baby' (ECEB), and

Gebreegziabher, E., Aregawi, A., & Getinet, H. (2014). Knowledge and skills of neonatal resuscitation of health professionals at a university teaching hospital of Northwest Ethiopia. *World journal of emergency medicine*, *5*(3), 196.

Gichogo D. M., (2014). Prevalence of asphyxia, readiness for neonatal resuscitation and associated factors in Naivasha district hospital [MMED Dissertation]: University of Nairobi;

Gillam-Krakauer, M., & Gowen Jr, C.W. (2020). Birth Asphyxia. Retrieved from: https://www.ncbi.nlm.nih.gov/books/NBK430782/

Golubnitschaja, O., Yeghiazaryan, K., Cebioglu, M., Morelli, M., & Herrera-Marschitz, M. (2011). Birth asphyxia as the major complication in newborns: moving towards improved individual outcomes by prediction, targeted prevention and tailored medical care. *EPMA Journal 2011 2:2*, *2*(2), 197–210. https://doi.org/10.1007/S13167-011-0087-9

Gülmezoglu, A.M., Lawrie, T.A., Hezelgrave, N., Oladapo, O.T., Souza, J.P., & Gielen, M. (2016). Interventions to Reduce Maternal and New born Morbidity and Mortality. Reproductive, Maternal, New born, and Child Health: Disease Control Priorities, Third Edition (Volume 2) Chapter 7.Retrieved from : https://www.ncbi.nlm.nih.gov/books/NBK361904/doi:10.1596/978-1-4648 0348-2_ch7
https://doi.org/10.1016/j.resuscitation.2010.04.034
https://doi.org/10.21203/rs.2.18004/v1

Kim, Y.M., Ansari, N., Kols, A., Tappis, H., Currie, S., Zainullah, P., Bailey, P., Semba, R.,Sun, K., Roosmalen, J., & Stekelenburg, J. (2013). Assessing the capacity for newborn resuscitationand factors associated with providers' knowledge and skills: a cross- sectional study in Afghanistan. *BMC Pediatr* 13, 140. https://doi.org/10.1186/1471-2431-13-140

Lee, A. C., Cousens, S., Wall, S. N., Niermeyer, S., Darmstadt, G. L., Carlo, W. A., & Lawn, J. E. (2011). Neonatal resuscitation and immediate newborn assessment and stimulation for the prevention of neonatal deaths: a systematic review, meta-analysis and Delphi estimation of mortality effect. BMC public health, 11(3), 1-19.

Mbonye, A. K., Sentongo, M., Mukasa, G. K., Byaruhanga, R., Sentumbwe-Mugisa, O., Waiswa, P., & Lawn, J. E. (2012). Newborn survival in Uganda: a decade of change and future implications. *Health policy and planning*, 27. Médecins Sans Frontières (2019) Neonatal Resuscitation.

Murila, F. Obimbo, M. M. and Musoke, R. (2012). "Assessment of knowledge on neonatal resuscitation amongst health care providers in Kenya," Pan African Medical Journal, vol. 11, p. 78.

Namuguzi, M., Drake, K., Ekong, E.N., & Asoquo, E.F. (2020). Evaluating Neonatal Resuscitation Skills of Practicing Nurses and Midwives in Selected Hospitals in Central Uganda. Retrieved from: https://doi.org/10.21203/rs.2.20482/v1
New-born 'infection prevention' (IP) trainings. *BMC Health Serv Res* **20,** 739. https://doi.org/10.1186/s12913-020-05225-2

Niermeyer, S., Robertson, N. J., & Ersdal, H. L. (2018). Beyond basic resuscitation: What are the next steps to improve the outcomes of resuscitation at birth when resources are limited? *Seminars in fetal & neonatal medicine*, *23*(5), 361–368. https://doi.org/10.1016/j.siny.2018.06.002

Ogunlesi, T. A., Dedeke, O. I., Adekanmbi, F. A., Fetuga, B. M., & Okeniyi, A. J. (2008). Neonatal resuscitation-knowledge and practice of nurses in western Nigeria. *South African Journal of Child Health*, *2*(1), 23-25
https://medicalguidelines.msf.org/viewport/ONC/english/10-2-neonatal resuscitation-51418320.html

Okawa, S.,Ansah, E.K.,Nanishi, K, Enuameh, Y.,& Shibanuma, A. (2015). High Incidence of Neonatal Danger Signs and Its Implications for Postnatal Care in Ghana: A Cross-Sectional Study. *PLOS ONE* 10(6): e0130712. https://doi.org/10.1371/journal.pone.0130712

Sardasht, F. G., Shourab, N. J., Jafarnejad, F., & Esmaily, H. (2013). *Application of Donabedian Quality-of-Care Framework to Assess the Outcomes of Preconception Care in Urban Health Centers , Mashhad , Iran in 2012*.

