HEALTH CARE PROVIDERS' PREPAREDNESS ON NEWBORN RESUSCITATION IN LABOUR WARD AND MATERNITY THEATRE AT KENYATTA NATIONAL HOSPITAL

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DECLARATION

I Carolyne Cheptoo Koech declare that this thesis is my original work and has not been submitted for award of degree in any university.

Signature …… Date ……

CERTIFICATE OF APPROVAL

We the undersigned certify that this thesis has been submitted for the degree in Masters of Science in Nursing (Pediatrics) of the University of Nairobi with our approval as internal supervisors.

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DEDICATION

To the Almighty God without whom I would never have come this far.

I dedicate this thesis to my dear parents Mrs. Regina Turgut and Mr. Andrew Koech. Words cannot express how grateful I am for the sacrifices you made for me, it's only God who can repay you. Thank you and be blessed always.

To my husband Peter Kirui and children Kimutai, Chebet, Nelel and Kipkalya we all know it's not been an easy journey, we have sacrificed and struggled a lot be blessed. Love you all.

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LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics;
ABC	Airway, Breathing and Circulation.
AHA	American Heart Association
BEmONC	Basic Emergency Obstetrics and Neonatal care
CPR	Cardiopulmonary Resuscitation.
CS	Cesarean Section
EPLS	European Pediatric Advance Life Support
ETAT+	Emergency Triage and Treatment
HBB	Helping Babies Breath
HCP	Health care Providers'
KNH	Kenyatta National Hospital
NMR	Neonatal Mortality Rate
NR	Newborn Resuscitation
NRP	Newborn Resuscitation Program
SDG	Sustainable Development Goal
SVD	Spontaneous Vertex Delivery
UHC	Universal Health Coverage
UNICEF	United Nations International Children's Emergency Fund
UON	University of Nairobi
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Basic equipment: Radiant warmer, two towels, blankets, mucus extractor and self-inflating bag valve with a mask.

Birth asphyxia: failure to initiate and sustain breathing at birth.

Environment: it is the state of the delivery room that is cleanliness, warmth and availability of resources needed for delivery and resuscitation.

Health care providers: birth attendants that is nurses, midwives, clinical officers, and medical doctors who resuscitate babies in the delivery rooms.

Health care providers' preparedness: it is the capacity and capability of health care providers' to offer critical medical services like newborn resuscitation to reduce the potential adverse health outcomes during an event.

Neonatal death: death during the first 28 days of life.

Preparedness: a state of readiness or measures taken to prepare for newborn resuscitation to reduce neuro-development sequelae associated with birth asphyxia and neonatal mortality.

Resuscitation: is defined as interventions done at the time of birth to support the establishment of breathing and circulation which is vital in the survival of the neonate (Lee *et al.,* 2011).

ABSTRACT

Introduction: Preparedness in neonatal resuscitation is critical in delivery rooms for the purpose of saving newborns lives. Neonatal mortality still continue to rise in Africa and one of the main causes of neonatal death is birth asphyxia. Annually136 million newborn are delivered and approximately 10 million require basic resuscitation. Neonatal death can be reduced by performing basic neonatal resuscitation such as drying to stimulate the newborn and assisted ventilation with bag valve and mask. Availability of equipment, knowledge and skills on newborn resuscitation are vital in decreasing neonatal deaths.

Objective: To assess healthcare providers' preparedness on newborn resuscitation in labour ward and maternity theatre of Kenyatta National Hospital (KNH).

Methodology: This was a cross-sectional descriptive study. Both qualitative and quantitative approaches were used to determine health care providers' preparedness on newborn resuscitation, in labour ward and maternity theatre in KNH. Stratified random sampling was used for the different categories for the study population who were doctors, nurses and clinical officers. Simple random sampling was then used to select the sample from each category. Self-administered questionnaires were used to collect data on knowledge on newborn resuscitation, environment and equipment. An observation checklist was used to assess the availability of equipment, drugs and supplies used in resuscitation. Data was analyzed using both descriptive and inferential statistics. Statistical package for social science (SPSS) version 21 was used for analysis. Level of significance was reported at 95% confidence interval P-value less than 0.05. Data was presented in figures and tables. Qualitative data was coded then presented as narrative texts.

Results: A total of 100 health care providers in both labour ward and maternity theatre were assessed. Majority were nurses 79(79.8%) and most of them had worked in this units for more than 5 years. Seventy five percent had been trained on newborn resuscitation, 34(45.3%) had been trained on Emergency Triage and Treatment plus (ETAT +). On their knowledge on newborn resuscitation' 78(78%) had good knowledge. Only 44(44%) of the health care providers identified correct steps of newborn resuscitation. There was no significant association between knowledge and years of experience, cadre or working station however there was significance between training and knowledge on newborn resuscitation P = 0.012. Equipment available were self-inflating bags 5 in each unit. Face mask size 0 was not available whereas size 1 was more than 2 in each unit. 2 Suction machines and a radiant warmer which was attached to the resuscitation table were 2 in each unit though labour ward had only one functional resuscitation table. WHO recommends at least two sets of each equipment to be used during resuscitation. Both units were clean and warmth was well maintained in theatre than in labour ward.

Conclusion: There is need to improve health care providers' preparedness on newborn resuscitation. Knowledge on newborn resuscitation was good however identification of the steps was a challenge. The available equipment in maternity theatre was adequate, labour ward needs more equipment. Environment was conducive for resuscitation in both units though there is need for improvement.

Recommendation: Health care providers can improve their knowledge through attending short courses on newborn resuscitation. The hospital management can allocate funds to equip both units with basic equipment needed.

CHAPTER ONE: INTRODUCTION

1.1 Background

Neonatal resuscitation is defined as interventions done at birth to establish breathing and circulation which is very important in the survival of the neonate (Lee, Cousens and Wall 2011). World Health Organization (WHO) recommends that any newborn who does not initiate breathing at birth or gasping or does not cry within 30 seconds, should be resuscitated using Bag Valve Mask (WHO, 2012). One of the basic needs of a newborn is the ability to breathe normally after delivery where the newborn inhales air into their lungs upon delivery of the head. This results in oxygen entering the blood and baby changes color from blue to pink. Approximately 90% of newborns do not require intervention and transit from life in the uterus to extrauterine life with no difficulties - (American Academy of Pediatrics, American Heart Association (AHA/AAP) 2016**).** A newborn experiencing difficulty in this transition requires timely and effective resuscitation measures that may involve ventilation with bag and mask, chest compressions and rarely medications (AAP, 2011)**.**

The airway, breathing and circulation (ABC) approach is applied in newborn resuscitation. Airway is assessed for secretions or meconium then suctioning is done by use of a vacuum suction machine or bulb. Once the airway is clear the baby is dried and warmth is maintained. Assessment of breathing includes if it is absent, poor or gasping respirations. If present, the birth attendant starts ventilation with bag valve and mask at a rate of 30 to 50 breaths per minute. Breathing should be initiated within 60 seconds upon birth also called the Golden minute. With effective ventilation the heart rate increases to more than 100 beats per minute. Circulation is assessed by counting the heart rate if it's less than 60 beats per minute chest compressions are initiated (WHO, 2014). If the

health care providers are not knowledgeable and prepared for effective and timely resuscitation neonatal death will increase.

Globally, neonatal mortality rate decreased from 5.0 million in 1990 to 2.5 million in 2017; this reduction is slower as compared to the decline in children under 5 years. Sub-Sahara Africa is leading in neonatal deaths at 37 deaths per 1,000 live births (WHO, 2014)**.** Globally in 2017, 2.5 million neonates died in the first month of life with approximately 7,000 deaths every day in the first week and almost 1 million dying within 24 hours (WHO, 2015). Neonatal deaths in Kenya is still considered high at 22 deaths per a thousand life births while Kenya is aiming to reduce neonatal mortality to at least 12 per 1000 live births by 2030 according to Sustainable Development Goal(SDG) number three. Neonatal Mortality Rate (NMR) in rural areas is 21 deaths per 1,000 live births and 26 deaths per 1,000 live births in urban areas this is inclusive of Nairobi County (Alkema, 2014).

Globally 136 million deliveries are conducted annually and approximately 10 million will require resuscitation (Wall, Lee and Niermeyer 2009). Babies who do not establish breathing spontaneously with mild apnea will respond to stimulation, such as drying and rubbing the back. Resuscitation with bag and mask is required for approximately 6 million newborns each year and is satisfactory for neonates with secondary apnea and heart rate below 60 beats per minute which results from hypoxemia and respiratory failure (Sarki, 2017). High level resuscitation such as endotracheal intubation, cardiopulmonary resuscitation and drugs are required in less than 1% of births (Wall, *et al.*, 2009).

WHO Guidelines on Newborn Resuscitation state that worldwide, about a quarter of neonatal mortality is caused by birth asphyxia which is defined as failure to establish spontaneous breathing

at birth (WHO, 2015). The incidence of birth asphyxia is 2 per 1000 births in developed countries; the rate is up to 10 times higher in developing countries where there may be limited access to maternal and neonatal care. Those infants affected, 15-20% die in the neonatal period while 25% of survivors are left with permanent neurologic deficits (Odd, Heep and Luyt 2017). Other causes of child mortality among children under five in 2015 were prematurity, respiratory infections and congenital anormalities. Neonatal deaths accounted for 46% deaths of total death of children below 5 year (WHO, 2015). Careful monitoring of labour, anticipation of baby at risk during delivery, a skilled health care provider and preparation would result in a significant reduction in newborn deaths (Fleeson, 2017).

Preparedness is the first step to successful resuscitation by ensuring the delivery room is warm and the equipment needed for resuscitation are available and in good working condition. Appropriate resuscitation techniques are crucial to the survival of newborn infants. Availability of skilled health care provider and equipment for neonatal resuscitation is crucial for prevention of newborn death which accounts for the majority of neonatal deaths and morbidity (Trevisanuto, Cavallin, Arnolda *et al.*, 2016). Readiness for neonatal resuscitation requires assessment of perinatal risk, so as to be able to alert health care providers, assemble supplies and equipment. A checklist to ensure all supplies and equipment are available, functioning and within reach for the health care providers would help institutions (Wyckoff, Aziz, Escobedo *et al.*, 2015).

The rule for successful resuscitation is being prepared. Preparations include having proper equipment, supplies and medication in an accessible area to manage medical emergencies promptly. It is also important for the health care provider to be knowledgeable and skilled in conducting resuscitation. A study conducted in eight hospitals in Kenya from different counties concluded that hospitals are relatively poorly prepared in ensuring newborn survival, interventions

are needed to improve the hospitals to meet the special needs of this group at risk (Opondo , Ntorobu and Wandare 2009).

According to APA, resuscitation is performed more effectively by two or more health care providers. Shortage of staff in health facilities does not allow them to work in pairs at all times. Resuscitation done by a team enables the health care providers' to use each other's strengths when faced with difficulties. They are able to communicate ways of improving ongoing resuscitation by maintaining warmth or alert the colleague ventilating to position the face mask well if there is no visible chest movement (APA, 2015).

1.2 Problem Statement

Newborn mortality and morbidity is preventable through timely identification and execution of resuscitation. For newborn resuscitation to be successful it depends on knowledge, skills of health care providers and availability of basic equipment, including warm towels for drying, an ambubag for ventilation and a suction machine for suctioning.

Globally birth asphyxia is the leading cause of neonatal death, accounting for 24% of the total mortality of children under five (WHO, 2014). In the year 2015, 784 newborns in 10,000 deliveries were admitted to newborn unit (NBU) KNH due to birth asphyxia and 332 died. In 2016, 825 newborns were admitted to NBU and 367 died (KNH statistics, 2017). These deaths can be easily prevented with prompt identification of newborns that require resuscitation.

National surveys assessing the provision of health services in Africa and Asia identified that skilled health care providers and basic equipment for newborn resuscitation are not always present in all hospitals. A research conducted in different African countries concluded that missing equipment,

inadequate knowledge and skills are obstacles in performing successful newborn resuscitation (Kim, Ansari and Kols 2013).

Improving neonatal resuscitation preparedness comes from observation and experiences in performing neonatal resuscitation in some of the county and referral hospitals. It is the responsibility of health care providers to assess and provide immediate medical intervention at all high risk deliveries. Neonatal outcome is dependent on health care knowledge, availability of equipment, supplies and a conducive environment for resuscitation. Equipment and supplies required for neonatal resuscitation should be appropriate for gestational age, functional and within reach for the health care providers.

A study conducted on knowledge on newborn resuscitation in Ethiopia found out that health care professional's knowledge was substandard and training was recommended (Gebreegziabher, E, Aregawi, A and Getinet H 2014). Another study conducted on quality of newborn care in East and Central Africa concluded that there is a need to better health facility in preparation to provide newborn care services by ensuring the health care providers have basic equipment, supplies and knowledge that is crucial in saving lives (Graft-Johnson, J, Vesel, L and Rosen, H 2017).

According to KNH statistics in the year 2018 approximately 10,000 deliveries were conducted in both labour ward and maternity theater, however it is not clear how many of these babies needed resuscitation. The number of deliveries approximated at 27 deliveries per day requires that the health care providers be prepared for resuscitation. KNH being a referral hospital most mothers referred for delivery are high risks groups that require preparations before conducting a delivery. This study looks at how prepared KNH is in conducting successful newborn resuscitation and

comparing them to international standards of resuscitation. Very few studies have been conducted to determine how prepared health care providers are in newborn resuscitation.

1.3 Justification

Neonatal resuscitation is receiving attention as a missed opportunity for saving newborn lives for births already in hospitals, and for improving morbidity outcomes. Lack of preparedness in newborn resuscitation contributes to preventable neonatal mortality and morbidity.

Kenya has been ranked 39th worldwide due to under five deaths which is above seven million yearly mostly due to treatable and preventable diseases (Universal Health Coverage UHC, 2018). According to Sustainable Development Goals (SDGs) number three, Kenya aims to reduce neonatal deaths to 12 per 1000 live births and under 5 mortality to 25 per 1000 live births by 2030. Despite determined global progress, an increasing proportion of child deaths are in Sub-Sahara Africa and Southern Asia. Four out of every five deaths of children under age five occur in these regions. Issues concerning preparedness have been identified in terms of service delivery (Dickinson, Pyon, and van den Broek 2015). Progress towards the achievement of SDG3 by 2030 requires urgent attention to reduce neonatal deaths.

Total number of deliveries conducted in 2018 at KNH through cesarean section (C/S) and via spontaneous vertex delivery (SVD) accounted for approximately 10,000 deliveries. About a third of children born via c/s may require resuscitation with bag valve and mask, ventilator support or admission to the newborn unit because they are at risk for respiratory distress syndrome and transient tachypnea. In labour ward out of 27 deliveries conducted per day 4 may require resuscitation. Babies born via SVD may require simple stimulation like drying using warm towels for them to cry.

There is lack of data showing preparedness of health facilities in neonatal resuscitation in developing countries. The study will be conducted at KNH because it's the largest and only referral hospital located in Nairobi County with huge clientele. KNH receives referrals of asphyxiated babies from all county and sub county hospitals due to its equipped intensive care unit for newborns that may require ventilator support. This study will provide insight into one of the largest Kenyan national hospital in its preparedness to neonatal resuscitation. It will also offer an opportunity to assess the availability of equipment, knowledge of health care providers on basic newborn resuscitation and a conducive environment for resuscitation.