Sedgwick, P, greenwood N. Understanding the Hawthrone effect BMJ 2015: 351: h4672 doi:10.1136/bmj.4672

Shikuku, D. N., Milimo, B., Ayebare, E., Gisore, P., & Nalwadda, G. (2018). Practice and outcomes of neonatal resuscitation for newborns with birth asphyxia at Kakamega County General Hospital, Kenya: a direct observation study. BMC pediatrics, 18(1), 1-11.

Sintayehu, Y., Desalew, A., Geda, B., Shiferaw, K., Tiruye, G., Mulatu, T., & Mezmur, H. (2020). Knowledge of Basic Neonatal Resuscitation and Associated Factors among Midwives and Nurses in Public Health Institutions in Eastern Ethiopia. *Int J Gen Med*.; 13:225-233. https://doi.org/10.2147/IJGM.S255892

Soti, H., Gautam, S., Paudel, S., & Bhattarai, M. (2021). Knowledge regarding Resuscitation of Newborn among Nurses. *Curr Pediatr Res* 2021; 25 (3). Retrieved from: https://www.alliedacademies.org/articles/knowledgeregarding-resuscitation-of newborn-among-nurses.pdf

United Nations Children's Emergency Fund (2016). Maternal and New born Health Disparities. Retrieved from:https://data.unicef.org/wp- content/uploads/country_profiles/Ghana/

Van Heerden, C. (2012). An introduction to Helping Babies Breathe: the" Golden Minute" is here for South African newborn babies. *Professional Nursing Today*, *16*(3), 6-7.

Woldu, A.M., Gebreegziabher, G.E., Weldemariam, S., & Gebrehiwot W.H. (2020). Exploring Factors Influencing Practice of Neonatal Resuscitation with Bag and Mask in Ethiopia: Analysis from 2016 National Emergency Obstetric and New born Care Survey. *J Multidiscip Healthc*.; 13:471 476. https://doi.org/10.2147/JMDH.S246347

World Health Organization (2021). Violence against women Retrieved from https://www.who.int/news-room/fact sheets/detail/violence-against-women

APPENDICES

APPENDIX I: PARTICIPANTS INFORMATION SHEET

This information sheet is to inform the participants about the research for them to make an informed decision of whether to participate in the study or not. It also outlines the nature of the research, what the research involves risks, benefits and compensation.

Title of Study:

Determinants of quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital

Introduction:

The principal investigator (PI) is Jacinta Korkor Dosoo, a Master of Public Health (MPH) student of the School of Public Health of the College of Health Sciences, University of Ghana. My email address is …….. My telephone number is …….

Background and Purpose of Research:

I am carrying out a research on the topic: "Determinants of quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital".

Nature of Research:

The research is a cross-sectional study with a quantitative approach. My interest is in finding out the Determinants of quality neonatal resuscitation among nurses and midwives at the Ga West Municipal Hospital. It would be conducted among nurses and midwives at the Ga West Municipal Hospital.

Data Storage/ Security:

Questionnaires will be filled using codes generated for each participant. Completed questionnaires will be kept in a secured briefcase where I am the only one with access. Data will be entered and kept on a computer with a password privy to only me.

Conflict of Interest:

I have no conflict of interest in this study.

PARTICIPANTS INVOLVEMENT

Potential Risks

This is a minimal risk study and the only inconvenience to participants will be the uneasiness that may arise from some of the questions. If this happens the participant will be given time to recover and if she cannot proceed, the process was stopped.