1.4: Research Question

1. What is the level of knowledge of health care providers on neonatal resuscitation at KNH labour ward and maternity theatre?
2. What are the basic equipment and supplies available for newborn resuscitation at KNH labour ward and maternity theatre?
3. What are the environmental conditions in the delivery room at KNH labour ward and maternity theatre?

1.5: Study Objective

1.5.1: Broad Objective

To evaluate healthcare providers' preparedness on newborn resuscitation in labour ward and maternity theatre of Kenyatta National Hospital.

1.5.2 Specific Objective

i. To establish the knowledge on newborn resuscitation among health care providers in KNH labour ward and maternity theatre.

ii. To assess the availability of basic equipment, supplies and resuscitation drugs for newborn resuscitation at labour ward and maternity theatre KNH.

iii. To assess whether the environment is conducive for newborn resuscitation in labour ward and maternity theatre at KNH.

1.6: Expected Benefits

This study provided insight in one of the largest Kenyan national hospital in its preparedness on neonatal resuscitation. The study advised administrators, policy makers and other relevant stakeholders on need to allocate funds and human resources for the same.

Caring for a child with neuro-development disorders resulting from birth asphyxia can be a great burden financially and emotionally to the parents, siblings and close relatives. If this can be prevented through timely and effective resuscitation to babies born with asphyxia these expenses can be avoided.

Health care providers working in labour ward and maternity theatre were able to judge themselves on how prepared they were in newborn resuscitation. Improvement on preparedness was based on the findings of the study. Health care providers were encouraged to attend short courses on newborn resuscitation to improve their knowledge. The findings formed basis of other research studies where gaps were identified.

1.7: Theoretical Framework

The Donabedian model examines health services and evaluates quality of health care. Avedis Donabedian is a researcher and physician at Michigan University, the model was first developed in 1966 and has undergone several revisions since then.

Donabedian's theory (2005) was used in this research to measure the quality of care. His model is flexible and can be applied in diverse health care settings. Application of this framework evaluated the quality of child health services offered at KNH and also helps the health care providers to understand the structure and processes rendered in the health facility.

Quality of care was assessed by classifying it into the three components defined by Donabedian. The three components in this model are structure, process and outcomes. Donabedian believed that structure measures have an effect on process measures then the outcome. The structure describes the context in which the care is delivered including staffing that is number of health care providers performing resuscitation, equipment, the resuscitation room if the environment is conducive for resuscitation in terms of space, warmth and cleanliness. Infection prevention is crucial in the delivery room; this was assessed by checking for a sink with water and soap for hand washing and presence of hand sanitizers. Availability of equipment was assessed by use of a checklist that includes bag mask and valve, suction machine, oxygen cylinder, warm towels, resuscitaire. Drugs for resuscitation was also assessed using a checklist such as adrenaline and 10% dextrose.

Process measures was used to determine the level of knowledge of the health care providers' in newborn resuscitation. This was done by administration of questionnaires on steps of newborn resuscitation. The outcome measure reflected how prepared the health care providers

were in resuscitation. According to Donabedian, outcome measures remain the ultimate goal of the effectiveness and quality of health care. This model can be used to modify structures and processes.

1.8 Conceptual Framework

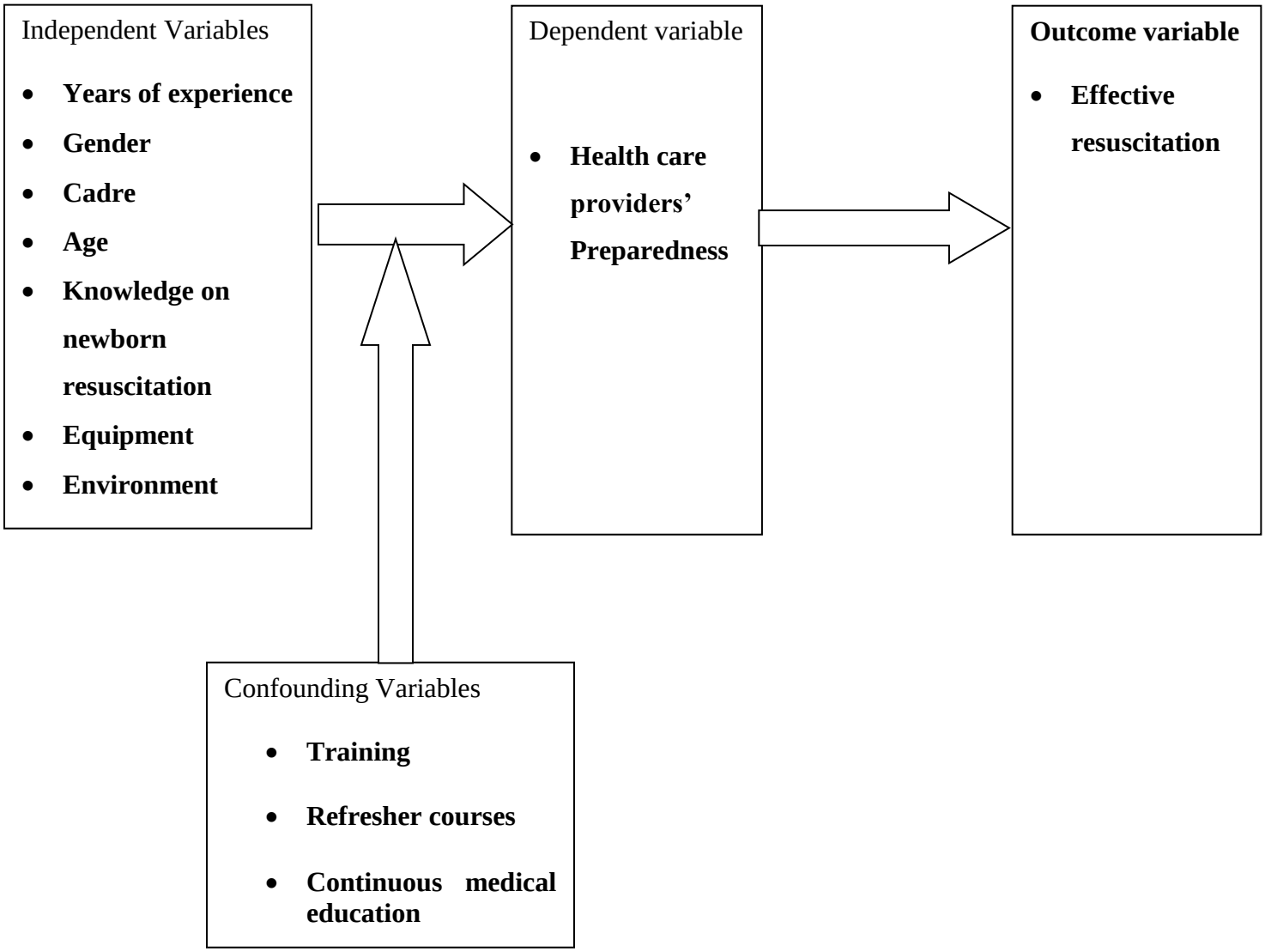

Figure 1.1: conceptual framework.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Being prepared for newborn resuscitation is vital as it reduces anxiety among the health care providers. Readiness for resuscitation shows cooperation and teamwork among them. Neonatal resuscitation is an important skill that every health care provider that conducts delivery should have. The goal of newborn resuscitation is to reduce neonatal mortality and long term developmental sequelae associated with birth asphyxia.

Majority of children born do not require resuscitation since only drying to stimulate the neonate is enough. Neonates who do not cry immediately or within the first minute of life require resuscitation (Lee *et al.*, 2011). This may involve ventilation with bag and mask, chest compression and rarely drug administration (WHO, 2012).The main causes of neonatal mortality according to WHO include birth asphyxia which accounts for more than 30% of neonatal mortality, birth trauma and prematurity. The below diagram illustrates the common causes and percentages of neonatal mortality.

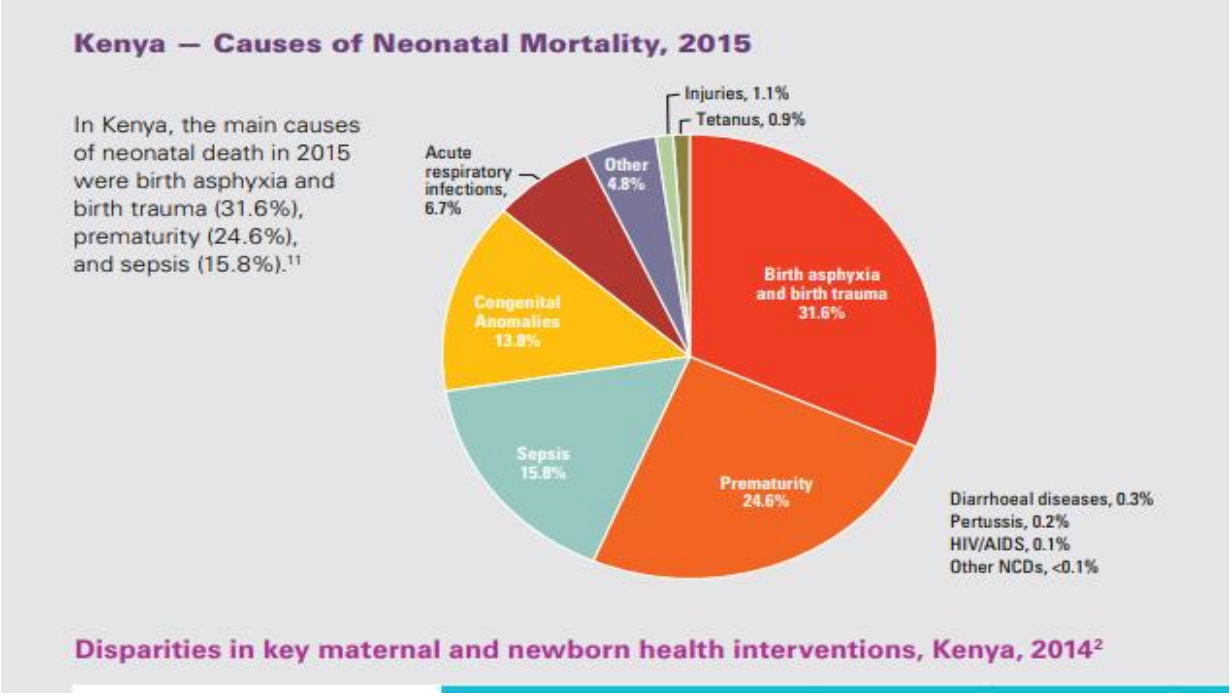

Figure 2.1: causes of neonatal mortality by WHO

2.2 Steps in Newborn Resuscitation (World Health Organization Guidelines 2012)

Assessment of airway, breathing and circulation (ABC) is vital in newborn resuscitation. The health care provider first assesses the airway for secretion or meconium, if present the baby is placed in neutral position and suctioning is done to clear the airway. Once the airway is cleared the baby is wrapped to prevent heat loss. Assessment of adequacy of breathing that is if it is absent, poor or gasping respirations is made, the birth attendant calls for help as he or she initiates ventilation with bag valve and mask at a rate of 30 breaths per minute. Breathing should be initiated within the first golden minute of birth.

Circulation is assessed by counting the heart rate of the newborn which should be above 60 beats per minute. With effective ventilation heart rate should increase to more than100 beats in 60 seconds. If the newborn still has bradycardia after effective ventilation chest compression should

be initiated at a rate of three compressions to one effective breath using bag valve and mask. ABC is reassessed every 1-2 minutes until breathing is adequate and heart rate is above 60 beats per minute (WHO, 2012).

WHO recommends that any newborn who do not initiate breathing at birth or gasping or does not cry within 30 seconds should be resuscitated using Bag Valve and Mask. Babies who do not **c**ry immediately after birth should be stimulated through wiping the newborn with warm towels and rubbing the back 2-3 times before cutting the cord. Neonates born through clear amniotic fluid and initiate breathing on their own do not require suctioning. In the presence of meconium stained liquor in newborns that do not breathe spontaneously suctioning is performed on the mouth and nose before initiating ventilation. For newborns that do not start breathing after stimulation, positive pressure ventilation should be started within 60 seconds using self-inflating bag valve and mask. Ventilation adequacy is assessed by measurement of heart rate and visible chest expansions on inspiration and expiration after a minute. Preference should be given to ventilation rather than chest compressions in babies who do not breathe in one minute. Resuscitation is stopped when there is no heart rate after 10 minutes of effective ventilation.

2.3 Outcome of Neonatal Resuscitation

Neonatal resuscitation plays a significant role in decreasing neonatal morbidity and mortality due to asphyxia, prematurity, birth injuries among other causes. The success of the outcome of resuscitation depends on the effectiveness of initiating appropriate management that can prevent or reduce neonatal mortality and prevent long term deformities (Opiyo, Were, and Govedi 2008).

A study conducted on outcomes following neonatal resuscitation concluded that short term outcomes for critically ill neonate shortly after birth could be death, survival with rapid recovery

or the need for admission in the intensive care unit. Long term outcomes include severe developmental impairment like cerebral palsy among others which can be prevented through effective and timely resuscitation that leads to spontaneous circulation and independent respiration (Marthe, Lee and Nakstad 2018).

2.4 Knowledge of Health Care Providers on Newborn Resuscitation

Readiness is being able to conduct neonatal resuscitation effectively based on current scientific knowledge and skill whenever there is a need to perform resuscitation (Blakey, 2007). Maintaining high standards of preparedness for neonatal resuscitation is very challenging therefore health care providers should obtain continuous education on resuscitation to ensure excellent outcomes during emergencies (Trevisanuto, D *et al*., 2009).

Newborn resuscitation is a complex intervention, therefore health care providers' should have the required skill and knowledge to provide an effective and efficient neonatal emergency service whenever and wherever is required (AAP & AHA, 2006). Newborns who may require resuscitation are preterm, those who do not breathe spontaneously, gasping or have poor muscle tone (WHO, 2012). The knowledge and skills that health care providers should have are stimulation, suctioning, ventilation using bag valve and mask and cardiopulmonary resuscitation.

Knowledge can be acquired during formal training or at work through attending short courses on newborn resuscitation for example Emergency Triage and Treatment (ETAT+), Emergency Obstetric Newborn Care (Emonc) and Help Baby Breath. The knowledge and skills to be acquired are recognition and anticipation of a newborn that requires resuscitation. The knowledge and skills acquired during training decline as the days go by therefore it is important that refresher courses on newborn resuscitation is done frequently (Murila, 2012).

Neonatal resuscitation programs developed by WHO and other partners are readily available in most public hospitals and contain steps needed for neonatal resuscitation. It is critical to ensure that health care providers have essential equipment, supplies, knowledge and skills that are vital in saving newborns lives. Graft-Johnson *et al*., (2017) conducted a study in different parts of Africa on steps in newborn resuscitation in asphyxiated babies. Health care providers that demonstrated the sequence correctly, that is drying and rubbing the back were between 52 to 72 %. Below one-third of health care providers completed all steps correctly. About 55–74% of health care providers readjusted the mask and checked airway to improve ventilation.

A study conducted on nurse's knowledge on newborn care in health facilities in Nairobi concluded that nurses scored best in knowledge on immediate maternal care and routine care of the newborn (Georgina, Gathara, Mwaiki *et al*., 2018). Performances were poor on questionnaires on newborn resuscitation which comprised of checking signs and symptoms of a newborn that requires resuscitation. It was noted that nurses who had been trained on neonatal resuscitation performed better than those who had not (Georgina A.V *et al.,* 2018).

According to (Murila, Obimbo and Musoke 2012) states that for resuscitation to be successful adequate knowledge on newborn resuscitation plays an important role in prompt diagnosis and management. Some countries including Kenya have well established neonatal resuscitation programs aimed at equipping their health personnel with knowledge and skills for neonatal resuscitation. Assessment done on knowledge of health care providers' on newborn resuscitation in Nairobi showed that there is overall poor performance despite the number of years in practice (Murila, F *et al*.,2012). Health care providers' are best prepared to deliver newborn resuscitation when they have adequate knowledge and skills which helps them to make early diagnosis and take correct measures.

The main aim of neonatal resuscitation program (NRP) is to ensure the health care providers in the delivery rooms have adequate knowledge and skills on newborn resuscitation and care after delivery. NRP is recognized worldwide for offering training on newborn resuscitation to health care providers. Studies have shown that following the NRP guidelines in newborn resuscitation decreases neonatal mortality especially in resource limiting areas (Duran, 2011)

Health care providers require refresher courses at least yearly through reviewing tapes on steps on newborn resuscitation and staging mock codes to maintain knowledge and skills acquired during training. These programs help health care providers to increase preparedness for neonatal resuscitation (Jukkala, Henly and Lindeke 2008). A study conducted in Sri Lanka on effects of training of health care providers on newborn resuscitation where an evaluation was done post 4 day training program, an improvement was noted in preparation of equipment required for neonatal resuscitation. Assessment of the newborn and maintenance of warmth such as providing skin to skin contact improved significantly. Generally preparedness for newborn resuscitation improved (Rodrigo, 2007). Findings from this study suggested that 4 day training in emergency neonatal care (ENC) can improve cleanliness at delivery rooms, maintenance of warmth, preparedness for resuscitation and assessment. The training may have an effect in reducing newborn mortality (Rodrigo and Usenarath 2007).

Health care providers require continuous training to improve their performance on newborn resuscitation, this helps them to be confident while conducting resuscitation (Moshiro, Ersdal and Mbekenga 2018). Factors that affect knowledge and skills on resuscitation can be related to the health care provider or the facility. Health care providers related factors include carder, year of practice and also confidence in performing resuscitation while in health facilities could be lack of equipment.

2.5 Availability of Basic Equipment, Supplies and Resuscitation Drugs For Newborn Resuscitation

Health care providers should be ready for newborn resuscitation through monitoring of labour, birth preparedness and carefully assessing the newborn after birth to reduce intrapartum related hypoxia. Knowledge of health care providers without adequate equipment will not improve neonatal mortality (Opiyo et al., 2008).

A study conducted in Tanzania identified several factors that affect resuscitation. Health care providers should always ensure that preparation of equipment is done for unexpected and expected resuscitations. This ensures that resuscitation is started on time which reduces anxiety and increases newborn survival. Poor preparation or misplaced equipment delays in starting resuscitation for this reason it is important to inspect equipment before each delivery (Moshiro, et al 2018).

A study done in Kakamega County Hospital on availability of equipment stated that the hospital is well prepared as equipment needed for newborn resuscitation is available (Shikuku, Milimo Ayabare et al., 2018). For newborn resuscitation to be successful it is important that health facilities equip their delivery rooms with adequate basic equipment for resuscitation which includes: ambubag 250mls and 500mls, face mask size 0 and 1, suction machine, heater and warm dry linen (Newton and English, 2006).

A study conducted in Nepal on equipment for neonatal resuscitation in 17 health centers 45% of the centers had visible resuscitation charts, 72% had warmers, 91% had suction machines while 36% had bulb suction and 82% had bag, valve and mask. The researchers concluded that availability of resuscitative equipment varied in different centers which may contribute to high

mortality rates (Spector, 2010). Kenya being a third world country some of the health facilities may not be well equipped with adequate and functioning equipment used in resuscitation (Opiyo et al., 2008).

A cross sectional study conducted in six different African countries on availability of vital equipment and supplies, including ambubag and different sizes of masks stated that equipment was available in most facilities. Gaps were identified in the supply of warm towels or blankets for drying the newborns to prevent heat loss (Graft-Johnson et al., 2017).

A study conducted in Vietnam on equipment of newborn resuscitation in low and middle class countries summarized that training on newborn resuscitation and availability of equipment is crucial. The author stated that adequate equipment for resuscitation was not available in most of the hospitals. Availability of stethoscopes was rated at 68%, clock 50%, warm clothing 29%, polythene bags 2.2%, pulse oximetry 1.9% (Trevisanuto et al., 2016).In the European countries there is a decline in neonatal mortality rate associated with birth asphyxia, this has been attributed to provision of resuscitative equipment and improving the skills of health care providers in the delivery rooms (Vakrilova, Elleau, & Slŭncheva, 2005).

According to WHO guidelines drugs used for newborn resuscitation is adrenaline to increase the heart rate and 10% dextrose to increase blood sugar levels. Adrenaline is the drug of choice in newborn resuscitation and therefore should be available in the resuscitation trolley. Drugs can only be used in children who do not establish breathing after cardiopulmonary resuscitation (2012). The emphasis is clearly on ventilation and chest compression as drugs will not be helpful if the primary issue of hypoxia and ischemia is not resolved. When the heart rate is below 60 beats in one minute,

adrenaline 1: 10.000 is administered intravenously while monitoring the heart rate which should increase to more than 100 beats in one minute.

2.6 Environmental Conditions During Newborn Resuscitation

The delivery room is a highly technical and complex environment where an emergency to both the mother and newborn is uncommon. The health care providers should ensure the resuscitation room is warm by closing windows, putting on the radiant warmer and pre warming babies' blankets before deliveries. Infection prevention is important in the delivery room to prevent hospital acquired infections which can be easily transmitted from one person to the other.

A warm environment in the delivery room prevents hypothermia which can lead to neonatal death, it is mandatory that delivery rooms have a temperature of 23 - 25 degrees centigrade. Delivery room should be warm before conducting deliveries by ensuring the windows are closed, the radiant warmer is switched on and the pre warmed towels are available. A study conducted in Vietnam showed that only 12.3 % of hospitals had head coverings for prevention of neonatal hypothermia while 2.2% reported to have plastic bags. Plastic bags are very effective on prevention of heat loss in preterm babies. Implementations of this plastic bags is low cost intervention in delivery rooms would improve neonatal outcomes (Trevisanuto et al., 2016).

Preterm babies born before 28 weeks gestation only drying and wrapping using warm towels and placing them under a radiant warmer is not enough to conserve heat therefore they are wrapped in a plastic wrapping and placed under the heater. A study conducted in Spain on environment in resuscitation room states that temperature monitoring in hospitals delivery room was not performed occasionally or never that is in 81% of the hospitals interviewed. 31% of the centers

interviewed demonstrated that premature newborns were wrapped in plastic bags (Iriondo M, Thió M, Burón S et al., 2009).

A newborn's body surface area is larger as compared to adults therefore they can lose heat rapidly. Premature newborns have little body fat making it difficult for them to regulate their own temperature in both cold and warm environment. When newborns are cold they use energy and oxygen to generate warmth, they should always be kept warm to conserve energy. A newborn can be kept warm by pre warming the delivery room and immediately drying the baby after delivery as the newborn's wet skin loses heat rapidly through evaporation. Skin to skin contact can also be done by the mother to prevent heat loss. Most newborns establish normal breathing spontaneously at birth, they only need maintenance of temperature and gentle stimulation through drying to start breathing. Hypothermia is a cause of morbidity and deaths in infants, underscoring the importance of maintaining body temperature in the delivery rooms (WHO, 2015).

Health care providers should always ensure that the labour room is clean, hands are washed to prevent cross contamination and wear protective gear before conducting deliveries. Conducting deliveries in rooms that are not disinfected increase the chances of spreading infections from one person to the other. Infection prevention in the delivery room is very important because newborns take time to adapt to their surroundings immediately after birth making them prone to infections from the surrounding environment(Ahmed A, 2015). Newborns especially preterms and low birth weight can easily become infected with harmful pathogens encountered before, during and after birth (Vergano, Sharland and Kazembe 2009). Globally these infections account for 26% of total newborns death. In Africa neonatal deaths accounts for 23 per 1000 live births (WHO, 2015).Newborn sepsis can be easily prevented by handwashing by health care providers,

disinfection and sterilization of equipment and prompt diagnosis and treatment of prolonged labour.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

This was a descriptive cross sectional study design utilizing both quantitative and qualitative methods at labour ward and maternity theatre of Kenyatta National Hospital.

3.2 Study Site

The study was conducted at Kenyatta National Hospital labour ward and maternity theatre which was founded in 1901. The hospital is located west of the city's central business approximately 3.5 kilometers. It serves as a national referral and teaching hospital to Kenya Medical Training College (KMTC), University of Nairobi (UON) students among other colleges. Labour ward and maternity theatre are located on the ground floor of KNH. Labour ward has twenty three bed capacity, two delivery rooms and an acute room for critically ill mothers in labour. Maternity theatre is adjacent to labour ward and has two operating theatres with two functional resuscitaires. Maternity unit and theatres conduct over 10,000 deliveries annually with an average of 27 babies born daily. Labour ward has 69 nurses, one clinical officers and five doctors operating in different shifts. Maternity theatre has 40 nurses, nine doctors and six clinical officers.

3.3 Study Population

The study population included Health care providers based in labour ward and maternity theatre namely midwives, nurses, clinical officers and doctors.

3.4 Eligibility Criteria

3.4.1 Inclusion criteria

a) Health care providers that is midwives, nurses, clinical officers and doctors working in labour ward and maternity theatre during the study period.

b) Health care providers with at least one month working experience in the unit.

c) Staff willing to consent for the study

3.4.2 Exclusion Criteria

a) Health care providers who did not consent for the study.

b) Health care providers who were on leave and sick off.

3.5 Study Sample Size

The sampling frame consisted of a 100 health care providers' based in labour ward and maternity theatre of KNH. The sample size was determined using Fisher's formula and adjustments were made accordingly for population less than 10,000.

Fisher's formula was used to determine the desired sample.

$$\boldsymbol{n = \frac{z2(p)(q)}{d2}}$$

$n=Z^2(p)\ (q)/d^2$

Where

N= population size

n= sample size (if the respondents are less than 10,000)

z = Z score at 95% confidence interval (=1.96)

d= margin error that was accepted in the study (+/-5% or 0.05)

p= refers to the proportion of population estimated at 0.5.

q= the proportion of population that did not have particular attributes q= 1-p

Since strategies to improve newborn resuscitation had been put in place then preparedness was at 50%.

The above formula is substituted in figures:

Z= 1.96 (the standard normal deviate at 95% confidence interval)

d= 0.05(5%)

p= 0.5(50%)

q= 0.5(1-0.5)

$n = (1.96)^2 \times (0.5) \times (0.5) / (0.5^2)$

n=384

n =384

The target population was less than 10, 000, sample size calculation was adjusted for finite population using Yamane's (1967) formula as follows:

nf = n/1+ (n/N)

Where;

nf= desired sample when the study population is less than 10,000

n = desired sample size when study population is greater than 10,000

N = population size.

The total number of health care providers working in labour ward and maternity theatre was approximately 130

nf = $384/1 + (384/130)$

n = $\frac{384}{\left(\frac{385}{130}\right)}$

= 97 =100

3.6 Sampling Frame

	Doctors	Nurses	Clinical officers	Total
Labour ward	5	69	1	75
Maternity theatre	9	40	6	55
	14	109	7	130

Sampling frame = $\frac{\text{Total Population}}{\text{Sample size}}$

Labour ward = $\frac{75}{130} \times 100 = 57$

Maternity theatre = $\frac{55}{130} \times 100 = 41$

3.7 Sampling Technique

Stratified random sampling was used to put different carders in different stratum that is nurses, doctors and clinical officers. Stratum N was for nurses, D for doctors and C for clinical officers. Simple random sampling was used to select the sample. Selection depended on chance or probability. The health care providers who agreed to take part in the study were given papers written YES or NO, those who picked yes participated in the study. It was a fair method as it reduced interviewer biases (Mugenda and Mugenda 2003).

3.8 Research Tool

Knowledge on newborn resuscitation was collected through self-administered questionnaires to health care providers. The questionnaire was divided into 4 categories where the first category included personal data, section two comprised questions on steps of newborn resuscitation, section three was on knowledge on equipment and drugs in newborn resuscitation and the fourth part was on maintenance of warm chain in the delivery room. The questionnaire took almost 10 minutes to answer. An observational checklist was used to assess the availability of equipment, supplies and drugs.

3.9 Validity of the Tool

The study sought opinion of the supervisors and members of the department to ascertain if the study instrument met the required standards. Study tool validity was based on their expert opinion and judgement on the clarity of the questionnaires. The questionnaire was adopted from training programs of resuscitation which made it valid for the study.

3.10 Reliability of the tool

Pretesting of the questionnaire was done to judge its reliability. Pretesting provided an opportunity to check if the questions were well constructed, easily understood and whether the questions asked provided the answers expected by the researcher.

The questionnaire was administered to ten health care providers which made up the 10% of the sample size at Mbagathi County Hospital who worked in labor ward to determine its reliability and validity, consistency of the answers, check the time required to fill the questionnaire and the flow of the research tool. Mbagathi Hospital is within the same locality as KNH. Pretesting of the observation checklist was also done at Mbagathi to determine if all the equipment, supplies and drugs were captured in the checklist.

3.11 Data Collection

The principal investigator introduced the study to the ward managers of the two units through meetings. With their permission the principal investigator met with the nurses, doctors and clinical officers working in labour ward and maternity theatre. The study was introduced to them including objectives and benefits of the study. The health care providers were requested to participate in the study and an informed consent was provided for further information and signing before participating in the study.

The health care providers were requested to participate in the study on a voluntary basis as long as they sign the informed consent (Appendix111). Those who met the inclusion criteria and consented were able to participate in the study by filling a questionnaire that had a code which was used during data entry. A list of the health care providers from both units was provided to prevent administration of questionnaires to one individual twice.

Data was collected in two phases the first one for filling questionnaires which provided the characteristics of the health care providers and standardized multiple choice questions on newborn resuscitation were answered using the tool (Appendix 1V). The questionnaires were filled and returned to the principal investigator by the end of the shift. The questionnaires were filled only once by the eligible health care provider.

The second phase was on observation of equipment used in resuscitation and the environment of resuscitation. The principal investigator used a standardized checklist to observe the equipment for resuscitation (Appendix V1). The equipment, supplies and drugs was observed through non-participant Observation. This was done during breaks as the health care providers were filling the questionnaires. Observation was done on the resuscitation environment specifically to document safety for staff and newborn, warmth and cleanliness. This was documented objectively whether present or not. The resuscitative equipment, supplies and drugs was assessed against a checklist. The checklist had four columns and a tick was put appropriately in each column. Present (P) absent (A), functional (F) and non-functional (NF). The availability of drugs used in resuscitation was assessed as per WHO guidelines recommendation.

3.12 Data Analysis and Presentation.

Data was checked by the principal investigator for completeness and accuracy then keyed into Microsoft Excel after data cleaning. Confidentiality was maintained by excluding any identifiable information. The database was password protected to prevent unauthorized access and backed up in a remote hard disk to safeguard against data loss.

The data was analyzed using both descriptive and inferential statistics. Data was analyzed using SPSS at 95% confidence interval. P-value less than 0.05 was considered statistically significant. Frequency tables and percentages were used for categorical data. The association between the categorical tables was tested using Chi squares. Results are presented in figures, tables and narrative texts. The data collected from the checklist was presented as narratives.

Newborn resuscitation programs states that one was considered to be Knowledgeable if scored above 80% in the questionnaire where the questions were adopted from. According to WHO an equipped institution is one that has at least 2 pairs of the basic equipment for resuscitation.

3.13 Ethical Consideration

Ethical clearance to conduct the study was obtained from Ethics and Research Committee (ERC) of UON and KNH. A clearance was sought from KNH department of research and ward in-charge.

Health care providers gave an informed consent after introduction and objectives of the study explained to them. Health care providers were assured of confidentiality of the data collected and the results obtained was shared with relevant stakeholders without giving names of the participants. It was emphasized that their participation in the study was voluntary with no monetary gains.

The health care providers were informed if the total score of knowledge on newborn resuscitation was below 80% training will be recommended. The questionnaire was adopted from newborn resuscitation programs which indicated 80% and above was considered as good knowledge.

3.14 Limitations and Delimitations

Interviewer bias: An interviewer's knowledge may influence the structure of questions and presentation. This was delimited by ensuring the questions asked were as simple as possible.

Responder bias: The respondents may not have been honest while answering the questions by making it a discussion rather than answering it individually. This was avoided by explaining to them that it was important that every person fills their questionnaire to get true results.

Information bias: The respondents gave information that the researcher may want to hear. This will be delimited by asking them to answer the questions based on what they have been doing.

The results obtained from the study may not be generalized to all facilities as KNH is a National referral hospital and the equipment available in the facility may not be available in other hospitals. KNH staff may be more experienced than staff from other facilities due to the number of deliveries conducted in the hospital.

3.15 Data Dissemination Plan

The findings of the study were shared with staff working in labour ward and maternity theatre during continuous professional development meeting. Presentation of the study results was made available to the panel of the faculty of the University of Nairobi. A copy of the report and recommendations from the study was submitted to the hospital management and UON library. The completed research will be published in one of the peer-reviewed journals.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the findings of the study based on the study objectives. The results are presented on health care providers' preparedness on newborn resuscitation at Kenyatta National Hospital.

4.2 Response rate

Health care providers who were enrolled by the end of the study were a total of 100 from maternity theatre and labour ward out of the total staff of 130. The 100 respondents were enrolled based on the eligibility criteria. Data collection was conducted from 25th April to 10th May 2019 through a self-administered questionnaire and an observation checklist to evaluate the availability of equipment. All questionnaires were filled contributing to a response rate of 100%.

4.3 Demographic data

Majority of health care providers who participated in the study were between the age group of 25-35 years, followed by above 35 years. Female participants were more than male participants and years of experience varied among the participants. Nurses were the majority of the respondents, followed by doctors then clinical officers. The findings are shown in table 4.1.

Table 4.1: Demographic characteristics of respondents

Variable		Frequency (n)	Percentage (%)
Age	Up to 25 years	9	9.3
	25-35 years	55	56.7
	Over 35 Years	33	34.0
Sex	Male	36	40.9
	Female	52	59.1
Years of experience	Below 2 years	22	22.0
	2-5 years	35	35.0
	Above 5 years	43	43.0
Formal training	Nurse	79	79.8
	Medical Officer	13	13.1
	Clinical Officer	7	7.1

Analysis was further done to determine the significance between demographic data with knowledge on newborn resuscitation. There was no significance between knowledge and demographic data this was revealed after the P value was used to test the association between the variables and knowledge. The findings are presented in table 4.2

Table 4.2 Relationship of knowledge on newborn resuscitation and demographic data

		Knowledge newborn resuscitation				
		Knowledgeable		Not knowledgeable		
		N	%	N	%	p-value
Station	Maternity theatre	31	75.6	10	24.4	0.631
	Labour Ward	47	79.7	12	20.3	
Age	Up to 25 years	6	66.7	3	33.3	0.389
	25-35 years	41	74.5	14	25.5	
	Over 35 Years	28	84.8	5	15.2	
Sex	Male	31	81.6	7	18.4	0.346
	Female	38	73.1	14	26.9	
Years of experience	Below 2 years	18	81.8	4	18.2	0.780
	2-5 years	26	74.3	9	25.7	
	Above 5 years	34	79.1	9	20.9	
Formal training	Nurse	62	77.5	18	22.5	0.189
	Medical Officer	12	92.3	1	7.7	
	Clinical Officer	4	57.1	3	42.9	

4.3.1 Characteristics of respondents based on working Station

The staff who met the inclusion criteria and participated in the study from maternity theatre were a total of 41, nurses were 26, Medical officers 9 and 6 clinical officers. Health care providers from labour ward were a total of 59. The nurses were 54, 4 Medical officers and one clinical officer. The findings are presented in figure 4.1.

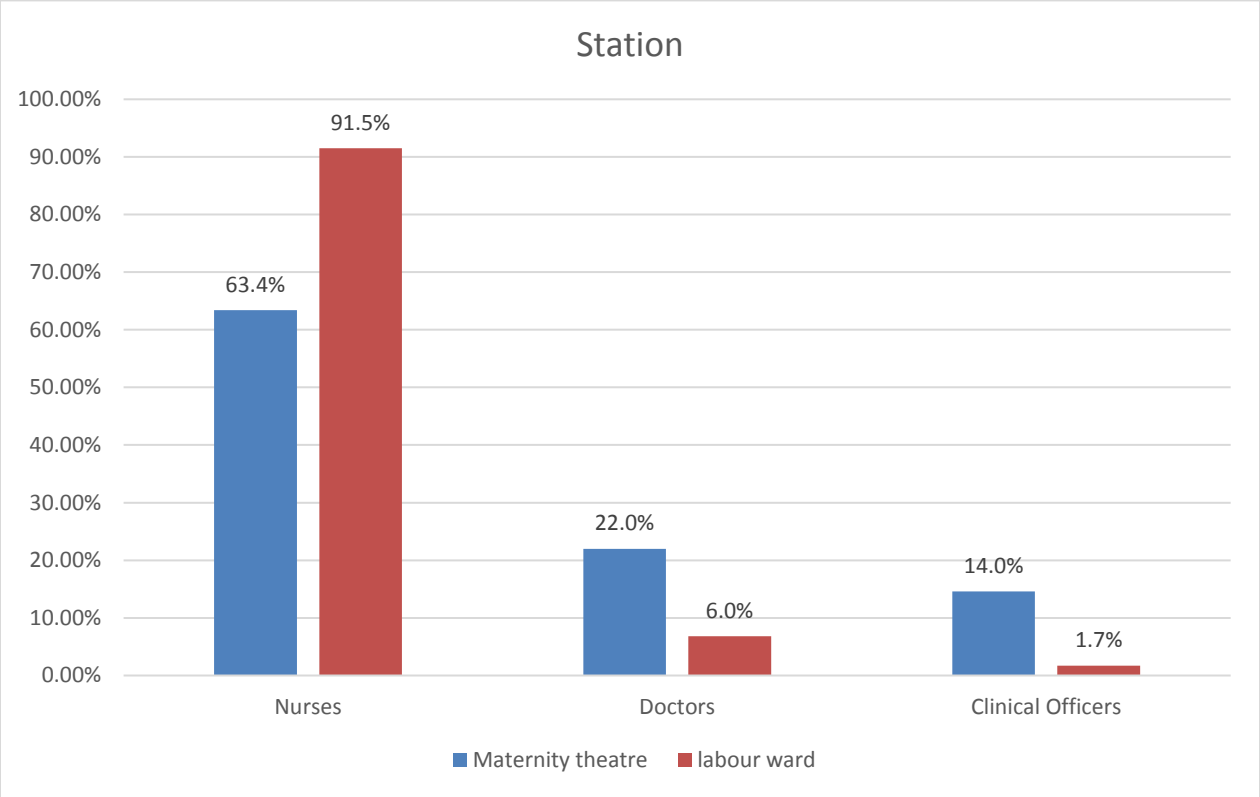

Figure 4.1: Specific place of work

4.3.2 Number of times newborn resuscitation had been performed

Respondents who had performed newborn resuscitation more than 10 times in the past three months, were 39(39.4%) followed by less than 5 times 34(34.3%). Those that had performed resuscitation between 5-10 times were the least 26(26.3%). There was no significance in the number of times newborn resuscitation was done and effectiveness of newborn resuscitation this was known after P value was used to test the association between the number of times one had performed newborn resuscitation and knowledge, P value at 0.426. The figure 4.2 below presents the findings.

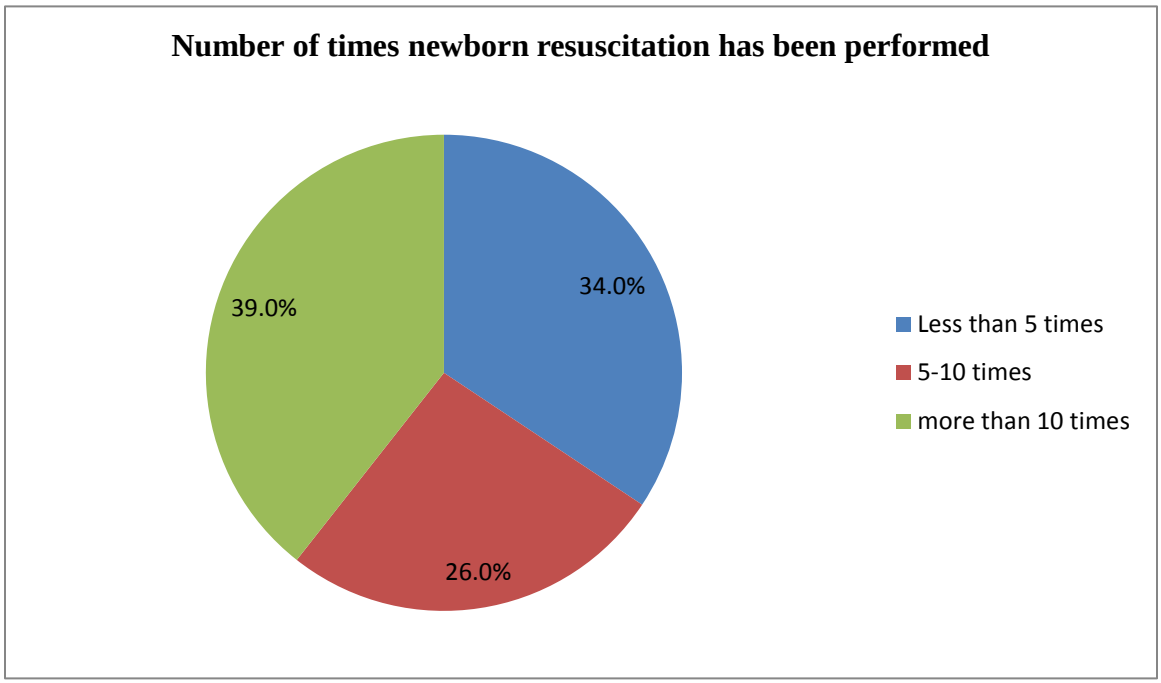

Figure 4.2: Number of times newborn resuscitation had been performed

4.4 Knowledge on newborn resuscitation procedures

Health care providers were given questionnaires which consisted of 10 questions on basic newborn resuscitation (see Appendix 4). A score of 80% and above was considered as good knowledge. Health care providers who were able to identify a newborn who required resuscitation were 89(89.9%). Majority 86(86.0%) were able to identify a newborn that required suctioning. Positioning of the newborn in neutral position before ventilation was known to 84(85.7%) of the respondents. Ventilation rate was known to the majority 70(70.7%) of the health care providers. Chest compression and landmarks for cardio pulmonary resuscitation (CPR) was also well identified by more than half 55(55%) of the health care providers'. Most of the health care providers 79(79.0%) were able to identify that stimulation of the newborn is done by drying and rubbing the back. The response to each of the questions on newborn resuscitation was analyzed as shown below in figure 4.3

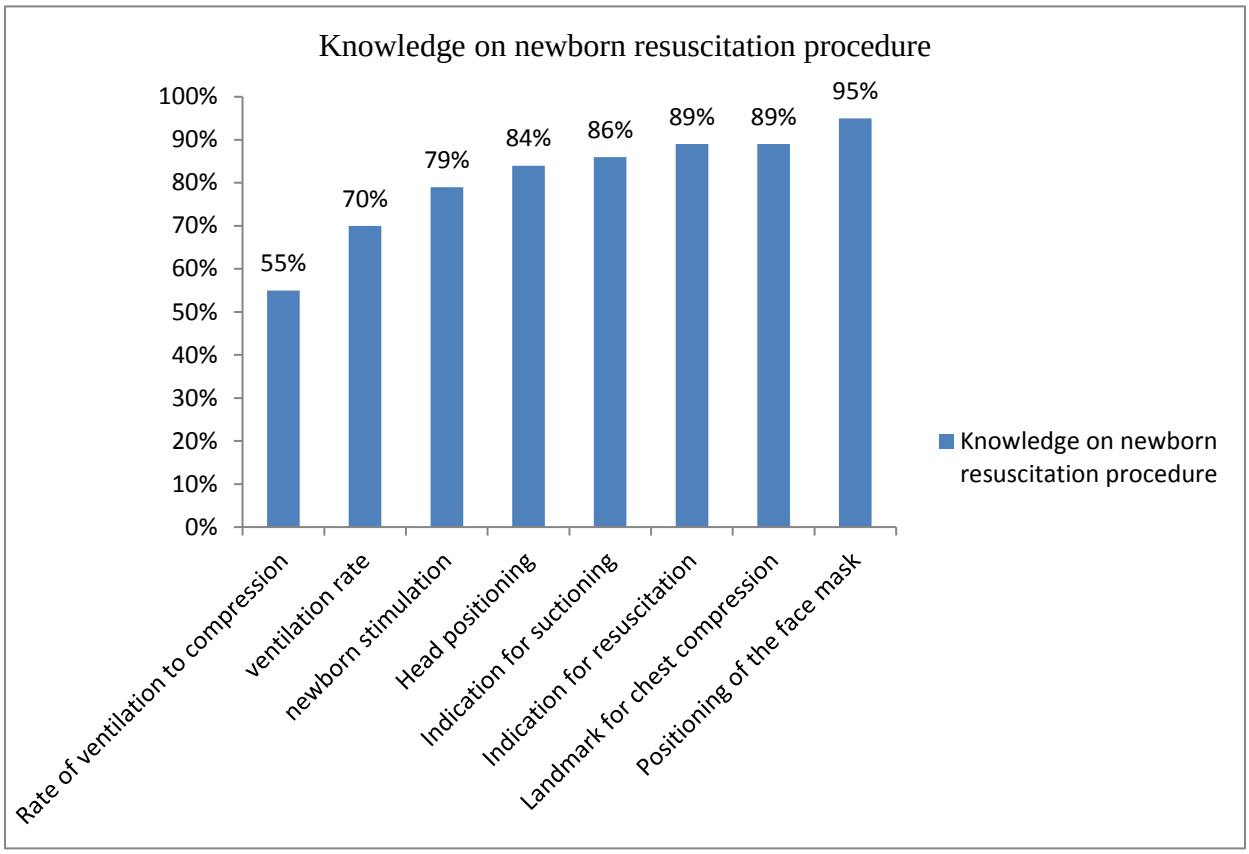

Figure 4.3 knowledge on newborn resuscitation procedure.

4.4.1 Overall performance on knowledge on newborn resuscitation

On overall performance hundred health care providers who participated in the study 78(78%) scored above 80% and were considered to have good knowledge. Only 22(22%) were not able to attain the mark and were considered not to be knowledgeable. The data is presented in figure 4.4 below.

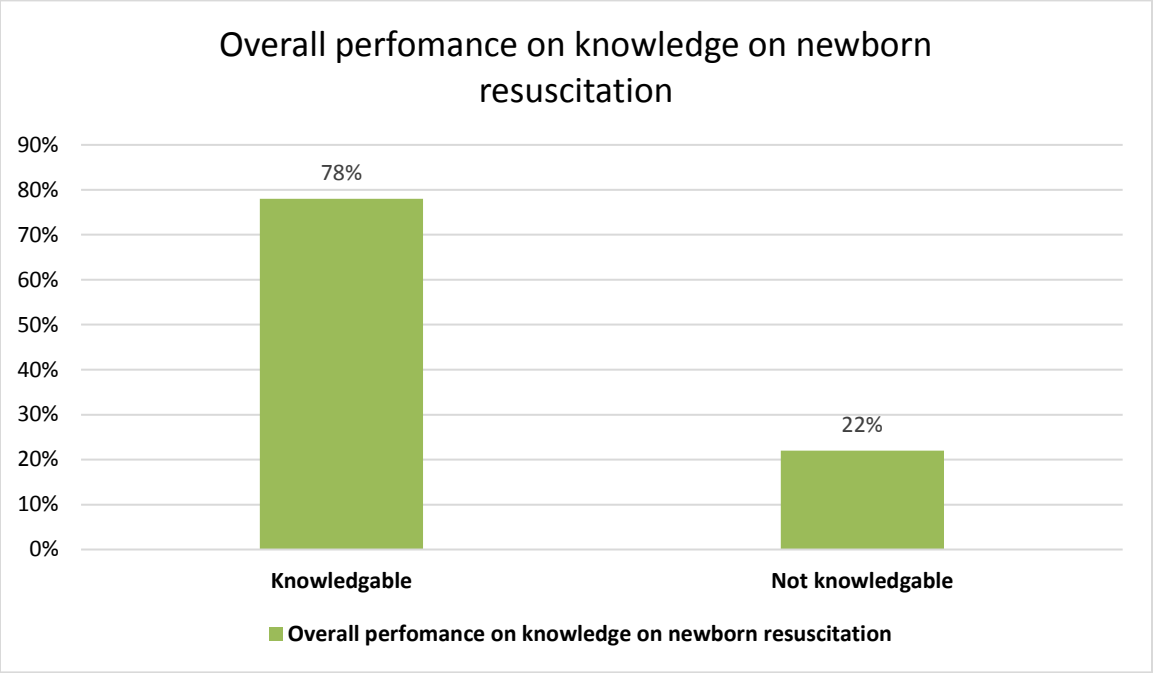

Figure 4.4: Overall performance on knowledge on newborn resuscitation

4.4.2 Knowledge based on carder

Health care providers who filled the questionnaires were doctors, nurses and clinical officers. Nurses who scored above 80% on newborn resuscitation were 62(77.5%) out of the 80 who participated in the study. Doctors were 13 in total, 12(92.3%) had good knowledge while the clinical officers had the least scores. Further analysis was done to determine correlation of effective resuscitation and carder, the study found no significance. The result is presented in table 4.3.

Table 4.3: Relationship of knowledge on newborn resuscitation and carder

		Knowledgeable n=100	%	Not knowledgeable	%	p-value
Carder	Nurse	62	77.5	18	22.5	0.189
	Medical Officer	12	92.3	1	7.7	
	Clinical Officer	4	57.1	3	42.9	

4.5 Steps on newborn resuscitation.

WHO recommends that every resuscitation room should be kept warm before conducting deliveries and resuscitation. Health care providers were asked to identify the sequence on newborn resuscitation the correct sequence being providing warmth, dry and stimulate, clear the airway, ventilation and chest compression then administration of adrenaline. Less than half 44(44%) of the health care providers identified the steps correctly. Table 4. 4 presents the findings

Table 4.4: Steps on newborn resuscitation

	NO		YES	
Steps of neonatal resuscitation	**n**	**%**	**n**	**%**
a)) Provide warmth- dry and stimulate - clear the airway- ventilation- chest compression- administer adrenaline	56	56.0	44	44.0
b Position head and clear the airway-ventilation- chest compression –provide warmth-administer adrenaline	58	58.0	42	42.0
c) Administer adrenaline – administer 10% dextrose – chest compression- ventilation-provide warmth	98	98.0	2	2.0

4.6 Training on newborn resuscitation

Health care providers who had been trained on newborn resuscitation were more than half 75(75.0%), those who had not been trained reported that they never had a chance to attend the course. Thirty four(45.3%) of the health care providers had done Emergency Triage and Treatment (ETAT+) course then Basic Emergency Obstetric and Newborn care (BEmONC) 23(30.7%) and Essential newborn care. The findings are presented in table 4.5

Table 4.5 Training on newborn resuscitation

	Frequency (n)	**Percentage %**
Training on newborn resuscitation	75	75.0
a) EPLS- European Pediatric Advance Life Support	8	10.7
b) HBB- Help Baby Breath	5	6.7
c) ETAT+- Emergency Triage and Treatment	34	45.3
d) BEmONC- Basic emergency obstetric and newborn care.	23	30.7
e) Essential newborn care	23	30.7
f) Others specify	2	2.7
Reasons never been trained on newborn resuscitation		
a) Never had a chance to attend	21	84.0
b) Cost of the course is expensive	2	8.0
c) Have never heard of any course	0	.0
d) No time off work to attend the course	1	4.0
e) Not interested	1	4.0

4.6.1 Years the course was attended

Trainings that were done on newborn resuscitation were between the years 2010 to 2019. Eighteen (25.4%) of the health care providers were trained in the year 2017, followed by 17(23.9%) who were trained in 2016. Table 4.6 presents the findings.

Table 4.6 Years training was done

Year the course was attended	Year	n	%
	2010	2	2.8
	2012	4	5.6
	2013	2	2.8
	2014	1	1.4
	2015	6	8.5
	2016	17	23.9
	2017	18	25.4
	2018	14	19.7
	2019	7	9.9

4.6.2 Knowledge based on prior training on newborn resuscitation.

Health care providers who were trained on newborn resuscitation performed better than those who had not. Out of 75 health care providers who had been trained on newborn resuscitation 63(84%) were knowledgeable. The results are presented in figure 4.5 below

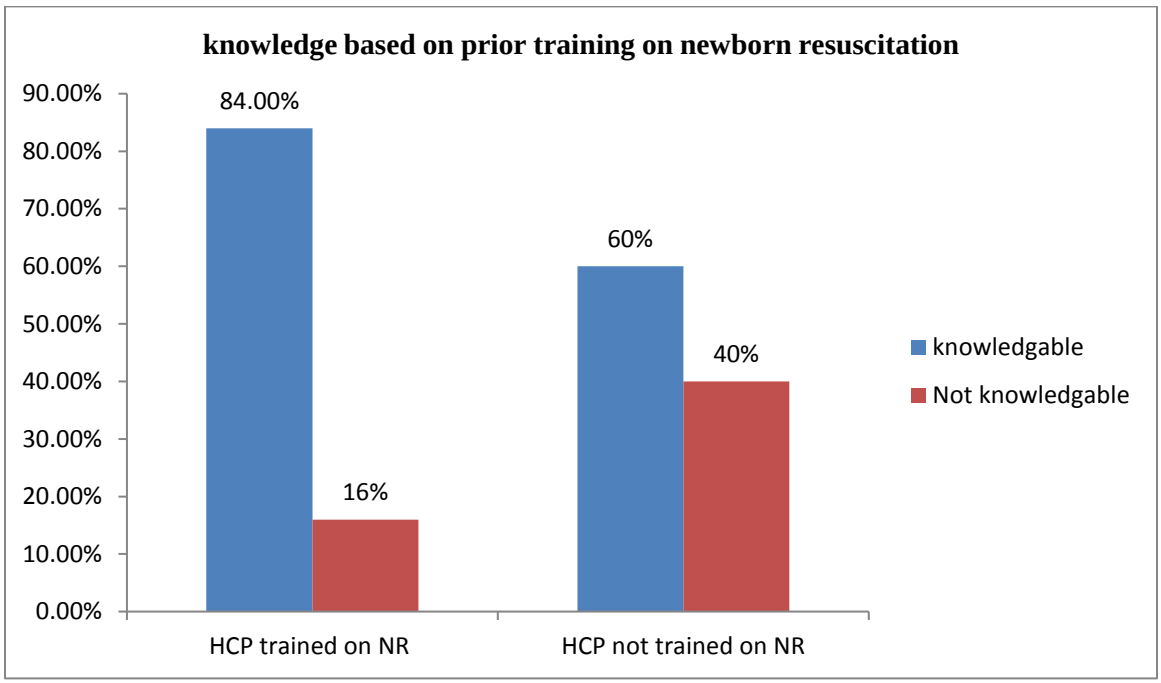

Figure 4.5 knowledge based on prior training on newborn resuscitation.

Further correlation was done to determine significance between training and knowledge on newborn resuscitation p- value was 0.012 which was significant.

Table 4.7 Relationship between knowledge on newborn resuscitation and training

		Frequency n	Percentage	Frequency n	Percentage	P-value
Have you ever been trained on newborn resuscitation?	Yes	63	84.0	12	16.0	0.012
	No	15	60.0	10	40.0	

On conducting multivariate analysis to determine factors associated with effective newborn resuscitation it was found out that health care providers who have been trained on newborn resuscitation are 3.5 times better in performing newborn resuscitation effectively. Table 4.8 presents the findings.

Table 4.8: Multivariate Analysis of training and knowledge on newborn resuscitation

	Coefficient	Standard Error of coefficient	P-value	OR	95% C.I. for OR	
					Lower	Upper
Prior Training on Newborn resuscitation	1.253	.516	.015	3.500	1.274	9.616

4.7 Equipment for resuscitation

This study sought to establish how equipped maternity theatre and labour ward was for newborn resuscitation. Equipment, supplies and drugs was observed using a checklist. Maternity theatre had 2 functional resuscitation tables for each theatre while labour ward had one functional table for 2 delivery rooms and an acute room. Radiant warmer was absent in both areas assessed however the resuscitation tables had overhead heaters that kept the newborn warm. Green towels for drying the baby after delivery were absent in both units. Maternity theatre has 3 suction machine but one is nonfunctional while labour ward has one suction machine. Self-inflating bag 250mls and 500mls and mask size 1 was available in both units, face mask size 0 for preterm babies was not available. Clock, portable cylinders and plastic bags were available. Adrenaline was more than 5 vials in each unit. Both units are well equipped but are not enough compared to the number of deliveries conducted per day. The table below (4.9) shows the availability of equipment in both units.

Table 4.9 Equipment available in maternity theatre and labour ward.

EQUIPMENT	MATERNITY THEATRE	LABOUR WARD
Resuscitation table	2	1
Radiant warmer	0	0
`Green towels	0	0
Suction machine	2	1
Self-inflating bag and mask 250mls and 500mls	5	5
Face mask size 0	0	0
Face mask size 1	4	2
Portable cylinder	3	2
Clock	1	1
Adrenaline	5	5

4.7.1 Health care providers' knowledge on resuscitation equipment

Health care providers' identified the following equipment as the basic equipment needed for resuscitation: resuscitation table was identified by 16(16%) of the health care providers', towels for drying the newborn was identified by only 4(4%) of the participants, bag valve and mask was identified by majority 77(77%) of the respondents, most 67(67%) identified suction machine while 23% stated oxygen as the main requirement for resuscitation.

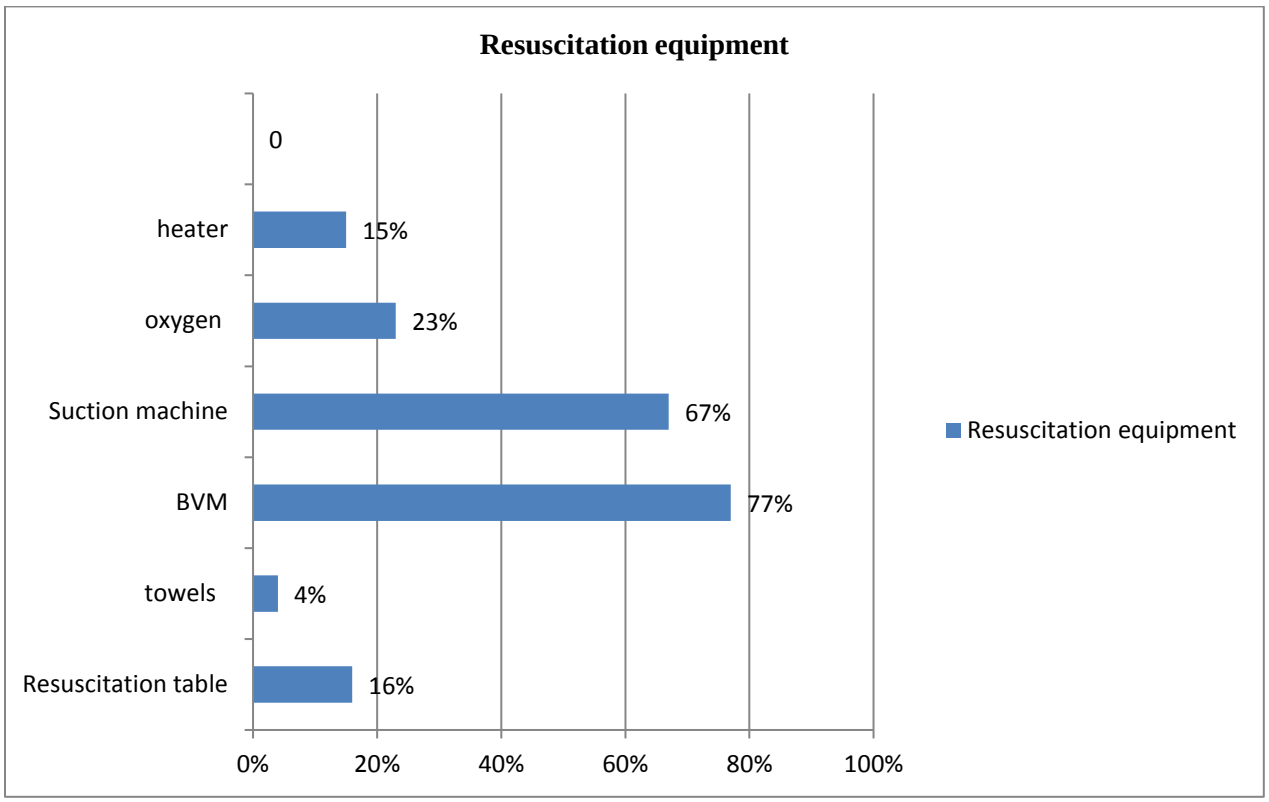

Figure 4.6 Health care providers' knowledge on resuscitation equipment

4.8 Environment in the resuscitation room

The study sought to establish how the resuscitation room was kept warm and clean. Health care providers were asked to identify ways of keeping the room warmth.

4.8.1 Warmth in the resuscitation room

Warmth maintenance is very vital in the delivery room to prevent hypothermia. The study sought to identify ways in which the resuscitation rooms are kept warm. Most of the health care providers 77(77%) stated that resuscitation room heater should always be put on during resuscitation. More than half 65(65%) stated that closure of windows maintains room temperature. Most of the health care providers 67(67%) identified that delivery rooms temperature should be maintained at 20-25 degrees centigrade but only 5 (5%) indicated that temperature monitoring of the resuscitation room

is vital. Provision of heat during resuscitation improves the outcome of newborn resuscitation. The findings are presented in figure 4.7

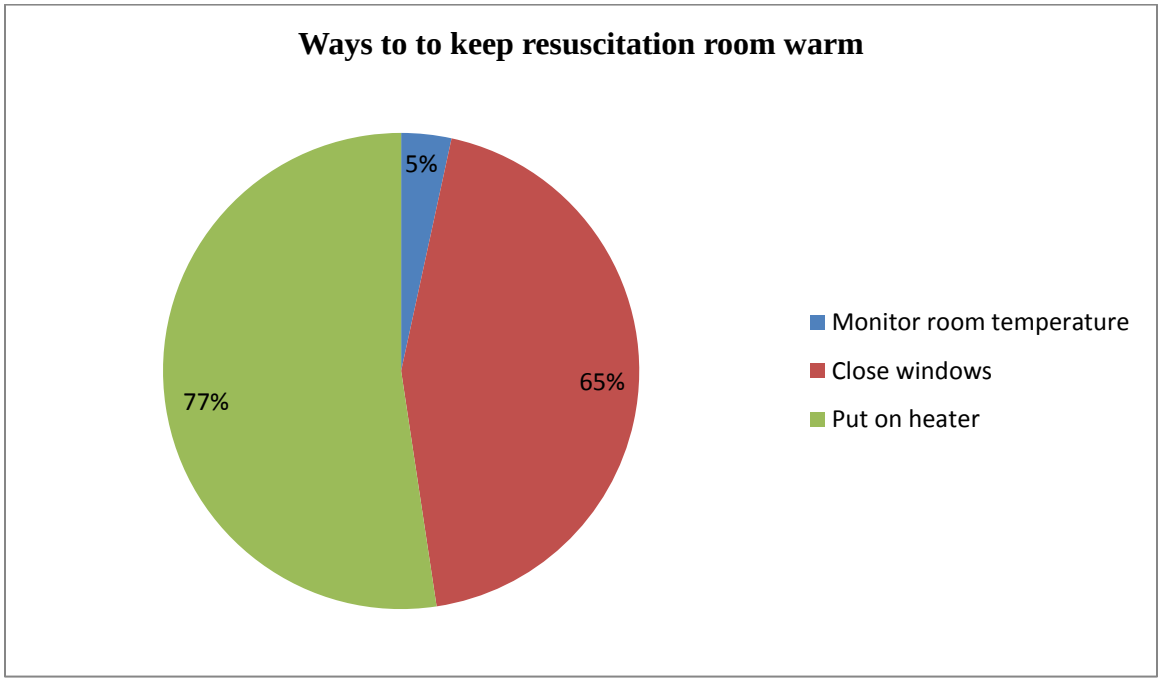

Figure 4.7 Ways to keep the resuscitation room warm

4.8.2 Warmth for preterm

Health care providers acknowledged that newborn's delivered before 28 weeks needed to be kept warm to prevent hypothermia during resuscitation. Only 8(8.0%) identified that preterm newborns needed to be wrapped in a plastic bag to prevent heat loss and be covered with cotton wool while more than half suggested that the child to be covered with warm clothing. The figure (4.8) below presents the findings.

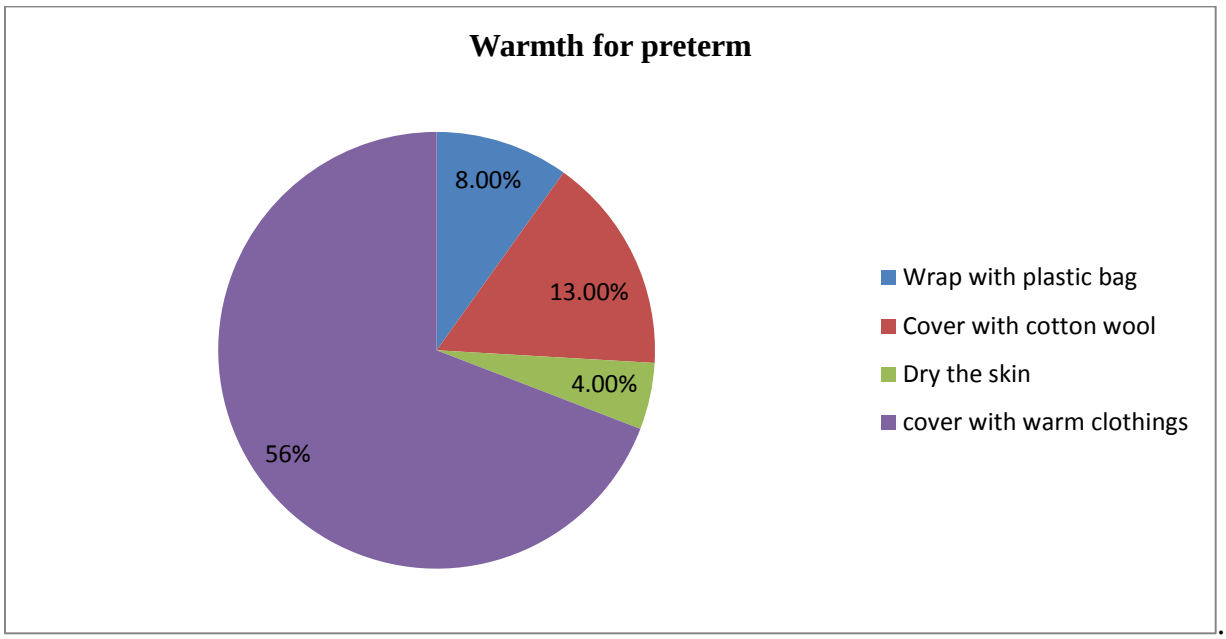

Figure 4.8 Warmth for preterm

4.8.3 Infection prevention

The study sought to establish how infection prevention is practiced in each unit. Hand washing was identified as the best way to prevent cross infections by half 57(57.0%) of the participants, decontamination of equipment before use was stated by 41(41%) of the participants. Wearing protective gear, waste segregation, cleaning and scrubbing the floor was identified by less than half of the health care providers. The results are presented in figure 4.9.

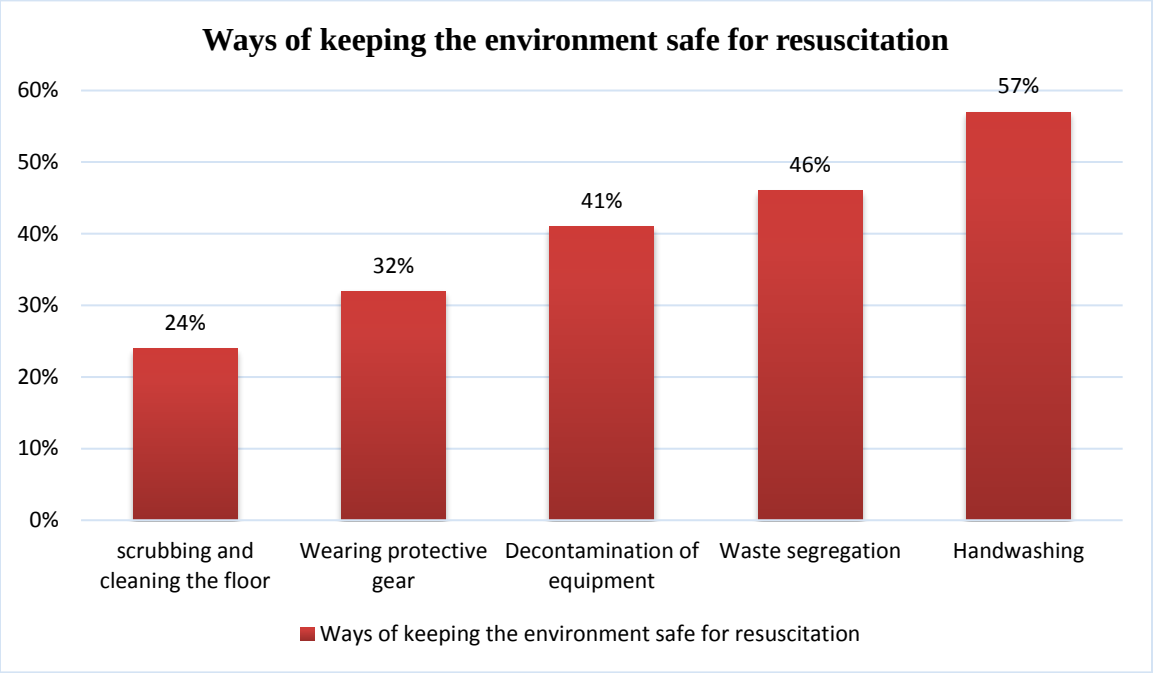

Figure 4.9 Ways of keeping the environment safe for resuscitation.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter presents discussions from the findings of the study from the assessment of the health care providers' knowledge of newborn resuscitation, availability of equipment and the environment in the resuscitation room in both maternity theatre and labour ward.

5.2 Demographic characteristics of the respondents

Age, gender, years of experience in the unit, station and formal training are the demographic data that were collected from the health care providers. From the findings of the study most (56.7%) of the participants were middle aged, female (59.1%) were more than male and majority (43.1%) had worked for more than 5 years. The years of experience varied in other studies with a range of 5.9 years in Afghanistan to 9 years in Kenya (Murila et al., 2012); (Kim et al., 2013). The long duration of experience may not necessarily imply that health care providers were knowledgeable on newborn resuscitation as there was no significant association between years of experience and knowledge performance. In a study conducted in Afghanistan health care providers who had worked for more than 6 years were more knowledgeable (Kim et al., 2013). Years of experience had also no significance in a study conducted in 6 sub county hospitals in Uasin Gishu where the health care providers had worked in the unit for a minimum of 5 years (Thirimu. P, 2018). Similar study that was conducted in a hospital in kakamega showed that years of experience was associated with better performance in newborn resuscitation (Shikuku et al., 2017). It is expected that health care providers' with more years of experience be more knowledgeable than those with less years of experience and assist impart the same knowledge through mentorship to the new staff. Newborn

resuscitation is a skill and knowledge that needs to be practiced severally to achieve effective resuscitation.

The unit where the health care providers work can make resuscitation more effective, most of the children born via cesarean section are more likely to be resuscitated than those born via spontaneous vertex delivery. The findings in this study indicated that there was no significance in the workstation and effective newborn resuscitation. Similar studies have been conducted and concluded that health care providers working in theatre were two times more likely to attain effective resuscitation compared to those in labour ward (Alwar, 2010).

5.3 Knowledge on newborn resuscitation

Newborn resuscitation is effective only when health care providers have sufficient knowledge (Gebreegziabher, 2014). The knowledge is acquired during formal training of nurses, doctors and clinical officers and through neonatal resuscitation programs such as Emergency Triage and Treatment Plus (ETAT+), Help Baby Breath (HBB), and Essential newborn care among others. The health care providers were assessed using a self-administered questionnaire with both open and closed ended questions. More than half (78%) of the health care providers were knowledgeable this is contrary to a study conducted by Murila et al., (2012) on assessment of newborn resuscitation on health care professionals concluded that only 35.4% were knowledgeable. Whereas the basic newborn resuscitation steps were assessed, other advanced steps such as endotracheal intubation and drug administration were included in the study. In this study only basic newborn resuscitation steps was assessed.

In overall three quarters of the health care providers attained more than 80% and were considered to have good knowledge on newborn resuscitation. A similar study which was conducted in the

same units that is labour ward and maternity theatre KNH concluded that health care providers had poor knowledge on newborn resuscitation as more than half of the respondents had failed (Alwar. P 2010). These are some of the studies that prompted the hospital to train the health care workers to train on newborn resuscitation. These findings of the study could be attributed to training that have been conducted in the unit.

The steps of newborn resuscitation are considered critical in performing resuscitation. The study looked at the proportion of the health care providers that identified the steps correctly. The health care providers were asked to identify the steps of newborn resuscitation, less than half (44%) identified the steps correctly. Although the general knowledge of the health care providers was good there was a challenge in identifying the right sequence on newborn resuscitation. These findings could be attributed to decline in knowledge despite attending training on newborn resuscitation. Though majority of the health care providers had been trained refresher courses can also be offered. Finding of a similar study conducted in Nigeria suggested that most of the health care providers had adequate knowledge on newborn resuscitation but their knowledge on decision making during resuscitation was low (Ogunlesi & Tinuade 2008).

The steps include warmth, drying to stimulate the newborn, positioning the head in neutral position then clear the airway through suctioning, ventilation and chest compression. It is important that health care providers follow the steps during resuscitation to prevent inhalation of secretion or expose the child to cold during resuscitation causing hypothermia. In a study conducted by Shikuku et al.,(2018) through observation of newborn resuscitation concluded that there is need to train health care providers' on maintaining warm chain during resuscitation and airway maintenance in cases of presence of meconium. In Pakistan health care providers failed to provide warmth during resuscitation (Arrif et al., 2010). In both labour ward and maternity theatre the

resuscitation table had a warmer attached to it so the health care providers might have gotten used to placing the newborn in a warm place without knowing that warmth is the first step to newborn resuscitation.

The second step of resuscitation is stimulation in case of absence of meconium. Less than half of the health care providers did not manage to identify the steps correctly, a question on stimulation of the newborn was asked and most (79%) of the participants identified drying and rubbing the back as a way of stimulation. A study conducted on newborn resuscitation through observation health care providers dried and gently rubbed the newborn's back (Shikuku et al., 2018). The health care providers, may have a challenge in identifying the steps correctly but they knew how to stimulate a newborn. Most resuscitated newborns will initiate spontaneous breathing after simple stimulation such as drying. This implies that in resource limiting settings many babies who do not initiate breathing at birth needs simple stimulation like drying.

The step of stimulation is followed by placing the infant in neutral position to open the airway and suctioning. On questions asked on head position and suctioning most (79%) of the health care providers knew about it. The participants were also asked to explain how suctioning was done less than half (39%) of the health care providers, mentioned position of the head, suction what you can see and suctioning of the mouth followed by the nose. Similar findings from a research done in Malawi identified that suctioning was the worst performed step (Bhurji, 2011). Newborns who do not respond to stimulation with secretion suctioning should be done in a correct manner to prevent damage of the mucosa which can lead to poor breastfeeding and risk of infections.

When newborns do not respond to suction then ventilation and chest compression should be done immediately to reverse asphyxia. Health care providers were asked to identify a way of placing a

face mask during ventilation and majority (95%) knew that the mask should cover both the nose and the mouth. The health care providers were not sure whether ventilation to chest compression ratio was 1:3 or 15: 2. Only (55.7%) knew the rate of ventilation to chest compression of a newborn is 1:3. Identification of landmarks for chest compression was known to (89.0%) of the participants. When breathing is delayed the chances of reversing asphyxia is reduced which can lead to permanent brain damage.

During resuscitation it's important for health care providers to have adequate knowledge on steps of newborn resuscitation to conduct effective resuscitation. The overall performance on the steps of newborn resuscitation indicates the health care providers need training or refresher courses on newborn resuscitation.

5.4 Training in basic newborn resuscitation

Training of health care providers enables them to provide quality and effective care to the newborn. The study found no association between knowledge and number of times resuscitation was performed (P value=0.426) but there was significance on knowledge and training on newborn resuscitation (P value= 0.012). The health care providers who had been trained on newborn resuscitation prior to the study performed better than those who had not been trained. The study found out that health care providers who had received prior training before the study performed three and a half times better than those who had not.

In low and middle income countries training of health providers in newborn resuscitation resulted in reduction in early neonatal mortality (Pammi, Dempsey, Ryan & Barrington, 2016). The health care providers in the study were asked if they had received prior training to the study, more than half (75%) had been trained with majority (45.3%) being trained ETAT+. However Murila found

that only 12-14% of health care workers had received formal training. Health care providers (n=21) who had not been trained stated that they never had a chance to attend any short course on newborn resuscitation.

Health care providers who had not been trained stated that they never had a chance but are willing to be trained on newborn resuscitation courses. Competence based training has shown to exert a great influence on knowledge (Kim et al., 2013). For those that had been trained the average duration after training was 4 years with a range of 1-10 years. Majority of the health care providers had been trained on newborn resuscitation but not all of them scored above 80% which was considered as having good knowledge. This shows that there is a decline in the knowledge in spite of previous training. There was a similar study conducted in Zambia and showed that there is decline in knowledge despite of training (Carlo *et. al*., 2010).

The number of times newborn resuscitation was performed or observed did not contribute to health care providers' knowledge on newborn resuscitation. This was revealed after P value was used to test association between this variable and knowledge, the correlation was found to be weak and not significant. This finding is contrary to that of Ogulesi *et al*., (2015) who observed higher levels of knowledge of newborn resuscitation among those performed more times compared to those that had not.

It is expected that health care providers who had performed resuscitation severally to be more knowledgeable than those who had performed fewer times. The more resuscitation is performed the more the chances of the health care provider to perform effective resuscitation. One of the standards of WHO in improving quality maternal and newborn care is to have health care providers in childbirth areas receive training or regular refresher courses on newborn resuscitation. Regular

continuous medical education can also be done in every unit to help in retention of knowledge to all carders.

5.5 Cadre of service

The main birth attendants at KNH are nurses however in maternity theatre doctors conduct surgeries. WHO recommends that child birth should be conducted by skilled personnel that is doctors, nurses and clinical officers (WHO, 2016). All cadres participate in conducting newborn resuscitation in these units. They also transferred newborn that required advanced care to Newborn Unit.

In the study conducted, majority of the doctors 12(92.3%) nurses 62(77.5%) and clinical officers 4(57.1%) performed well on knowledge on newborn resuscitation. There was no significance between knowledge and cadre (P value = 0.189). In a study conducted by Kim *et al* showed that health care providers of different carders demonstrated similar knowledge on newborn resuscitation (Kim *et al*., 2013). In contrast nurses have been reported to be more knowledgeable than other health care providers in Pakistan with reasons attributed to greater exposure to child birth (Shabina et al., 2010). In as much as nurses conduct most deliveries in our set up there was no significance in the performance on knowledge on newborn resuscitation.

In both units where the research was conducted newborn resuscitation was performed by all cadre therefore it is important for health care providers' to be trained on newborn resuscitation to provide effective resuscitation. Training helps the health care providers have the necessary knowledge and skill to conduct effective newborn resuscitation. Training with basic equipment for resuscitation improves neonatal outcomes during resuscitation.

5.6 Newborn Resuscitation Equipment

Basic newborn resuscitation requires a bag and mask for ventilation, suction machine for suctioning and a source of warmth to prevent hypothermia. The key equipment is a self-inflating bag and mask used for ventilation (WHO, 2016). Health care providers' were asked to state basic equipment used for resuscitation, most (77%) identified a self-inflating bag valve and mask as the main equipment. Less than half (16%) stated resuscitation table and oxygen as basic equipment for resuscitation while most (67%) identified Suction machine and heater. Only 4 out of the 100 health care providers mentioned warm towels for drying. A similar study conducted in Nigeria on availability of equipment in both private and public hospitals concluded that basic equipment like bag and mask, heater and pre warmed towels were poorly distributed in these hospitals. Most hospitals seemed to have drugs required for advanced resuscitation (Oloyede, 2016).

In this study both labour ward and maternity theatre were assessed on availability of basic equipment used in resuscitation. Both units had resuscitation tables, in labour ward they were two but one was nonfunctional whereas in maternity theatre had 2 functional resuscitation tables. Approximately more than one delivery is conducted at the same time in labour ward and the health care providers were forced to use the nonfunctional resuscitation table which also lacked source of warmth during resuscitation. Suction machines were available in both units however labour ward had only one suction machine. Face masks were available in the resuscitation tray and others were soaked in cleaning detergents at the time of data collection however it's not within the scope of the study to evaluate disinfection practice. In a study conducted in Afghanistan found out that some facilities may lack basic equipment or the equipment may not be enough for resuscitation

based on the number of deliveries conducted (Kim *et al*., 2013). The units studied had basic equipment needed for resuscitation but were not adequate.

Bag valve and mask both 250 and 500mls for preterm and term babies were available in both units as these are essential in initiating breathing through ventilation. This is contrary to a study conducted in different hospitals in Vietnam which indicated that basic equipment like an ambubag was not available in a considerable proportion of hospitals (Trevisanuto et al., 2016).

Both units did not have towels for drying the babies after delivery, the health care providers used mother's clothes as an alternative. In a setting where the mother did not carry extra clothing the baby may not get optimum warmth during resuscitation hence an intervention is needed to always ensure the towels are always available.

A wall clock was available and working in each delivery room of both units this was in contrary with a research conducted in hospitals in Vietnam where clocks were not available in most hospitals (Trevisanuto, 2016). WHO requires that a wall clock indicating minutes and seconds be available in each delivery room. A common practice is the use of a wrist watch or mobile phone in timing of resuscitation which may affect the timing of resuscitation events.

In addition to training programs for health care providers, management of the newborns at birth and the availability of adequate equipment in all delivery settings is crucial. A handing over book for equipment was available in both units but were not handed over during each shift. This can help the health care providers to prepare for newborn resuscitation as they could identify missing items before conducting resuscitation. The equipment that were available were sometimes not within reach during resuscitation.

5.7 Environment in the resuscitation room

The resuscitation room should be kept warm by ensuring doors and windows are closed and radiant warmer switched on before delivery. This study examines thermoregulation in both preterm and term infants. Health care providers were not able to determine room temperature because they lack room thermometers however most (67.0%) of them knew that resuscitation room should have temperatures between 22-25 degrees centigrade. A study conducted in Spain found out that 81% of the hospitals were not monitoring the temperature in the delivery room (Iriondo et al., 2009).

Health care providers were asked to identify ways in which the delivery room was kept warm, more than half (77.0%) stated that a heater should always be put on and windows closed before conducting deliveries. Only 5 out of the 100 participants mentioned monitoring room temperature was a way of ensuring the room had the right temperature. In labour ward during the time of data collection the windows were not closed at all times as compared to maternity theatre where windows are closed permanently. Health care providers in labour ward depended on how they feel whether cold or hot to either close or open the windows.

Neonatal hypothermia is a worldwide problem and leads to increased morbidity and mortality in newborn infants. Health care providers were asked to mention ways of providing warmth to preterm babies half (56.0%) of them mentioned covering them with warm clothes while less than 10 participants mentioned the use of plastic bags to wrap the preterm. A study conducted on hypothermia stated that infant hypothermia remains prevalent especially in premature infants. In the United States and developing countries, a simple mechanism as wrapping the preterm in a polythene bag would help in loss of heat (Knobel. D and Robin, B, 2015). In both maternity unit

and labour ward polythene bags were available but not once was observation made of preterm covered in it either during resuscitation or transfer to newborn unit for further management.

It is also important to ensure the room is clean, hands are washed and protective gear worn to prevent cross infection. Health care providers were asked to state ways in which delivery room is kept clean. Half (57.0%) of them said hand washing is very important followed by decontamination of equipment (41.0%) only a few (24.0%) stated that the resuscitation room should be cleaned after every resuscitation. Newborns can easily get infected with harmful pathogens encountered before, during and after delivery (Vergano et al., 2009). Globally these infections accounts for 26% of total newborn deaths and it's the third leading cause of neonatal mortality after birth asphyxia and prematurity (WHO, 2016). Newborn sepsis can be easily prevented by hand washing, disinfection and sterilization of equipment before use.

The environment of both units were good, there was source of warmth but theatre was more clean than labour ward this could be attributed to the fact that theatre has less number of people entering the unit as compared to labour ward.

CHAPTER SIX: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the summary, conclusion and recommendations of the study.

6.2 Summary

Readiness for newborn resuscitation is important in saving newborns life. Newborn resuscitation is a complex intervention therefore the health care providers should have the required skill and knowledge to provide effective and efficient neonatal emergency services whenever is required.

This research study aimed at identifying how health care providers are prepared to conduct newborn resuscitation. It was a descriptive cross sectional study design which was carried out in labour ward and maternity theatre from January to date. The objective of this study was to assess health care providers' knowledge on newborn resuscitation, availability of basic equipment and to determine whether the environment used for resuscitation is conducive.

Knowledge of newborn resuscitation was good as three quarters of the health care providers scored over 80% in the questionnaire however more than half were not able to identify the steps of newborn resuscitation correctly. Health care providers' who had been trained on newborn resuscitation performed better than those who had not been trained. The findings of the study showed there was a significant correlation between the health care providers' knowledge and training on newborn resuscitation (OR= 3.500 and P value < 0.05). Other variables had no positive significance correlation as the P values were >0.05.

Preparation of the delivery room prior to delivery was not well done especially in labour ward where the windows were not always closed and had a faulty resuscitation table that was cold at all

times since they didn't have a radiant warmer. Health care providers' were not always kin with the environment during resuscitation. Resuscitative equipment were not always prepared prior to delivery, it's only when an emergency occurred that the health care providers started looking for equipment and test whether they were functional which could delay resuscitation. Theater resuscitative equipment were readily available during resuscitation than labour ward. Theater was always clean and half of the staff mentioned scrubbing the floor and cleaning the resuscitation table as one of the ways to minimize cross infections.

6.3 Conclusion

a) More than half of the health care providers had adequate knowledge on newborn resuscitation however identification of steps of newborn resuscitation was a challenge that could be improved with training on newborn resuscitation.
b) The Maternity theatre was well equipped but labour ward needed more equipment for resuscitation in comparison with the number of deliveries conducted.
c) The environment was conducive for resuscitation however warmth was not well maintained during resuscitation.

6.4 Recommendations

There is need to improve health care workers preparedness on newborn resuscitation in both labour ward and maternity theatre. Health care providers can improve their knowledge on newborn resuscitation through attending short courses on newborn resuscitation. The policy makers can set funds to train health care providers on newborn resuscitation especially to those who have never gotten a chance to attend the course.

The units assessed are well equipped for newborn resuscitation however the faulty equipment can be repaired or the institution can help to purchase more equipment. A handing over book of the equipment should be available and handed over at every shift. Resuscitative equipment should be readily available during resuscitation by ensuring equipment are prepared prior to conducting deliveries.

Warmth in labour ward can be maintained by closing windows in the delivery room before conducting resuscitation. Health care providers should ensure the environment in the delivery room is always clean by frequently cleaning the unit and cleaning of resuscitaire after every resuscitation.

6.5 Further study

A study on skills on newborn resuscitation should be conducted to correlate the knowledge and skills on newborn resuscitation.

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APPENDICES

Appendix 1: Authorization Letter to KNH Research Committee

KNH/R&P/FORM/01

KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
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Study Registration Certificate

1. Name of the Principal Investigator/Researcher
CAROLINE KOECH

2. Email address: Koech.carolyne@gmail.com Tel No. 0722584394

3. Contact person (If different from PI) N/A

4. Email address: N/A Tel No. N/A

5. Study Title
Health care providers preparedness on newborn resuscitation in Kenyan Level and Maternity Theatre

6. Department where the study will be conducted Obs Reproductive Health
(Please attach copy of Abstract)

7. Endorsed by Research Coordinator of the KNH Department where the study will be conducted.
Name: DR. IKOL DUNCAN Signature [signature] Date 16/04/2019

8. Endorsed by KNH Head of Department where study will be conducted.
Name: DR. MUNGE Signature [signature] Date 16/4/19

9. KNH UoN Ethics Research Committee approved study number P55/2/2019
(Please attach copy of ERC approval)

10. I Caroline Koech commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Research and Programs.

Signature [signature] Date 16th April 2019

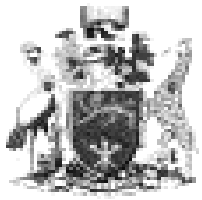
11. Study Registration number (Dept/Number/Year) Obs & Gynae / 293 / 2019
(To be completed by Research and Programs Department)

12. Research and Program Stamp

All studies conducted at Kenyatta National Hospital must be registered with the Department of Research and Programs and investigators must commit to share results with the hospital.

Version 2: August, 2014

Appendix 2: Authorization Letter from Ethics Committee



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KNH-UON ERC
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KENYATTA NATIONAL HOSPITAL
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Ref: KNH-ERC/A/133

10th April, 2019

Caroline Chepkoo Koech
Reg. No.H58/7105/2017
School of Nursing Sciences
College of Nursing Sciences
University of Nairobi

Dear Caroline

RESEARCH PROPOSAL: HEALTHCARE PROVIDERS' PREPAREDNESS ON NEWBORN RESUSCITATION IN LABOUR WARD AND MATERNITY THEATRE AT KENYATTA NATIONAL HOSPITAL (P85/01/2019)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and approved your above research proposal. The approval period is 10th April 2019 – 9th April 2020.

This approval is subject to compliance with the following requirements:

a. Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b. All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
c. Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
e. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
f. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (Attach a comprehensive progress report to support the renewal).
g. Submission of an executive summary report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website http://www.erc.uonbi.ac.ke

Yours sincerely,

PROF. M. L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
The Director, School of Nursing Sciences, UoN
Supervisors: Dr. Joyce Jabat, Prof.Anna Karani

Appendix 3: Informed Consent

Title of the study: Health care providers' preparedness on newborn resuscitation at labour ward and maternity theatre. This study aims at assessing the capacity of health care providers in preparedness in newborn resuscitation. The key areas that will be looked into is health care providers' knowledge in newborn resuscitation, availability of basic equipment used in resuscitation and the environment in which the delivery is conducted.

The primary investigator Carolyne Koech on 0722584291 or Email Address at koechcarolyne@gmail.com a second year student at UON.

Benefits of the study

There will be no direct benefits to you as a participant. The information gained during the research will be used to address the issues that hinder preparedness of newborn resuscitation.

Risks

The only risks involved are your professional background, years of experience, training attended on newborn resuscitation and knowledge on resuscitation procedure.

Procedures

If you agree to participate in the study you will be asked to fill a questionnaire. Kindly read and understand all questions before answering. Each questionnaire will have a serial number not your name this is to maintain confidentiality therefore the findings cannot be linked to any person. The questionnaire will contain both closed and open ended question. Filling the questionnaire will take approximately 10 minutes. There will be different section to capture your demographic data, knowledge on newborn resuscitation, equipment and maintenance of warm chain.

Compensation

There is neither a monetary award nor compensation for participation.

Voluntary Participation and Withdrawal

Your participation is entirely voluntary. Should you change your mind, you have the right to drop out at any time without facing any consequences.

Sharing the results

The results of this study may be presented during scientific and academic forums and may be published in scientific journals.

Confidentiality

You will not be required to write your name or give personal identification in the questionnaire; there will be no way to identify individual participants.

Contact person

If there any questions, complaints or concerns kindly contact:

Name and role	**Institution**	**contact**
Carolyne Koech (primary investigator)	**University of Nairobi, School of Nursing.**	**0722-584291**
Dr. Joyce Jebet (lead supervisor)	**University of Nairobi, School of Nursing**	**jjcheptum@gmail.com**
Prof. Annah Karani (second supervisor)	**University of Nairobi, School of Nursing**	**kagure@uonbi.ac.ke**
Director ethics	**KNH /UON**	**Tel no. 020272630**

Consent confirmation form

I have read the consent explanation and understood its content. I have been given the opportunity to discuss all my concerns with the researcher. I have had my questions answered in language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I understand that all efforts will be made to keep information regarding my personal identity confidential.

I understand that by signing this consent form, I have not given up any of the legal rights that

I have as a participant in a research study.

I agree to participate in this research study: Yes No

I agree to fill in the questionnaire Yes No

Name of the health care provider…… signature……. Date…….

Name of investigator……signature……. Date…….

Researcher's Statement

I the undersigned have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has freely given his/ her consent.

Researchers Name: ----------Signature ---------- Date ----------

Role in the study----------

Witness Name ----------Signature---------- Date: ----------

Witness contact: Tel Number: ---------- P. O Box ---------- Email ----------

Appendix 4: Health Care Providers' Questionnaire

Title: Health care Providers' Preparedness on Newborn Resuscitation in Labour ward and Maternity Theatre at KNH.

Date:

Encircle one answer and specify where indicated.

The questionnaire will take approximately 10 minutes to fill.

Section A: Demographic data

1. Serial no…… Designation …….
2. Age

   a) 25 years and below b) 25-35 years c) over 35 years
3. Sex

   a) Male b) Female
4. Years of experience in the unit:

   a) Below 2 years b) 2-5 years c) over 5 years
5. Formal training:

   a) Nurse

   b) Medical Doctor

   c) Clinical Officer

   d) Others (specify) _____
6. Have you ever been trained on newborn resuscitation?

   a) Yes b) No

7. If yes which of these training courses did you do?

    a) EPLS- European Pediatric Advance Life Support

    b) HBB- Help Baby Breath

    c) ETAT+- Emergency Triage and Treatment

    d) BEmONC- Basic emergency obstetric and newborn care.

    e) Essential newborn care

    f) Others specify

8. If NO why?

    a) Never had a chance to attend

    b) Cost of the course is expensive

    c) Have never heard of any course

    d) No time off work to attend the course

    e) Not interested

9. Which year did you attend the course ……..……

10. How many times have you performed newborn resuscitation for the past 3 months?

    a) Less than 5 times

    b) 5-10 times

    c) More than 10 times

KNOWLEDGE ON NEWBORN RESUSCITATION PROCEDURES

11. A newborn at term with no meconium stained liquor or on the skin and has good muscle tone requires resuscitation

    a) Yes b) No

12. A newborn with meconium stained liquor who looks flaccid will require suctioning?

a) Yes b) No.

13. How is suctioning done in case of secretions?

……

……

……..

14. Stimulation of a new born is done by:

a) Slap the sole of the foot
b) Rub the back
c) Slap the back
d) Suctioning

15. The steps of neonatal resuscitation include

a) Administer adrenaline – administer 10% dextrose – chest compression- ventilation- provide warmth
b) Provide warmth-dry and stimulate –position head and clear the airway- ventilation- chest compression- administer adrenaline
c) Position and clear the airway-ventilation- chest compression –provide warmth- administer adrenaline

16. A baby is positioned in neutral position for ventilation?

a) Yes b) No

17. What is the rate of ventilation per minute

a) 30 breaths
b) 40 breaths

c) 50 breaths

18. The face mask during ventilation must cover

a) Nose only

b) Both the Nose and mouth

c) Mouth only

19. Chest compressions are done when the heart rate is below 60 breaths per minute

b) Yes b) No

20. The land mark of chest compression in a new born is 2 fingers placed on the sternum below the nipple line.

a) Yes b) No

21. What is the ratio of ventilation to chest compression

a) 1:3

b) 3:1

c) 15:2

22. Name at least three ways of ensuring the delivery room is kept warm

a)…….

b) ……..

c)……..

24. The delivery room temperature should be maintained at 20-25 degrees centigrade

a) Yes b) No

25. A preterm born below 28 weeks gestation is put under a radiant heater to keep warm but still feels cold. What mechanism can be done to the newborn to maintain warmth?

……

26. What is the basic equipment for newborn resuscitation? Name three.

a)…….

b)……

c)……

27. How is infection prevention done in your unit?

……

……

……

……..

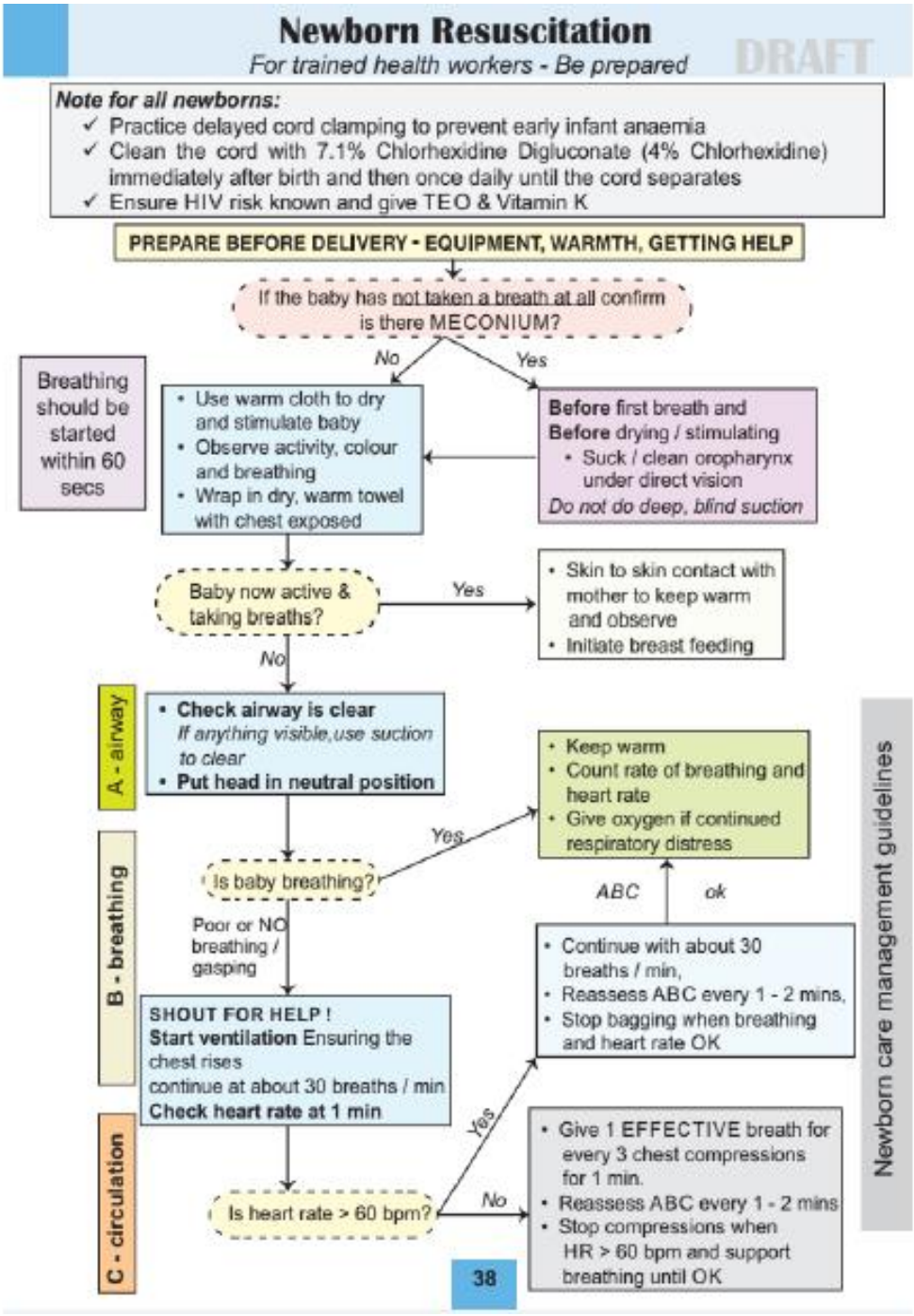
Appendix 5: Basic Newborn Resuscitation Equipment and Drugs Checklist

Service station: labor ward and maternity theatre:

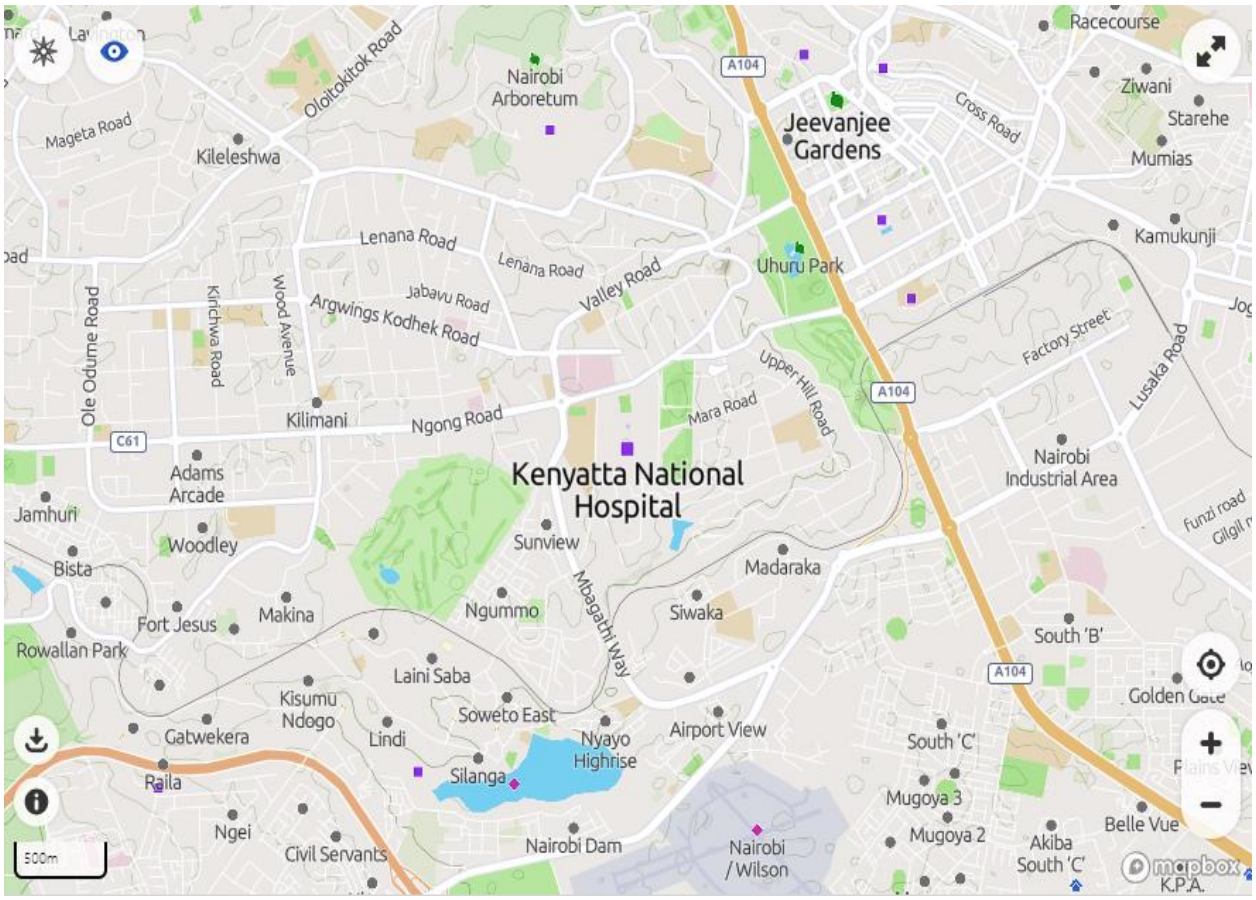
Mark- P for present, A for absent, F- functional NF- nonfunctional.

Item	Present	Absent	Functional	Nonfunctional	Quantity
Resuscitation table					
Radiant warmer					
Towels minimum 2					
Mucus extractor/ vacuum suction machine					
Bulb sucker/ penguin syringe					
Self-inflating bag and mask (250mls/ 500mls)					
Face mask size 0					
Face mask size 1					
Clock / watch					
Portable cylinder					
Plastic bags					
Adrenaline					

Appendix 6: WHO Guidelines On Steps On Newborn Resuscitation



Appendix 7: Map of Kenyatta National Hospital



Adapted from Google Maps.