Benefits:

The study will help assess the practice of neonatal resuscitation among nurses and midwives and help in formulations of some recommendations for possible future changes. Participants and neonates might benefit directly or indirectly through improved services in lieu of the policy

Cost:

There will be no cost incurred by participants for taking part of the study except their time.

Compensation:

Participants who will agree to partake in the study will not be given any monetary compensation.

Confidentiality:

All data will be coded. Only investigators of this study will be privy to the data. Research information will be purely for academic purposes. Hard copies were stored under lock and key.

Voluntary participation/ withdrawal:

Participation will be voluntary and participants will have the right to decline to participate and also withdraw from the study at any time without having to give any reasons and without penalty.

Feedback to participants:

A report will be presented to various stakeholders such as the Ghana Health Service, Greater Accra Regional Hospital to formulate policies regarding birth companions during labour and child birth and maternal health related issues. The report will be published in a journal.

Funding information:

The Principal Investigator will fund this study.

Sharing of Participants Information/Data:

Participants were assured that the data collected will not be shared with any individual or organization and was used solely for research purposes by the principal investigator.

Provision of Information and Consent for participants:

A copy of the information sheet and consent form will be given to you to sign before participation in the study.

APPENDIX II: CONSENT FORM FOR STUDY PARTICIPANTS

STUDY TITLE:

DETERMINANTS OF QUALITY NEONATAL RESUSCITATION AMONG NURSES AND MIDWIVES AT THE GA WEST MUNICIPAL HOSPITAL

PARTICIPANTS' STATEMENT

I acknowledge that I have heard or have had the purpose and contents of the Participants' Information Sheet read and satisfactorily explained to me in a language I understand (English) I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Initials of Participant…….. Date: …….

STATEMENT OF WITNESS:

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to the participant in the language he/she understood confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name: ……..

Signature……...

Date: ……

INVESTIGATOR STATEMENT AND SIGNATURE:

I certify that the participant has been given ample time to understand and learn about the study. All questions and clarifications raised by the participant have been duly addressed.

Researcher's Name ……..

Signature …… Date……

APPENDIX III: QUESTIONNAIRE

QUESTIONNAIRE TO ASSESS THE PRACTICE OF QUALITY NEONATAL RESUSCITATION AND FACTORS INFLUENCING QUALITY NEONATAL RESUSCITATION AMONG NURSES AND MIDWIVES AT THE GA WEST MUNICIPAL HOSPITAL.
This is a research is seeking to assess the practice of quality neonatal resuscitation and factors influencing quality neonatal resuscitation among nurses and midwives at the Ga West municipal hospital. As a nurse or midwife, you are required to share your experiences on neonatal resuscitation by responding to the following questions.

	QUESTIONS	CODING CATEGORIES	SKIP TO	CODES
	1. **INDIVIDUAL FACTORS**			
a.	Sex	**1. Male [ ]** **2. Female [ ]**		sex
b.	Age (State your last birthday age)	……		age
c.	Marital status	**1. Single [ ]** **2. Married [ ]** **3. Divorced [ ]** **4. Widowed [ ]** **5. Cohabiting [ ]**		mstat
d.	How many years have you worked in your current position?	……		yearspost
e.	Education level	1. Enrolled nurse (Certificate) [ ] 2. Registered nurse/midwife (Diploma) [ ] 3. Registered nurse/midwife (Degree) [ ] 4. Registered nurse/midwife (Masters) [ ]		educ

j.	Have you been trained on neonatal resuscitation	1. Yes [ ] 2. No [ ]		trainresus
	if yes , what Type of training did you receive	1. Emergency Obstetric and Newborn Care (EMONC) [ ] 2. Emergency Triage Assessment and Treatment Plus (ETAT+) [ ]		traintype
	If no, have you ever practiced neonatal resuscitation	1. Yes [ ] 2. No [ ]		ifnopract
	How long ago was your last training (in years)?	…… … ……		lasttrain
	Number of times you performed new born resuscitation	…… … ……		numperr e sus
KNOWLEDGE OF NEONATAL RESUSCITATION Answer the following questions to demonstrate your knowledge of neonatal resuscitation.				
	How would you diagnose birth asphyxia? 1. Depressed breathing 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 2. Heart rate below 100 beats per minutes 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 3. Floppiness 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 4. Central cyanosis (blue tongue) 1. Yes [ ] 2. No [ ] 3. I don't know [ ]			dxbirasph
	What are the preliminary steps of newborn resuscitation? Tell me in a sequential order 5. Place newborn face up 6. Explain to mother condition of baby 7. Start ventilation using bag and mask 8. Wrap or cover baby, except face and upper portion of chest 9. Aspirate mouth then nose 10. Position head so neck is slightly extended 11. Check the ambu-bag to be functional 12. Call for help	write the numbers in the correct order -----, ------, ----,-----,------,-----,------,---- --		preresus

	What do you do when resuscitating with a bag and mask or tube and mask? Tell me in a sequential order 13. Ventilate 1 or 2 times and see if chest is rising 14. Place mask to cover chin, mouth and nose 15 Ensure seal between mask and face 16. Pause to determine whether baby is breathing spontaneously 17. Ventilate 40 times per minute for 1 minute	Write the numbers in the correct order -------, ------, --------,-------,-------		
	What do you do if the baby is breathing and there is no sign of respiratory difficulty soon after delivery? 18. Keep baby warm 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 19. Initiate breastfeeding 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 20. Continue monitoring the baby 1. Yes [ ] 2. No [ ] 3. I don't know [ ]			signresdif
	What do you do if the baby does not begin breathing, breathing is < 30/minute, or if there is intercostal retraction or grunting? 21. Continue to ventilate 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 22. Administer oxygen, if available 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 23. Assess the need for special care 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 24. Explain to mother what is happening 1. Yes [ ] 2. No [ ] 3. I don't know [ ] 25. Refer the baby to higher level care service 1. Yes [ ] 2. No [ ] 3. I don't know [ ]			interretr a ct
	2. HEALTH SERVICE FACTORS			
	Which of these Neonatal resuscitation facilities and essential equipment are available? **Tick as many as apply**			essenequ i p

	1. Self-inflating bag and mask of appropriate size for normal babies [ ] 2. Self-inflating bag and mask of appropriate size for small babies [ ] 3.Heat source and pre-warmed towels to dry baby [ ] 4.Suction device [ ] 5.Clock or watch to measure heart rate and length of time ventilation [ ] 6. Documentation that resuscitation was required, progress, and outcome [ ]			
	Is there a neonatal resuscitation guideline in the facility?	1. Yes [ ] 2. No [ ] 3. I don't know [ ]		

OBSERVATIONAL CHECKLIST TO ASSESS QUALITY NEONATAL RESUSCITATION

Preparation for resuscitation

Preparation for resuscitation area	Yes	No
Check NR equipment availability	Yes	No
Check NR equipment functioning	Yes	No
Identify a helper	Yes	No

Drying/stimulation*

Baby dried thoroughly by gently rubbing the back	Yes	No
Wet cloth removed	Yes	No
Baby kept warm	Yes	No

Airway clearance**

Looked into airway	Yes	No
If meconium, suctioning done before	Yes	No
Airway cleared with suction bulb if unresponsive	Yes	No
Baby's head in neutral position	Yes	No

Bag and mask ventilation (BMV) for breathing

Initial

BMV initiated	Yes	No
BMV initiated within the Golden minute	Yes	No

Advanced

HCP call for help	Yes	No
Correct mask size used during BMV	Yes	No
Chest movements observed with each ventilation	Yes	No
BMV rate within 30–50 breaths/minute	Yes	No
Baby's HR checked at 1 min	Yes	No

Advanced ventilation

Effective breath with chest compressions	Yes	No
Supportive oxygen	Yes	No

APPENDIX IV: ETHICAL CLEARANCE FROM GHANA HEALTH SERVICE

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-681109
Email: ethics.research@ghsmail.org

My Ref. GHS/RDD/ERC/Admin/App 122/085
Your Ref. No.

10th March, 2022

Jacinta Korkor Dosoo
School of Public Health, College of
Health Sciences, University of Ghana,
P.O. Box LG 13, Legon- Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 028/12/21**
Study Title	Determinant of Quality Neonatal Resuscitation Among Nurses and Midwives at the Ga West Municipal Hospital
Approval Date	10th March, 2022
Expiry Date	9th March, 2023
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of a yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
Dr. James Akazili
(Head, Ethics & Research Management Department)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra