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Sinyiza, Leah

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EXPLORATION OF NURSES VIEWS ON MECHANICAL VENTILATOR MANAGEMENT PROTOCOL IN NEONATAL INTENSIVE CARE AT AN ACADEMIC HOSPITAL IN GAUTENG

Leah Sinyiza

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of

Master of Science in Nursing

Johannesburg, 2015.

DECLARATION

I, Leah Sinyiza, declare that this research report is my own work. It is being submitted for the degree of Master of Science (Nursing) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature.....

Date.....

Protocol Number M140752

DEDICATION

I dedicate this work to my parents for encouraging me to take on educational challenges and never to give up my dreams of having a Master's degree.

I also dedicate this to my darling husband Dr. Frank Watson Sinyiza, my brothers and my sisters for their untiring support and love throughout my study period at the University of the Witwatersrand, Johannesburg.

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ABSTRACT

Mechanical ventilation is one of the major interventions in neonatology which provides lifesaving support for infants with respiratory failure. It is indicated in approximately two thirds of all infants admitted to neonatal intensive care units with respiratory acidosis, hypoxia and severe apnoea to improve gaseous exchange and to reduce work of breathing. Although mechanical ventilation is lifesaving, it may cause chronic lung injury resulting in broncho-pulmonary dysplasia. In the South African setting, only 25% of nurses practicing in intensive care units are formally qualified as intensive care nurses and 3% of these in neonatal and paediatric care. As a result care delivery in this specialist unit relies on registered nurses and newly qualified nurses, who are expected to provide quality, advanced nursing care with good patient outcomes. An increasing practice is the development and utilisation of protocols or clinical guidelines based on best available evidence to reduce variability in mechanical ventilation thus reducing risk of complications in this vulnerable patient population.

This study aimed to explore and describe nurses' views regarding the current mechanical ventilator management protocol, whether it can be adopted to standardise nursing care in a neonatal intensive care unit at a public tertiary academic hospital in Johannesburg.

A qualitative, descriptive and exploratory approach was used in this study. Focus group interviews were conducted and an interview guide was used to collect data. Data were analysed following the process of thematic content analysis by Braun & Clarke.

Three themes emerged from the study which includes current practice, importance of protocols, and development of protocols is a multidisciplinary task. Under current practice theme, there are three subcategories namely; use of the protocol in the neonatal intensive care unit, management of ventilated patients and importance of knowing arterial blood gas. Findings indicated that the current protocol doesn't guide nursing care and is meant for doctors' understanding. Nurses felt that there is need for a nursing protocol to guide nursing care. It is also important to involve multidisciplinary team when developing protocols.

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LIST OF ABBREVIATIONS

ACV : Assist control ventilation

CMV : Controlled mechanical ventilation

CPAP : Continuous Positive Airway Pressure

HFOV : High frequency oscillation ventilation

IMV : Intermittent Mandatory Ventilation

NICU : Neonatal intensive care units

PEEP : Positive end expiratory pressure

PICU : Paediatric intensive care unit

PSV : Pressure support ventilation

SANC : South African Nursing Council

SIMV : Synchronized Intermittent Mandatory Ventilation

CHAPTER ONE

OVERVIEW OF THE STUDY

1.0 INTRODUCTION

This chapter focuses on the background of the study, problem statement, research question, objectives and importance of the study. An overview of research methodology used, validity and reliability (trustworthiness) of the study including ethical considerations are also presented.

1.1 BACKGROUND OF THE STUDY

Paediatric intensive care units (PICU) and the specialisation of paediatric critical care were established in response to increased numbers of children with critical disease conditions and injuries. The survival outcomes of critical care patients with diseases such as respiratory distress syndrome, septic shock and other surgical operations have improved with advancement in technology and education through continuous monitoring and specialisation trainings respectively (Epstein and Brill, 2005). Following on the emergence of paediatric critical care in the 1960s, neonatal intensive care units (NICU) were developed to provide specialised care for high risk infants (Epstein and Brill, 2005). Neonatologists came up with new environmental strategies, nutritional procedures, ventilation and monitoring techniques to support the premature infants and sick new-borns with respiratory distress syndrome (Epstein and Brill, 2005). And this greatly improved survival of infants. In the 1960s, it was discovered that many infants who developed persistent lung disease such as broncho-pulmonary dysplasia were the ones who previously received extended mechanical ventilation due to respiratory distress syndrome and this called for a need to extend the care of older infants and children (Epstein and Brill, 2005).

In intensive care units, mechanical ventilation is one of the frequently used treatment modalities for most admissions (Burns, 2005). It is intended to support

the airway and respiratory system when the patient's breathing is compromised to sustain life.

Globally, 90% of critically ill paediatric patients admitted in intensive care units are put on the mechanical ventilation (Murray, O'Halloran, Chisakuta, Cardwell and Blackwood, 2011). Ventilation in children is commonly required for the following conditions; respiratory distress syndrome, apnoea due to prematurity, infections as in sepsis or pneumonia, postoperative recovery, persistent pulmonary hypertension, meconium aspiration syndrome and congenital abnormalities such as congenital diaphragmatic hernia (Wong, 2012). Improved ventilation and adequate oxygenation with minimal lung damage and compromise to the circulatory system are the main goals of mechanical ventilations to these children. Despite being the life-saving intervention, mechanical ventilation may cause chronic lung damage which can result in bronchopulmonary dysplasia (Adam and Eichenwald, 2013).

Ventilation is delivered artificially using an endotracheal tube inserted in the mouth or nose and sometimes a surgical tracheostomy is performed. Patients need's determines the mode of ventilation, pressure support and also the setting values of tidal volume, frequency, fraction of inspiratory oxygen (Fio2) and positive end-expiratory pressure (PEEP) (Lawson, 2008).

Most ventilators used in infants are pressure-limited, time-cycled and have continuous flow. Pressure-limited ventilators are used depending on the patient's lung compliance to deliver a variable tidal volume. Time cycled - inspiratory time (IT) is set to complete the breath from inspiration to expiration within a limited time. Inspiratory time is set from 0.25-0.45 seconds and it determines the period in which the gas gets in contact with the alveoli for gas exchange (Lawson, 2008).

In continuous flow of gas, during inspiration the patients does not need to activate the flow system because there is continuous supply of gas in the patient airway. The flow of this gas is usually set at 6-12 litres per minute based on the neonate's body weight and neonatologist preference (Lawson, 2008).

Advances in medical practice are always followed by advances in nursing care. Intensive care training for nurses was established in South Africa in 1966 as a post registration qualification (de Beer, Brysiewicz and Bhengu, 2011). According to the South Africa Nursing Council regulation 2598 (1984) the registered nurses scope of practice in regards to oxygenation is to "supervise over and ensure that there is maintenance of oxygen supply to the patient". In intensive care nursing this responsibility extends to include: in-depth knowledge of various types of ventilators and modes of ventilation used in specific units (Scribante, Muller and Lipman, 1996). With this knowledge and close proximity to the patient, nurses are able to recognize and correct the respiratory problems using proper oxygen supplementation. Pretorius and Klopper (2012) found that there were 2537 trained critical care nurses on the SANC registers in 2007. Lack of trained intensive care nurses forces health care system to deploy newly qualified comprehensive professional nurses to work in this specialist unit (de Beer et al., 2011).These nurses may not been formally educated for nursing in intensive or critical care nursing, thus increasing the risk to patients (Scribante et al. as cited in Beer, 2011).

Increase in neonatal malpractice lawsuits in South Africa has led to reflection on the standards of neonatal care (Department of Health, MDG for South Africa, 2010). As partner in the WHO (World Health Organisation) the spotlight is on South Africa to realise Millennium Developmental Goal 4, of not only reducing child mortality of the under-5 group by two thirds, but also improving the quality of life of children (Department of Health, MDG for South Africa, 2010). Now more than ever there is a growing need to improve the quality of health care of children by maintaining standards of nursing care. Standards of care, protocols and guidelines are important to reduce inconsistency in all practice, particularly nursing, as well as potential risks to patients. Mead (2000) commended that one way of realising practitioner's consistency in delivering of care and use of evidence based practice is by using the clinical guidelines. In addition, in the study by Ahmed, Soliman and Awad, (2012) observed that guidelines provide framework for patients to evaluate the care they receive in terms of quality and it also assist practitioners in decision making when providing patients' care. The study further supported that nursing

interventions requires development of clinical guidelines based on current studies to improve performance and support the quality of health services.

Mechanical ventilation is an essential intervention in NICU and PICU where clinical guidelines or protocols are required to standardise care. Observation in this context is that although there are protocols, these are often developed by medical practitioners according to their scope of practice. Kacmareck (1998) observed that despite doctors developing the protocols, nurses are the ones who are responsible for operationalizing them since they are in constant contact with the patients and can make changes when the medical practitioners are not around. This means that nurses rely on the same protocol to inform nursing care. Differences in the scope of practice of these professionals who work collaboratively and the requirement of protocols and clinical guidelines to improve patient care require a multidisciplinary team approach for development, monitoring and evaluation. In a setting where research to support evidence based care is in its infancy, the first step will be to explore current practice on mechanical ventilation in neonates.

1.2 PROBLEM STATEMENT

There is anecdotal evidence of a variation in ventilator management partly due to patient clinical presentation and largely due to individual practitioner practice. This practice is informed by protocols developed by medical practitioners that are used to inform neonatal care in NICU. In critical care nursing the nurse has an extended role which requires clinical decision making in implementing protocols in response to the emerging patient needs (Endicott as cited in Harris and Chaboyer, 2002). In employing this role, nurses need to take part in the development, implementation and evaluation of protocols with the aim of advancing nursing practice and building the body of nursing knowledge. Based on the above this study intended to explore nursing opinions when faced with the question:

> Can current ventilator management protocols guide the nursing care of neonates?

1.3 THE PURPOSE OF THE STUDY

The purpose of this study was to explore and describe nurses' views on whether current ventilator management protocols can be adopted to standardise nursing care in a neonatal intensive care unit at an academic Hospital in Gauteng.

1.4 OBJECTIVES OF THE STUDY

- To explore and describe the opinions of professional nurses concerning the utilisation of a ventilator management protocol.

- To make recommendations that can help in the development of a specific nursing protocol in the management of mechanically ventilated neonates.

1.5 SIGNIFICANCE OF THE STUDY

The significance of this study was to gather essential nursing information and perspectives which will inform the development of a nursing protocol to guide mechanical ventilation in NICU. This will help to generate new knowledge for nursing practice.

1.6 RESEARCHER ASSUMPTIONS

Assumptions are statements that are taken for granted or are considered true, even though they have not been scientifically tested and meta-theoretical assumptions are the philosophical discussions of the foundation (Simon 2011). The research was based on the following meta-theoretical, theoretical and methodological assumptions:

1.6.1 Meta-Theoretical Assumptions

.

- **The person**

According to Ernestine Weidenbach (1964), a person is a unique being who needs stimulation to strive towards self-direction. She states that each person develop self-sustaining resources based on his or her uniqueness to fulfil ones responsibilities.

She further states that personal integrity and self-worth are as a result of self-acceptance and awareness. And this represents that whatever the person does reflects what that person decide at that time (George, 2002). The person in this study is the nurse who is taking care of the ventilated patient in Neonatal intensive care unit. The nurses usually make decisions on the patient depending on clinical assessment and the situation that she is in, for instance when the doctor is not around and the patient needs urgent intervention.

- **Environment**

The environment is a place or situation in which a person is constantly and actively involved in. Every individual has his or her own internal and external environment. The physiologic element constitutes internal environment, while perception, operation and conceptual represent three levels of the external environment. In nursing setting, environment may also be defined as peripheral factors and situations which includes policies, setting, atmosphere time of the day, humans and happenings (George, 2002). In this current study, the environment implies to the mechanical ventilator which is attached to the critically –ill patient. The nurse usually work with this ventilator in monitoring and taking care of the ventilated patient.

- **Nursing**

Nursing is a practice discipline designed to produce explicit desired results.

According to Wiedenbach, nursing is nurturing and caring for someone in a motherly fashion. She further states that nursing requires application of knowledge and skill toward meeting patients' needs (George, 2002). Royal college of Nursing also defined nursing as "the use of clinical judgement in the provision of care to

enable people to improve, maintain, or recover health, to cope with health problems, and to achieve the best possible quality of life, whatever their disease or disability, until death" (Royal College of Nursing United Kingdom, accessed on 15 June, 2014). In this study, nursing implies that nurses need to have knowledge of mechanical ventilation to enable them to make good clinical judgement in the provision of care.

- **Health**

Health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity (WHO, 1948). People's environment and situation play a role in determining their health status.

1.6.2 Theoretical Assumptions –

Theoretical assumptions are statements that are taken for granted or are considered true, even though they have not been scientifically tested (Simon 2011). A theory is an explanation of phenomenon and its relationship between variables that are related to the phenomenon (Burns and Grove, 2005). The theoretical framework for this study was based on Ernestine Weidenbach prescriptive theory. According to this nursing theory, each patient care is individualised. The nurse has responsibility to assess needs of each patient so as to intervene accordingly.

Weidenbach (1964) stressed that help is an integral part of nursing. An individual's action of a particular situation represents his or her clinical judgement. The practice of nursing is the observable actions that are affected by the nurse's beliefs and feelings about meeting the patient's need for help. The nurse develops goals and actions based on understanding of patient's needs and concerns. This will intend to enhance patient's ability and guide on activities related to medical plan that will improve the patient's condition. The nurse also focus on preventive measures that would prevent the occurrence of complications that can come up due to relapse, or the development of new concerns (George, 2012).

The prescriptive theory directs action toward an explicit goal and is based on the following three concepts;

The central purpose.

The practitioner identifies what is valuable to the particular discipline. In this concept the nurses' central purpose defines the quality of care she desires to implement in her patient and recognises her responsibility in management of the patient. The nurse usually bases her philosophy to guide her thinking about what she is to do and this thus influence her decisions (George, 2012).

The prescription

The prescription is a directive to activity which specifies both the nature of the action that will most likely lead to fulfilment of the nurse's central purpose and the thinking process that determines it (George, 2002). Prescription also indicates the broad general action appropriate to implementation of the basic concepts as well as suggesting the kind of behaviour needed to carry out these actions in accordance with the central purpose (George, 2002).

The realities in the immediate situation

The nurse then considers the realities of the situation in which she is to provide nursing care after determining the central purpose.

The central theoretical statement of this study is that nurses make sound decisions based on clinical judgment. Comprehensive decision results from sound mind and emotions which develop with expanding knowledge and professionalism. Having a specific nurse mechanical ventilator management protocol helps not only their clinical decision-making but will also help to prevent complications that can ensue with delays in waiting for the medical practitioners (George, 2002).

1.6.2.1 Definition of terms for the purpose of this research

The operational definitions consistently used in this study are as follows:

- **Mechanical ventilator**

Mechanical ventilation refers to the use of an artificial device or machine specifically designed to assist a patient to breathe (Urden, Lough and Stacy, 2006). Mechanical ventilation can be categorised as invasive or non-invasive where ventilator support is provided without the use of an endotracheal tube. In this study, mechanical ventilation will refer to the use of an endotracheal tube inserted into a critically ill neonatal patient and connected to a mechanical ventilator.

- **Ventilator management**

In this study ventilator management refers to the assessment, monitoring and evaluation of the need for mechanical ventilation. This includes the application of knowledge about the different types of ventilation modes, settings and alarms, initiation of ventilation, monitoring of patient response to ventilation, identification of patient and ventilator-related problems, adjusting ventilator strategies and parameters so as offer optimal individualised care to the patient as well as preventing complications (Grossbach, Chlan and Tracy, 2011).

- **Ventilator management protocol**

National clinical guidelines interpreted and implemented locally are sometimes referred to as protocols (Thompson and Dowding, 2002). In this study a term ventilator management protocol will refer to a locally developed evidence-based guideline which outlines a course of interventions that act as a blueprint for the care of ventilated neonate and provides knowledge which enables practitioners to make clinical decisions regarding patient care (Jordan, 2011).

- **Neonate**

A neonate is a child under 28 days of age (Department of Health, Republic of South Africa, 2013). In this study a patient is referred to a neonate.

1.6.3 Methodological Assumptions

"Methodological assumptions are statements that are taken for granted or are considered true even though they have not been scientifically tested" (Burns and Grove, 2007:37). Research in nursing enables nurses to describe, explain, predict and control a phenomenon which is essential to nursing practice (Polit and Beck, 2012). The researcher believes in a holistic approach to patient care based on Ernestine Weidenbach's prescriptive theory as an essential component to nursing practice and a functional approach in nursing research.

A functional approach to nursing research is of paramount importance in improving clinical practice through development and expansion of knowledge. It also helps to provide current information to be used to generate guidelines for actions in order to make practice more effective. This study was done with the aim of acquiring information that is useful to improve nursing practice.

1.7 OVERVIEW OF RESEARCH METHOD

1.7.1 Research Design

A qualitative, descriptive and exploratory approach was used in this study.

Qualitative design refers to "a systematic, subjective approach used to describe life experiences and give them a meaning" (Burns and Grove, 2011:487). The findings in the qualitative design leads to an understanding of circumstances and gives insights that guide nursing practice as well as building nursing knowledge through the process of theory development. In this study, the findings and

recommendations will help in the process of developing nursing protocol for management of mechanically ventilated patients.

Descriptive design is “intended to give in depth information about the characteristics within a particular field of study” (Burns and Grove, 2011:505). This gives an overview of a natural situation and helps to identify the existing problems with current practice or rationalise current practice and determine what other nurses in similar situation are doing.

Exploratory design is used to uncover or discover information about little known phenomena. In this study the researcher seeks to gather baseline information on a particular variable that is difficult to measure, that is, nurses views pertaining to the current mechanical ventilator management protocol which can eventually determine the development of a specific protocol for nurses (Burns and Grove, 2011:613).

1.7.2 Research Method

1.7.2.1 Population

Population is “all elements (individuals or objects) that meet certain criteria for inclusion in a study” (Kerlinger and Lee, 2000 as cited in Burns, 2007:40). The target population were professional nurses practicing in the selected neonatal unit. There are sixty nine (N=69) registered nurses working in these units of which thirty (n=30) have the specialty qualification and thirty-nine (n=39) are without specialty qualification. Fifteen (n=15) was included in the study representing 21.7% of the total population.

1.7.2.2 Sample and sampling

A sample is “a subset of the population element, which are the most basic units about which data are collected for a particular study” (Burns and Grove, 2007:40). Sampling method is “the process of selecting a group of people, events or elements that are representative of the population that is being studied” (Burns and Grove, 2007:40). A non-probability purposive sampling method was used to select fifteen (15) professional nurse experts, involved in neonatal intensive care units and paediatric or neonatal specialists. A non- probability sampling implies that not all elements of the population have an opportunity for selection in the sample (Burns and Grove, 2007). A purposive sampling refers to the judgemental selection in which the researcher selects certain subjects to include in the study (Burns and Grove, 2007). This method of sampling was chosen in this study to obtain in-depth understanding of a complex experience as it included participants with different levels of experience. Nurse experts according to Benner, Tanner and Chesla (2009) have sufficient knowledge gained from clinical experience to evaluate care interventions, a role recognised by their peers who nominate them as spokesperson for the nursing profession.

Inclusion criteria

- Paediatric trained professional nurses
- Neonatal trained professional nurses
- More than 2 years experience in intensive neonatal nursing care

1.7.2.3 Data collection

Data collection is “a systematic gathering of information relevant to the research purpose or specific objectives of the study” (Burns and Grove, 2007:41). In this study a series (three) of focus group interviews each lasting 45 – 60 minutes was conducted and recorded to capture the accurate data as expressed by the informants. An interview guide was formulated to guide the focus group discussion. Data was collected until saturation was reached (Polit and Beck, 2012).

1.7.2.4 Instrument

Demographic data

This data was collected to describe the sample and determine the population for generalization of the findings.

Interview guide

In this study, data was collected using in-depth interviews. The open ended question was used to acquire the nurses' views. The use of open ended question permitted the respondents to answer in detail and to qualify and clarify responses. It also permitted self-expression and richness of details. Before the interview the participants were given a copy of the current medical protocol on ventilator management in NICU to review and engage in a group discussion. The interviewer then facilitated the discussion by asking one broad question followed by probing questions.

Research process

After obtaining ethical approval and permission from the university and hospital authorities, data was collected from paediatric units. The eligible participants were invited to take part in the study. Each participant was given an information sheet containing details of the study. The participants were given time to read and understand the information letter before signing a consent form indicating their willingness to participate in the study. The participants were also required to sign a consent form giving permission for the interviews to be audio taped. The audiotapes, transcripts and field notes were stored in a locked cupboard which was accessed only by the researcher, co coder and supervisor. Electronic records of the study were encrypted to maintain confidentiality.

1.7.2 Study Setting

The study was carried out in the neonatal intensive care unit at an Academic hospital. The NICU comprises of two units, with 16 bed capacity for critically ill infants and children requiring advanced intensive care. This setting is also a tertiary academic institution staffed by medical and nurse practitioners expected to demonstrate continuous education and research skills in applying evidence based practice to maintain quality care delivery.

1.8 TRUSTWORTHINESS

There are four criteria for developing the trustworthiness of qualitative inquiry, whether data is collected from direct observations, focus groups, or interviews according to Lincoln and Guba (1985) as cited in Polit and Beck, (2012).

- **Credibility** – "refers to the confidence in the truth of the data and interpretation of them" (Polit and Beck, 2012: 584). Credibility in this study was guaranteed by tape recording the information provided by the participants to obtain the accurate data as expressed. It was also ensured by accurate transcription of interview narratives and field notes. Stakeholder checks like peer review meetings and one to one supervision with the research supervisor were continuously done during data collection, analysis, interpretation and writing up of the study findings and conclusion.

- **Dependability** – "this is the reliability of data over time and conditions" (Polit and Beck, 2012:585). This has been ensured by keeping the interview question scripts for comparison in future with a replicated study in a similar setting to see if the findings are going to be repeated. A thorough documentation of the research process was followed throughout the study to ensure reliability to other settings.

- **Confirmability** – "refers to the objectivity for similarity between two or more independent people about the data's accuracy, relevance and meaning"

(Polit and Beck, 2012:585). This is important as it represents the information that reflects the participant's voice and not the researcher's perspectives. Confirmability was guaranteed by having a second moderator who acted as a co-facilitator in the focus group to ensure data accuracy, relevance or meaning. And by ensuring that the findings represent the information gathered from the participants.

- **Transferability**- "the extent to which findings of the study can be transferred to or have applicability to other settings or groups" (Polit and Beck, 2012:585). Sufficient descriptive data should be provided so that users would be able to evaluate if data is applicable to other contexts. In this study transferability was confirmed utilising purposive sampling to include only registered nurse in the sample to maximize the range of specific information obtained from the informants. Hence the findings can be applicable to other similar settings. The recommendations are described sufficiently in details to enable applicability to other settings with similar characteristics.

1.9 ETHICAL CONSIDERATION

Ethical clearance to conduct the study was obtained from the Human Research Ethics Committee (Medical) of University of Witwatersrand. Permission was also sought from the Hospital Management and Department of Health to conduct research in the hospital. A letter of request for permission to access the clinical facility and collect data was sent to the hospital management of an Academic Hospital.

Confidentiality and anonymity of the participants was ensured through the use of pseudonyms for each participant during data collection and reporting. Invitation letters informing the potential participants of the study were administered and then they signed the consent forms in agreement to take part in the study.

It was emphasised that participation in the study was voluntary and participants had a liberty to decline to answer questions as well as withdraw at any time without incurring any penalty.

1.10 SUMMARY

In this chapter, an overview of the study was presented which includes the problem statement, purpose of the study, research objectives and the significance of the study. The assumptions and the operational terms of the study were defined. A brief description of research methodology, trustworthiness of the study and the ethical considerations have also been presented. The remaining chapters of this report will present the following: Chapter two - a review of the literature; Chapter three – discussion of the research design and methods; Chapter four - presentation of research findings; Chapter five- discussion of findings, recommendations and conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

“A literature review is central to the research process and can refine a research question through determining inconsistencies in a body of knowledge. It inspires new research innovations and ideas while creating greater understanding about a topic” (Cronin, Ryan and Coughlan, 2008:43).

This chapter comprises of literature as regards to the study. A description of the conceptual basis of the study and an outline of mechanical ventilation are also presented.

The sources of literature reviewed included printed text books, articles and online publications which were not based on a specific time frame due to limited publications related to the topic. Most relevant sources accessed ranged from 1987 to 2014. The majority of literature accessed and analysed is from international sources as few articles related to the study could be accessed from within the African region. It should be acknowledged that not all accessed and reviewed literature is presented. Only relevant issues are presented in detail while others are only mentioned in this section.

2.2 THEORETICAL FOUNDATION OF THE STUDY

This study is founded on the prescriptive theory of nursing. This model was developed in 1964 by Enerstine Weidenbach and based on a concept that encompassed all nursing. According to Weidenbach, there are several explicit and implicit assumptions which guide her theory (George 2002). One explicit assumption that Weidenbach stated was that whatever the individual does represents his/her best judgment at the moment of doing it. The theory also emphasised that clinical judgment represents the nurse's likeliness to make sound decisions, which are based on differentiating facts of assumption, and relating them

to the effect (George 2002). Sound judgment is the result of disciplined functioning of mind and improves with expanded knowledge, as well as increased clarity of professional purpose (George 2002).

2.3 OVERVIEW OF MECHANICAL VENTILATION

Mechanical ventilation is “a method to mechanically assist or replace spontaneous breathing and involves a machine called a mechanical ventilator” (Courey and Hyzy, 2014:1). “A mechanical ventilator is a machine that generates controlled flow of gas into a patient’s airway. It is indicated for acute or chronic respiratory failure, which is defined as insufficient oxygenation, insufficient alveolar ventilation, or both” (Courey and Hyzy, 2014:1).

Mechanical ventilation augments the function of the diaphragm as well other muscles of respirations such as thoracic chest wall muscles. Mechanical ventilation plays a major role during respiratory failure by improving ventilation perfusion matching hence improved gas exchange, minimizing the risk of lung injury, optimizing patients comfort and decreased work of breathing (Wong, 2012).

A mechanical ventilator delivers a positive and negative pressure to the lungs based on the needs of the patient. For the delivery of positive pressure ventilation by a ventilator, the patient will have an endotracheal tube or a tracheostomy. “Positive pressure ventilation inflates the lungs by creating pressure at the airway opening that is greater than the intra-alveolar pressure thus resulting in improved gas distribution within the lungs because of recruitment or re-opening of partially collapsed lung segments and overall effect is improvement of gas exchange” (Wong, 2012:1148). “Negative pressure ventilators create a sub atmospheric pressure around the chest wall and create a negative abdominal pressure, which allows the diaphragm to distend and pull air into the chest” (Wong, 2012:1200).

The mechanical ventilation is classified as invasive and non-invasive. “In invasive mechanical ventilation, the administration of ventilation involves insertion of an artificial airway thus endotracheal tube or tracheostomy whereas non-invasive

ventilation refers to the administration of ventilatory support without using an invasive artificial airway" (Donn and Sinha, 2003:430).

2.3.1 Modes of Mechanical Ventilation

There are several modes of mechanical ventilation used in paediatrics. The mode refers to "the method of inspiratory support provided by the mechanical ventilator" (Grossbach, Chlan and Tracy, 2011:31). It is the specific combination of breathing pattern and control variables to deliver inspiration" (Grossbach, et al., 2011:31).

2.3.1.1 Continuous positive airway pressure (CPAP)

CPAP refers to "a continuous level of a positive airway pressure maintained throughout the respiratory cycle" (Grossbach et al., 2011:34). "The ventilator does not provide breaths during CPAP, the patient has to initiate all breathes" Grossbach et al., 2011:34). It increases functional residual capacity by holding the alveoli and airways open during exhalation.

2.3.1.2 Intermittent mandatory ventilation (IMV)

Intermittent Mandatory Ventilation is "a mode of ventilatory support that allows spontaneous breathing in between mandatory breaths from the ventilator. In this mode, the infant is allowed to breathe warmed, humidified continuous flow gas in between the pre-set respiratory rate of the ventilator that delivers a specific pressure" (Donn and Sinha, 2003:430).

2.3.1.3 Synchronized intermittent mandatory ventilation (SIMV)

Synchronized Intermittent Mandatory Ventilation is "the mode of ventilation in which mandatory breaths are given at a pre-set rate and spontaneous respirations are allowed in between just as in IMV" (Donn and Sinha, 2003:431). "A timing mechanism in the ventilator senses the appropriate time to give the mechanical

breath without interfering with the spontaneous breath" (Donn and Sinha, 2003:431).

2.3.1.4 Controlled mechanical ventilation (CMV)

In this mode minute ventilation is determined entirely by the set respiratory rate and tidal volume / pressure. The patient does not initiate additional breaths above that set on the ventilator (Donn and Sinha, 2003).

2.3.1.5 Assist control ventilation (ACV)

In this mode the tidal volume of each delivered breath is constant, regardless of whether it is triggered by the patient or the ventilator. The pressure threshold required to trigger a breath is usually set. At the beginning of a breath cycle, the ventilator senses a patient's effort at inhalation by detecting negative airway pressure or inspiratory flow. If the patient does not initiate a breath before the required period of time determined by the set respiratory rate, the ventilator delivers the breath (Donn and Sinha, 2003).

2.3.1.6 Pressure support ventilation (PSV)

Pressure support is a "way of providing an inspiratory pressure assist to spontaneous breaths during mechanical ventilation" (Donn and Sinha, 2003:431). The patient triggers each breath. The patient initiates every breath and the ventilator delivers support with the preset pressure rate. With support from the ventilator, the patient also regulates own respiratory rate and tidal volume (Donn and Sinha, 2003: 431).

2.3.1.7 High frequency oscillation ventilation (HFOV)

High frequency oscillation ventilation is "the delivery of small tidal volumes to the infant at fast frequencies of more than 150 breaths per minute" (Jarvis, Burt and English, 2012:2). Both inspiration and expiration are active, therefore reducing the

likelihood of gas trapping. High frequency ventilation is designed to reduce ventilator-associated lung injury, especially in the context of acute respiratory distress syndrome (ARDS) and acute lung injury (Jarvis et al., 2012).

2.4 HISTORY OF MECHANICAL VENTILATION IN PAEDIATRIC UNITS

Paediatric critical care started to emerge in the 1960s and has advanced since then (Epstein and Brill, 2005). However, adult respiratory intensive care units were created between 1930 and 1950 to care for adult polio patients. These adult intensive care units also cared for children with polio using the “iron lung” ventilators as a matter of necessity (Epstein and Brill, 2005). This was the basis for the neonatologists to establish neonatal intensive care units. Later on, they developed procedures for nutritional and environmental support of sick new-borns and premature infants along with ventilation techniques and monitoring for treating respiratory distress syndrome (Epstein and Brill, 2005). And this greatly improved survival of infants. By the 1960s, it was observed that many infants with bronchopulmonary dysplasia were previously mechanically ventilated due to respiratory distress syndrome. This created a need for extended care of older infants and children (Epstein and Brill, 2005).

Paediatric intensive care units (PICU) and the specialisation of paediatric critical care were established in response to increased numbers of children with critical disease conditions and injuries. The survival outcomes of critical care patients with diseases such as respiratory distress syndrome, septic shock and other surgical operations in have improved with advancement in technology and education through continuous monitoring and specialisation trainings respectively (Epstein and Brill, 2005). Following on the emergence of paediatric critical care in the 1960s, neonatal intensive care units (NICU) were developed to provide specialised care for high risk infants such as those with in the lung injury, severe infection and sepsis, traumatic brain injury and post-operative care which were not possible to manage in an ordinary paediatric ward (Epstein and Brill, 2005).

2.5 INDICATIONS FOR MECHANICAL VENTILATION

Mechanical ventilation is one of the major interventions in neonatology which provides lifesaving support for infants with respiratory failure (Adam and Eichenwald, 2013). It is indicated in approximately two thirds of all infants admitted in neonatal intensive care units with respiratory acidosis, hypoxia and severe apnoea to improve gaseous exchange and to reduce work of breathing. Despite potential benefits of mechanical ventilation, it may cause chronic lung injury (Adam and Eichenwald, 2013).

Mechanical ventilation is indicated for any acute or chronic cardiopulmonary insufficiency which may be due to problem with lung, cardiovascular system, Central Nervous System or various metabolic disorders (Adams and Eichenwald, 2013; Wong, 2012). The clinical signs which determines the initiation of mechanical ventilation includes the pH of 7.25 or less with a PaCO2 of 55 mmHg or more; FIO2 requirement of 50% or more (Adams and Eichenwald, 2013).

2.6 COMPLICATIONS OF MECHANICAL VENTILATION

Although mechanical ventilation improves survival outcome in infants with respiratory problems, it may be associated with a variety of complications (Fraser, Walls and McGuire, 2004)

2.6.1 Endotracheal Intubation injury

The insertion of a laryngoscope during intubation creates significant anxiety and stress to the infant which may lead to episodes of bradycardia and hypoxia. Iatrogenic injury to trachea may lead to perforation, which is associated with significant morbidity and mortality. About “1–2% of intubated neonates develop subglottic stenosis, mostly as a result of friction injury from the endotracheal tube” (Abubakar, 2012:251). Palatal deformities can develop secondary to grooves and a high arched palate that can lead to significant feeding and speech problems. This can occur as a result of palatal deformities that are sustained during the period of intubation (Abubakar, 2012).

2.6.2 Pulmonary Air-Leak Syndromes

“Pulmonary air-leak syndromes are a cause of significant mortality and morbidity in ventilated neonates, particularly in low birth weight infants” (Abubarkar, 2012:251). Airleak syndromes which can present as pneumothorax, pneumo mediastinum, or pulmonary interstitial emphysema are common in mechanically ventilated infants with advanced lung pathology, however, it can also occur spontaneously or in infants receiving continuous positive airway pressure (CPAP) (Abubarkar, 2012).

“Prolonged inspiratory time, high peak inspiratory pressure, excessive tidal volume and air-trapping due to insufficient expiratory time increase the danger of air leak during mechanical ventilation” (Abubarkar, 2012:251).

2.6.3 Hemodynamic Compromise

During normal respiration, a negative pressure is generated in the thorax, which facilitates venous return to the heart. However, positive intrathoracic pressure generated by mechanical ventilation leads to reduction in ventricular filling hence decrease in cardiac output, pulmonary and systemic blood flow (Abubarkar, 2012).

2.6.4 Broncho pulmonary Dysplasia

High ventilatory pressures and tidal volume causes lung injury (Abubarkar, 2012). It is evident that large tidal volumes are the primary cause of lung injury regardless of pressure used, this is due to excessive alveolar stretch which causes epithelial injury, influx of inflammatory cells and protein leakage into the alveolar space, hyaline membrane formation, changes in lymphatic flow, and disruption of surfactant activity (Abubarkar, 2012; Lipes, Bojmehrani and Lellouche, 2012).

2.6.5 Neurologic Injury

The use of mechanical ventilation can be associated with significant neurological complications although these may not be obvious initially. Cerebral blood flow in the preterm infant is poorly regulated due to the relatively narrow window of

effective auto regulation of immature cerebral vessels, therefore, changes in systemic blood flow are easily reflected in the cerebral vascular system (Abubarkar, 2012).

“Systemic hypotension caused by decreased cardiac output as a result of increased intrathoracic pressure can lead to decreased cerebral blood flow and cerebral ischemia particularly in the periventricular regions of the immature brain and subsequent return of normal or increased blood pressure can then lead to a reperfusion injury that can contribute to intracranial haemorrhage” (Abubarkar, 2012: 255). Other events that contribute to rapid changes in cerebral circulation include endotracheal intubation and suction which causes pain hence surges in blood pressure with episodes of bradycardia and hypoxia (Abubarkar, 2012).

2.6.6 Infection

“Endotracheal tube alters host defences, impairs mechanical clearance from the respiratory tract, which causes local trauma and inflammation, and allows pooling of secretions around the cuff which causes orophanryngeal colonization and nosocomial sinusitis” (Girou, Schortgen, Delclaux, Brun-Buisson, Blot, Lefort, Lemaire and Brochard, 2000: 2363). Consequently there is increased risk of Ventilated Associated Pneumonia (VAP) (Rello, Sonora, Jubert, Artigas, Rue and Valles, 1996).

2.7 NURSING CARE OF MECHANICALLY VENTILATED PATIENTS

“About 80% of patients in intensive care units are reported to require mechanical ventilation, and nursing care of patients receiving mechanical ventilation has become more and more important” (Suhara, George, Thomas, Chacko, Geevarghese and Babu, 2013:1410). There is need for close observation and continuous monitoring of all patients on mechanical ventilation. This ensures that patients receive a high standard of care in the following areas;

2.7.1 Clearance of secretions

Intubated patients have an ineffective cough due to a lack of glottis closure, therefore, endotracheal suctioning is necessary for the effective management of opening airways (Wood, Lewis, von Harz and Kollof, 1998). Suctioning reduces the risk of hypoxia induced by disconnecting the patient from the ventilator circuit thus maintains an uninterrupted oxygen supply and positive end expiratory pressure (PEEP). The indications for tracheal suction include high airway pressures, adventitious breath sounds and a reduction in oxygenation saturation levels. The procedure is performed in response to clinical signs and symptoms and not on a routine basis because this increases the risk of mucosal damage (Blackwood, 1999).

2.7.2 Sedation

Sedatives and analgesics are usually administered for tolerability of the tube, patient's comfort and reduction of anxiety in mechanically ventilated patients (Newmarch, 2006; Rose, 2012).

2.7.3 Oral care

The presence of oral cuffed endotracheal tube may cause hyper salivation in some patients, whereas other patients may develop a dry mouth (Newmarch, 2006) hence nurses need to provide mouth care to keep it clean and maintain mucosal integrity.

2.7.4 Humidification

The airways normally moisten and warm inspired air to 37"C and 100 per cent relative humidity. The presence of an endotracheal tube means that inspired oxygen by-passes the upper airways which deprive the lungs of heat and moisture (Newmarch, 2006). The effects of this are epithelial drying and retained respiratory secretions. "Humidification during mechanical ventilation is necessary to prevent

atelectasis and destruction of airway epithelium" (American Association for Respiratory Care, 1992).

2.7.5 Eye care

Sedated patient on mechanical ventilator have impaired blink reflex. This exposes the cornea to dryness, infection and perforation. It is important to prevent corneal abrasions by application of ocular lubricants or use of sterile eye pads (Newmarch, 2006).

2.7.6 Nutritional support

Nutritional support is vital in all mechanically ventilated patients and has to be monitored continuously. Feeding patients encourages weaning from ventilation by improving the hypoxic and hypercarbic ventilatory response (Boysen, 1987**).**

2.7.7 Communication and psychological support

Intensive care nurses are always in close contact with patients and relatives, therefore are in better position to offer psychosocial support. Nurses should provide continuous updates to parents or guardians about the management of the patient and offer counselling to alleviate their anxiety (Newmarch, 2006).

2.7.8 Safety issues

Nurses have an important role to play to ensure that ventilated patients are safe. Vigilant observations about safety precaution is of paramount importance. Endotracheal or tracheostomy tube must be handled with care when moving the patient and positioning ventilator tubing because of their fragility (Newmarch, 2006). At the beginning of each shift, the nurse is responsible for conducting safety checks on equipment in the bed space, alarm limits on monitoring equipment and ventilator alarm limits. It is essential to set these alarms sensibly so that changes to

normal set parameters are detected early and the relevant action taken (Newmarch, 2006).

A manual inflation bag should be available at all times and connected to an oxygen supply. High vacuum suction equipment must be in full working order to maintain airway patency if necessary (Newmarch, 2006).

2.8 WEANING FROM MECHANICAL VENTILATION

Weaning is defined as “the process of discontinuation of the ventilatory support plus removing the endotracheal tube” (Biban, Gaffuri, Spaggiari, Silvagni, Zaglia and Santuz, 2013:3). The first requirement for discontinuing ventilator support is the improvement or resolution of the underlying cause of respiratory failure and any related complication. At that point, once the gas exchange is adequate with low positive end-expiratory pressure and low fraction of inspired oxygen, hemodynamically stable and the respiratory drive to initiate spontaneous breaths is maintained or re-established, the patient is usually ready for withdrawal of ventilation and extubation (Biban, et al, 2013).

Weaning from mechanical ventilation includes both a systematic reduction of ventilatory support and the assessment of a patient’s readiness to breathe independently (Biban, et al, 2013). The weaning course is also directed by clinical judgment of the objective indicators of gas exchange as determined by the arterial blood gas results, respiratory progression and the patient’s ability to protect the airway.

2.9 ROLES OF A NURSE IN MECHANICAL VENTILATION MANAGEMENT

One of the nurse’s roles according to South African Nursing Council Regulation 2598 (1984) is to supervise over and maintain oxygen supply to patients. In this regard, the nurse should ensure that the airway is maintained open by positioning the patient in the best way that his/her physical condition allows. And if the patient needs the artificial airway support, the nurse should do everything possible to get

the medical help and if the medical help is not available, the patient should be intubated correctly (South African Nursing Council Regulation 2598,1984).

Critical care nurses perform physical assessments as part of monitoring patient condition and status. Nurses must be well trained and should develop sound knowledge and practical skills in taking care of a client on mechanical ventilation in order to develop them as effective and competent nurse practitioners (South African Nursing Council Regulation 2598, 1984).

All in all, the nurses need to plan and implement nursing care, and to evaluate the results thereof.

2.10 USE OF CLINICAL PROTOCOLS IN NURSING

Clinical protocols are defined as “systematic statements developed to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances” (Hewitt-Taylor, 2004:49). “Clinical protocols have the potential to enhance care provision by providing clear guidance based on the current best evidence related to specific aspects of care" (Hewitt-Taylor, 2004:49) and reduce variations in practice (Forbes and Griffiths, 2002).

Within nursing practice, clinical protocols have the potential to ensure utilisation of research findings thus promoting evidence based practice (Miller and Kearney, 2003). “Clinical protocols make recommendations on the appropriate treatment and care of people with specific diseases and conditions and a good clinical protocol will assist decision-makers in changing the process of healthcare to improve outcomes for patients, ensure the efficient use of health care resources, and reduce current variations to practice” (Hewitt-Taylor, 2004:49). Protocols can also be used in the education and training of health care professionals (Fisher, 2011).

2.10.1 Benefits of protocols to patients

The principal benefit of utilisation of protocols is to offer a high standard care to the patients, which is manifested by the improved outcomes. Protocols promote

interventions and improve the consistency of care just as Woolf, Grol, Hutchinson, Eccles and Grimshaw (1999) stated that "protocols offers a remedy, which makes it more likely that patients will be cared for in the same manner regardless of where or by whom they are treated" (Woolf et al., 1999:1340).

And in some cases, protocols also encourage patient's participation in health care delivery and make an informed decision. Protocols can also help patients by influencing public policy, calling attention to under recognised health problems, clinical services, and preventive interventions and to neglected patient populations and high risk groups. Services that were not previously offered to patients may be made available as a response to newly released protocols (Woolf et al., 1999).

Protocols can also advocate for better services delivery to those in need, for example in a resource limited environment through rational allocation of resources.

2.10.2 Benefits of protocols to nurses

Protocols promote high level of patient care as they guide nurses in their decision-making process and reduce the time delay that would have resulted if the nurse had sought medical approval before continuing with the treatment (Lowe, Fulbrook, Aldridge, Fox, Gillard, O'Neill & Papps, 2001). Nurses gain confidence when caring for the patients when they know that they are doing the right things.

Another benefit of protocols is that it ensures consistency of care even when the nurses are changing shifts. The nurses also use the protocol as a teaching tool when imparting knowledge and skills to other colleagues and students. In some cases it is also used a monitoring and evaluation of nursing care.

2.10.3 Benefits of protocols for institution

Protocols are an effective way of introducing evidence-based practice into the ICUs, and have been shown to reduce morbidity and mortality (Meade and Ely, 2002). This may also reduce the burden as well as cost associated of critical

illness (Meade and Ely, 2002). Clinical protocols are effective in improving efficiency by standardising care and optimising value for money. Utilisation of protocols reduces expenses associated with hospitalisation, drugs prescriptions and surgical procedures. Having the protocols and adhering to them in practice may also promote public confidence as well as encourage good will, political support and revenue (Hewitt-Taylor, 2004).

Protocols act as reference for both prospective and retrospective audits of the hospitals' practices. These may include the tests, treatments and their goals compliance related issues (Hewitt-Taylor, 2004).

2.10 TEAMWORK AND INTERPROFESSIONAL COLLABORATION IN MECHANICAL VENTILATION

In healthcare, every care discipline is integral. Each health care provider has a role to play and interpersonal communication is vital in management of patients (Van de Cappelle, Hui, and Yan, 2012).

“Medicine and nursing are two professions with increasingly overlapping scopes of practice that interact frequently during ICU care, however, the two professions are trained in different manners in that physicians are trained to collect information and generate differential diagnoses, and to evaluate patient outcomes in the context of the treatment plan” (Van de Cappelle et al, 2012:34). While nurses are traditionally trained to collect data frequently and concurrently with physicians, offer observations and impressions, and advocate for the patients and families during their time in the ICU (Hall, 2005).

There is often miscommunication among physicians and nurses as a result of the differences in professional and educational training (Baggs and Schmitt, 1997). Nurses may find physicians unwilling to accept their contribution or to make changes while physicians find nurses as defensive or aggressive in getting instructions (Baggs and Schmitt, 1997). However, successful management of ventilated patients require team work approach. Failure in collaboration and communication can lead to unintended harms to patients. Protocols have been

identified as one way for nurses to achieve autonomy in decision making while still engaging in power sharing and collaboration (Rose, Blackwood, Egerod, Haugdahi, Hofhuis, Isfort, Kydonaki, Schubert, Sperlinga, Spronk, Storli, McAuley and Schultz, 2011). Collaborative team members have less autonomy but practice interdependence to produce optimal care for patients.

In the management of ventilated patients the professional responsibilities of consultants in the NICU include providing care and offering supervision for the neonatology fellows/registrars, medical officers/residents, and nurses. Nurses are responsible for oxygen administration, applying ordinations in practice (Crocker, 2002), implementation of care plans, and assisting in medical care (Rose, Nelson, Johnston and Presneill, 2007).

Multidisciplinary team is essential in the critical care setting, more especially when patients are managed using standardized protocols, they are consistently extubated in nearly two days less time as compared to the traditional process (Dichter, 2003). Solberg, Hansen, and Bjork (2014) indicated that nurses and doctors have to improve the quality of care by developing good communication, formulating plans together, and improving the co-ordination of the ventilator treatment.

2.12 SUMMARY

This chapter has presented the literature reviewed in relation to the study. Major concepts that support the study, description of the theoretical foundation of the study as well as an overview of mechanical ventilation, nursing care of ventilated patients, use and benefits of protocols has been clarified.

CHAPTER THREE

RESEARCH DESIGN AND RESEARCH METHODS

3.1 INTRODUCTION

This chapter presents the research methodology and includes research design, the research setting, population, sample and sampling, the inclusions criteria, and data collection. A description of the instrument used in data collection including the trustworthiness of the instrument, data analysis and the ethical consideration

3.2 AIM AND OBJECTIVES

The purpose of this study was to explore and describe nurse's views on whether current ventilator management protocols can be adopted to standardise nursing care in a neonatal intensive care unit at an academic Hospital in Gauteng.

To achieve the aim, the following objectives were established:

- To explore and describe the opinions of professional nurses concerning the utilisation of a ventilator management protocol.

- To make recommendations that can help in development of specific nursing protocol in management of mechanically ventilated neonates.

3.3 RESEARCH DESIGN

Research design is a plan or strategy which moves from the underlying philosophical assumptions to specifying the selection of respondents, the data gathering techniques to be used and the data analysis to be done (Maree, 2012).

In this study, a qualitative, descriptive and exploratory approach was used to explore the nurse's views on the current mechanical ventilator management protocol.

3.3.1 Qualitative Research

Qualitative research is "a systematic subjective approach used to describe life experiences, answering questions by analysing and making sense of unstructured data. It is suitable for exploring the full nature of the little-understood phenomenon". (Burns and Grove, 2011:487). Qualitative research is centred on a holistic approach and may be derived from generalizations but are limited by time and context. (Burns and Grove, 2011). Basically the findings lead to situational understanding and provides insight that can be generalised and guide nursing practice as well as building nursing knowledge through the process of theory development. In this study the findings and recommendations will help in the process of developing a nursing protocol for the management of mechanically ventilated patients.

3.3.2 Descriptive Design

Descriptive design is intended to gain more information about characteristics within a particular field of study (Burns and Grove, 2011). This gives an overview of natural situation and helps to identify the existing problems with current practice or rationalise current practice and determine what other nurses in similar situation are doing.

3.3.3 Exploratory Design

Exploratory design is used to uncover or discover information about little known phenomenon. It gives the researcher an insight by investigating the problem or situation. Facts can be obtained through interviews, focus group discussions, trial studies as well as through experiments (Burns and Grove, 2011). The emphasis of exploratory research is that the researcher seeks to understand more about an idea of what she/he has observed. According to Patton and Cochran, (2002) an exploratory research is an attempt to lay the groundwork that will lead to future

studies or to determine if what is being observed might be explained by a currently existing theory. In this study the researcher sought to gather baseline information on a particular variable that is difficult to measure, that is, nurses views pertaining to the current mechanical ventilator management protocol which can eventually determine the development of specific protocol for nurses.

3.4 RESEARCH SETTING

The study was carried out in the neonatal intensive care unit (NICU) at an Academic hospital. The NICU comprises of two units, with 16 bed capacity for critically ill infants and children requiring advanced intensive care. This setting is also a tertiary academic institution staffed by medical and nurse practitioners whom are expected to demonstrate continuous education and research skills in applying evidence based practice to maintain quality care delivery.

3.5 POPULATION

Population is “all elements (individuals or objects) that meet certain criteria for inclusion in a study” (Kerlinger and Lee, 2000 as cited in Burns, 2007:40). This was described in terms of the target population, eligibility criteria and sampling method.

3.5.1 Target Population

According to Burns and Grove, (2011:290) target population is defined as “the entire individuals or elements who meet the sampling criteria”. Professional nurses practicing in the neonatal and paediatric intensive care unit whom are considered to be experts in the NICU were targeted for this study. The units has sixty- nine (N=69) professional nurses.of which 39 of them have the speciality qualification. These experts consisted of:

- Nurses who were formally trained as paediatric professional nurses or neonatal professional nurses.

- Nurses who had more than 2 years' experience in intensive neonatal nursing care.

3.6 SAMPLE AND SAMPLING

"Sample is a subset of the population element, which are the most basic units about which data are collected for a particular study" (Burns and Grove, 2011:317). "Sampling is the process of selecting a group of people, events or elements that are representative of the population that is being studied" (Burns and Grove, 2011:291). A non-probability purposive sampling method was used to select fifteen professional nurse experts, involved in neonatal intensive care. Non-probability sampling implies that not all elements of the population have an opportunity for selection in the sample (Burns and Grove, 2007). A purposive sampling refers to the judgemental selection in which the researcher selects certain subjects to include in the study (Burns and Grove, 2007). This method of sampling was chosen in this study to obtain in-depth understanding of a complex experience as it included registered nurses with different levels of neonatal nursing experience. Nurse experts according to Benner, Tanner and Chesla (2009) have sufficient knowledge gained from clinical experience to evaluate care interventions, a role recognised by their peers who nominate them as spokesperson for the nursing profession.

3.7 DATA COLLECTION

Data collection is "a systematic gathering of information relevant to the research purpose or specific objectives of the study" (Burns and Grove, 2007:536). In this study, data was collected using unstructured interviews. Focus group approach was used in this study to obtain the participants' views on specific areas under study. The focus group discussions were conducted in a permissive, non-judgemental and nonthreatening manner. Burns and Grove (2011) further said that unlike in one-to-one interviews, in group dynamics participants are more likely to express and clarify their views. A series of three (3) focus group interviews, each lasting 45 – 60 minutes were conducted and recorded to capture the accurate data

as expressed by the informants. An interview guide was formulated to guide the focus group interview. Data was collected until saturation was reached.

3.7.1 Focus group interviews

A focus group is defined as in –depth, open-ended group discussion of 1-2 hours duration that explores a specific set of issues on a predefined and limited topic (Robinson, 1999).

In history, the focus group methodology was developed in 1920's on the basis that decisions of consumers are made in social perspective and usually through discussions with others (Robinson, 1999). Accurate information regarding product preferences was obtained by market researchers through focus group discussions in America in the 1950's, as a way of stimulating consumers group process of decision making and gathering more accurate information about consumers product preferences (Patton and Cochran, 2002). Paul Lazarfeld and Robert Merton, 1942 utilised similar method to explore the impact of media on people's views towards the participation of the United States in World War II. The participants were invited to listen and respond to radio programme. Their responses were obtained by pressing a buttons to indicate positive or negative feedback. However, data obtained did not give reasons for their responses. So, the method was evaluated that the complexity of the respondents' views could not be thoroughly understood. In their following studies, group-based interviews was used as alternative approach for carrying out these and more focus was on unstructured and qualitative aspects of the participants' perspectives as conveyed in their own words. Henceforward, focus group discussions were used as a means of allowing participants to state their reasons for their responses (Kitzinger, 1994). The National Health Service reforms in the United States of America adopted the method to evaluate the quality of patient care (Robinson, 1999).

Focus groups give rich and detailed information about feelings, thoughts, understandings, perceptions and impressions of people in their own words and is a flexible research tool because the method can be applied to elicit information from

any topic, from diverse groups of people and in diverse settings (Stewart, Shamdasani and Rook, 2007). Usually the participants are homogeneous group of people to promote a comfortable group dynamics. Participants feel more comfortable pressing their views among themselves if they come from similar background. (Polit and Beck, 2012).The aim of focus group discussion is to obtain precise information on specific topic within social context where participants are able to give their own views in relation to others. According to De Vos, Strydom, Fouche, and Delport (2012) focus groups usually include six to ten participants to allow everyone to participate while eliciting a range of responses and smaller groups of four to six people are preferred when the participants have a great deal to share about a topic or have intense or lengthy experiences related to the topic of discussion. Robinson, 1999, states that focus group consists of five to eight people who are under the guidance of a facilitator.

Morgan and Krueger 1998 as cited in de Vos et al., (2012) suggested that more than one focus group should be conducted, as too few focus group meetings may result in missing something or lead to premature conclusion. They further said that the greatest amount of new information usually comes in the first two group meetings with considerate repetition after that.

The focus group is coordinated by a facilitator with the help of co-facilitator. The facilitator's role is to primarily directing the discussion and limiting the conversation within the scope of the study (Krueger and Casey, 2009) while as the co-facilitator deals with note taking, operation of the tape recorder, handling of environmental conditions and logistics and responding to unexpected interruptions.

In this study three (3) focus group interviews were conducted consisting of five, four and six people for the first, second and third group respectively. All the groups had a facilitator and assistant facilitator.

3.7.2 Instrument

3.7.2.1 Demographic data

This data was collected for the description of the sample which would determine generalization of the findings. The demographic variables examined in this study included; age, gender, qualification and period of practice in the NICU (See Appendix A).

3.7.2.2 Discussion guide

In this study data was collected using focus group discussions that is, open ended question with probes (See Appendix B). This approach was used to obtain participants' views towards the use of ventilator management protocol. This was applicable to the study because it allowed the researcher and participants to explore an issue. The open ended question that was asked to acquire the nurse's view "*What are your views regarding the use of ventilator management protocol in delivering nursing care to neonates?*" The use of open ended question permitted the respondents to answer in detail, qualify and clarify responses. It also permitted self-expression and richness of details as well as encouraged the participants to raise important issues that were not addressed by the researcher. Probing questions were more focused and guided by responses to the broad question (Polit and Beck, 2012).The interviews were recorded by audio tape and field notes were also made during and immediately after the interviews. The participants were given a copy of the current medical protocol on ventilator management in NICU (See Appendix C) to review and then engaged in a group discussion. The interviewer then facilitated the discussion by asking one broad question followed by probing questions.

3.7.3 Procedure

After obtaining ethical approval to conduct a study from Medical Human research ethics committee (See Appendix D): clearance certificate no. M140752) and from the Chief Executive Officer for the Academic hospital, permission was sought from the Manager of Nursing Services of the hospital (See Appendices E and F). The copy of all the approvals, permission and information letter was taken to the Neonatal intensive care unit manager where briefing on the intended study was

done. Eligible participants were invited to participate in the study at their convenient time. Each participant was given an information letter containing details of the study (See Appendix G). The participants were given time to read and understand the information letter before signing a consent form to participate in the study (See Appendix H). The participants also signed consent forms for the interviews to be audio taped. The audiotapes, transcripts and field notes were stored in a locked cupboard which was accessed by the researcher, assistant facilitator and supervisor. Electronic records of the study were encrypted to maintain confidentiality.

Focus groups offer a way of systematically acquiring qualitative data on specific topics. Each group included between 4 and 6 people. For all the three focus groups, participants were recruited from neonatal intensive care units. Each group was recorded using audio recorder and a moderator sat in on the discussions in the background and made detailed notes of what was said and of how discussions developed. The discussions were conducted in a quiet, private place within the unit.

3.8 DATA ANALYSIS

Data analysis is the process of extracting, compiling, and modelling raw data for purposes of obtaining constructive information that can be applied to formulating conclusions, predicting outcomes or supporting decision **(**Bradley, Curry and Devers, 2007). Qualitative analysis involves numerous tasks that are intends to manage narrative data (Polit and Beck, 2012). Content analysis involves coding and classifying data, also referred to as categorising and indexing and the aim of context analysis is to make sense of the data collected and to highlight the important messages, features or findings (Graneheim and Lundman, 2004). In this study, an independent coder was used in data analysis and data was analysed using the qualitative content analysis technique of Braun and Clarke, 2006.

Step 1. Familiarising with data

Step 2. Generating initial codes

Step 3. Searching for themes

Step 4. Reviewing themes

Step 5. Defining and naming themes

Step 6. Producing the report

3.8.1 The Practical Approach Employed for Data Analysis in this Study

Before starting the data analysis process, each transcribed interview was cross checked with its audiotaped recording to establish its accuracy. The following activities were engaged throughout the analysis process.

Step 1: Familiarising with data

Familiarising with data involves transcribing data, reading and rereading the data, noting down initial ideas (Braun & Clarke, 2006). At this stage all the audio-taped interviews from the three groups were listened to with more attention for several times and then transcribed creating three transcripts, one for each group. The transcribed data was read repeatedly to get sense out of it. The data collected from three focus groups was transcribed by the principal researcher. As the researcher was reading, the key points were highlighted and noted down on the margin of the script.

PA: Eish! I will say, how we manage them when they are on ventilator, first of all it depends on the severity of the patient. The settings, we are going to do it according to the result of arterial blood gas and also according to the saturation of as a nurse you can, may be wean your ventilator settings according to saturation.

Step 2: Generating initial codes

This entails coding interesting features of the data systematically across the entire data set, collating data relevant to each code. The whole data set was given equal attention so that full consideration could be given to repeated patterns within the data.

Data extract	**Coded for**
"…..and another thing in nursing, what I realised is that, it's like when we have reached a certain level……like ….....we don't have nurses in senior positions to deal with the protocol. If there was a matron in the hospital who deals with protocols, we develop our own protocol and she will read it, she Okays it. But we know, at the end of day the doctors will help us to endorse it. We don't have nurses themselves with good protocol knowledge to guide…the nursing fraternity	Multidisciplinary involvement

Step 3: Searching for themes

Searching for themes involves collating codes into potential themes, gathering all data relevant to each potential theme. Themes explain larger sections of the data by combining different codes that may have been very similar or may have been considered the same aspect within the data. All initial codes relevant to the research question were incorporated into a theme.



Fig 3.1 Initial thematic map

Step 4: Reviewing themes

Reviewing themes involves checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic map.

Researcher developed thematic maps to aid the generation of themes. These helped the researcher to visualise and consider the links and relationships between themes. At this point any themes that did not have enough data to support them or were too different were discarded. This refinement of the themes took place on two levels, primarily with the coded data ensuring they formed a rational pattern, secondly once a coherent pattern that formed the themes were considered in relation to the data set as a whole. This stage continued until a clear idea of the various themes and how they fitted together appeared.

Step 5: Defining and naming themes

Defining and naming themes encompasses ongoing analysis for refining the specifics of each theme and the overall story that the analysis tells, generating clear definitions and names for each theme. Each theme was clearly defined and accompanied by a detailed analysis. Main themes were viewed as essential in determining the understandings of all the participants. Labels for main themes were ‘‘current practice,’’ ‘‘importance of protocols,’’ and ‘‘development of protocol is multidisciplinary task.”

Step 6: Producing the report

Producing the report involves final analysis and write-up of the report. Selection of extracts is done, selection of vivid, captivating extract examples, relating back of the analysis to the research question and literature, producing a report of the analysis.

3.9 TRUSTWORTHINESS OF THE STUDY

Four criteria were suggested for developing the trustworthiness of qualitative inquiry whether data is collected from direct observations, focus groups, or interviews according to Lincoln and Guba (1985) as cited in Polit and Beck (2012).

3.9.1 Credibility

“Credibility focuses on the confidence in the truth of the data and researchers’ interpretations” (Polit and Beck, 2012:584). The strength of qualitative study that aims to explore a problem or describe a setting is measured through credibility (de Vos et al., 2005). Lincoln and Guba pointed out that “credibility involves two aspects: first, carrying out the study in a way that enhances the believability of the findings, and second, taking steps to demonstrate credibility in a research report” (Polit and Beck, 2012:584). In this study credibility was enhanced by frequent debriefing sessions with the supervisor and peer scrutiny during protocol

development for its feasibility and approval. Credibility was also guaranteed by tape recording the information provided by the participants during data analysis to obtain the accurate data as expressed. It was also ensured by accurate transcription of interview narratives and field notes. Stakeholder checks were continuously done during data collection, analysis, interpretation and writing up of the study findings and conclusion.

3.9.2 Dependability

"Dependability refers to the stability (reliability) of data over time" (Polit and Beck, 2012:585). Dependability is enhanced by following the protocol of research methodology in data collection and data analysis methods so that if the study is done in similar context using the same methodology and study participants, similar results can be obtained. In this study the interview question scripts are kept for comparison in future with a replicated study in a similar setting to see if the findings are going to be repeated. A thorough documentation of the research process was followed throughout the study to ensure reliability.

3.9.3 Confirmability

Confirmability refers to "the congruency between two or more independent people about the data's accuracy" (Polit and Beck, 2012:585). The criteria ensured that the data obtained reflects participants' perspectives and not the researcher's views. In this study confirmability was enhanced by using an assistant facilitator who acted as a co-coder in the focus group to ensure data accuracy, relevance or meaning and to ensure that the findings represent the information gathered from the participants. The findings of the research are based on data collected from the audiotape recorder interviews and not based on the researcher's opinions and the findings does not reflect the biases or views of the researcher.

3.9.4 Transferability

Transferability refers to “the extent to which findings can be transferred to or have applicability in other settings” (Shenton, 2004:69). According to Lincoln and Guba, the investigator’s role is to provide necessary descriptive data that is applicable to another context (Polit and Beck, 2012). This criteria was applied by having a purposive sampling to maximize the range of specific information obtained from the informants. The recommendations are described sufficiently in details to enable applicability to other settings with similar characteristics. It was also enhanced by the researcher referring back to the original research proposal to show how data collection and analysis were guided.

3.10 ETHICAL CONSIDERATION

According to Burns and Grove (2011), the goal of research is to generate sound scientific knowledge through the honest conduct, reporting and publication of quality research. Ethical review and clearance is necessary to ensure a balance between benefits and risk of a study and prevent research misconduct. To ensure that, the following ethical considerations were applied in the study:

3.10.1 Permission to conduct research

Approval to conduct this study was obtained from the University Postgraduate Committee through the submission of the protocol to the School of Therapeutic Sciences Assessor Group (See Appendix I). Ethical clearance to conduct the study was obtained from the Human Research Ethics Committee (Medical) of University of Witwatersrand. A permission to access the clinical facility and collect data was granted from the hospital management.

3.10.2 Informed consent

Informed consent means that participants have adequate information about the research, comprehend that information and have ability to or decline participation

voluntarily (Polit and Beck, 2012). An information letter informing the potential respondents of the study was administered and participants signed the consent form to acknowledge their participation in the study as well as to be audio recorded (See Appendix G and H).

3.10.3 Anonymity of participants

This exists when the subject's identity cannot be linked with his or her responses (Burns and Grove, 2011). Anonymity of the participants was guaranteed in that names were not recorded instead identification numbers were used. Therefore, no participants' identifiers were used during data collection, analysis and reporting to maintain the anonymity.

3.10.4 Confidentiality

Confidentiality is a "pledge that any information participants provide will not be publicly reported in a manner that identifies them and will not be accessible to others" (Polit and Beck, 2012). In this study, confidentiality was guaranteed in that the researcher and her supervisor were the only people with access to the raw data. The audio-taped interviews were destroyed immediately after transcription and transcribed data was saved with a password only known to the researcher. All the scripts with identifiable information were kept in a lockable cabinet whose keys were only accessed by the researcher.

3.11 SUMMARY

This chapter described the research methodology. The research design was selected to appropriately meet the study's purpose and objectives. An exhaustive description was given of the method that was used for data collection. The following chapter will present research findings.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 INTRODUCTION

This study explored the nurse's views on the current mechanical ventilation protocol that is used to guide the care for the mechanically ventilated paediatric patients at an academic hospital in Johannesburg.

The exploration involved probing into the nurse's views, experience, and observations regarding the use of this protocol when providing nursing care to neonatal patients who are mechanically ventilated. To achieve this, the main objectives that guided the conduct of this study were: to explore the views of professional nurses concerning the utilisation of a ventilator management protocol and to make recommendations that can help in the development of a specific nursing protocol in the management of mechanically ventilated neonates. Fifteen (15) registered nurses participated in this study and data collection was done using focus group discussion which were recorded. Data analysis was done using the thematic content analysis approach by Braun & Clarke, (2006).

This chapter reports on the results after data analysis of focus group discussions that elicited the participant's views on the mechanical ventilation. The themes that appeared from the participants' opinions regarding the use of the protocol in the unit are then presented with participants' quoted words for clarification purposes.

Finally, a summary of findings in this study is presented which provide the vital picture of the nurse's views on the use of the ventilation management protocol in neonatal intensive care unit.

4.2 DEMOGRAPHIC DATA OF STUDY PARTICIPANTS

Fifteen (15) registered nurses participated in the study were from the Neonatal Intensive Care Unit of the public sector academic hospital in Johannesburg. Table 4.1 Below presents the demographic data of this study participants (n=15).

Table 4.1 Demographic data of study participants

ITEM	DEMOGRAPHIC VARIABLE	FREQUENCY	PERCENTAGE
1	Gender: Male Female	0 15	- 100
2	Age: less than 30 30 to 40 41 to 50 51 to 60 over 60	 5 2 6 2 -	 33.3 13.3 40 13.3
3	Qualifications: Diploma Bachelor's degree	 11 4	 73.3 26.6
4	Specialty training: Neonatal nursing Paediatric nursing ICU nursing other professional nurse	 4 3 8 3	 26.6 20 53.3 20
6	Years of experience in PICU: 2 to 5 years 6 to 10 years more than 10 years	 10 1 4	 66.6 6.6 26.6

All the participants in this study were female nurses, 100% (n=15). Thirty percent (n=5) of the nurses in the study were in the age range of less than 30 years, 13.3% (n=2) were of 30-40; 13.3% (n=2) of 51-60. 26.6% (n=4) of the nurses had bachelor's degree in nursing while 73.3% (n=) had diploma in nursing. On speciality trainings, 26.6% (n=4) were trained in neonatal nursing, 20% (n=3) were trained in paediatric nursing, 53.3% (n=8) were trained in intensive care nursing, and 20% (n=3) had no speciality training. However, 26.6% (n=4) had than one sub-speciality for example critical care and paediatric or paediatric and neonatal nursing.

4.3 GATHERINGS OF THEMES AND EMERGENT THEMES

From the data that was collected significant statements were isolated and meanings were formulated from these statements. The formulated meanings were grouped into categories of themes according to their commonalties and emergent themes were developed against the isolated categories of themes. Below is an illustration of how categories of themes and emergent themes were developed from the formulated meanings:

Table 4.2 Categories of themes and emergent themes

Formulated meanings	Categories of themes	Emergent themes
Nurses expressed that there is no nursing protocol for mechanical ventilation management in the unit hence they use the doctor's protocol which is currently present but it doesn't guide the nursing.	Existence of protocol in the unit	Current practice
Management of patient depends on the severity of patients conditions.	Management of ventilated patients	
Nurses provides the nursing care in terms of assessments of all body systems, does continuous monitoring and plans, implements and evaluate the nursing care.		

4.4 EMERGENT THEMES

This section focuses on the important issues that appeared from the participant's point of views regarding the use of mechanical ventilation management protocol in the neonatal intensive care unit. The main issues that came out were current use of the protocol in the unit , importance of protocols, need for nurses protocol development, collaboration of multidisciplinary team in protocol development , limitations on performing duties due to lack of protocols. Twelve (12) categories of themes were isolated from the formulated meanings of extracted important statements. These were collapsed into three emergent themes which provides the fundamental structure of the findings of the study as follows:

- Current practice- use of the protocol in the unit
- Importance of protocols
- Development of protocols is a multidisciplinary task.

Each of these emergent themes will be presented in details using extracts from the participants' quotes in the context that they were expressed to give more meaning.

To ensure anonymity, each participant's citation is coded with a non-identifying number representing the focus group.

CURRENT PRACTICE

Use of the protocol in the neonatal intensive care unit

This theme encompasses the expressions of participants on the use of the current protocol; how patients are managed in the unit and how they feel about having the knowledge of arterial blood gas as part of the management of ventilated patients.

All the participants acknowledged that they are aware of the existence of the protocol in the unit. The participants expressed that this protocol is meant for

doctors because it doesn't have the nursing care aspect for the ventilated patient but it has only settings of which they are initiated by doctors.

> *"…….this protocol is more for doctors….otherwise you can't see the nursing part, so it doesn't guide us much…." (Focus group discussion (FGD) 2)*

And another participant also expressed that:

> *"…for me, it is not for nursing, it's more of doctors side because it doesn't say how you wean or how you do this, according to the way the nurses should be doing it… " (FGD 1)*

A participant added:

> *"….it's more focused on doctors though at certain times, it gives us a guideline…it still gives us …eeeh…a guideline but in terms of…just the giving of the surfactant, you have the part ….the role that you are to play and the doctor has a role that they have to play…needs to play, remember like…isn't it that we function as a team. The doctor may function as the leader …leading, but at the end of the day even with us, we know what is expected of us and what we are to do as well…." (FGD3)*

Participants acknowledged that they see the doctor following this protocol when managing patients as evidenced by what they do. This is what one of the participants said:

> *"….actually they use this protocol in this department, but it starts from Transitional Unit, the admission ward for sick neonates. When they come from labour ward that's where they are initially assessed. If the child needs resuscitation, like a preterm baby needs resuscitation or a term baby, if it needs resuscitation and stabilisation and post resusci-stabilisation. If continues to be distressed, that's when this protocol is initiated because they take bloods to check like…the … arterial blood gases to check the clinical status of the baby and if the ABG warrantees the baby to be ventilated,*

that's when they start by intubating down there and here in ICU, I think it's just to do the management of the baby who was initiated in transitional nursery."(FGD3)

On the other hand, the participants also feel that even though the protocol is there for doctors, they are not adhering to it just as this participant is saying:

"I feel they are not using only this. Others will find that others are also using the (another hospitals name) one. ….. with… somewhere are a bit similar but somewhere they are not. So they are using 2 protocols and they also consult the consultant on call. They don't work the same also. You find this one is suitable with this and the other one is not suitable with this. So, yes there is a protocol but they are not adhering to it most of the time." (FGD1)

However, participants expressed that nurses use this protocol sometimes and in certain situations.

"You use this protocol, if you feel like, you don't understand, because when you are working here, you also need to know what is happening. The doctor is going to prescribe, but must also know …, just in case, the doctor makes a slight mistake so must also know…..so, you find yourself that maybe, whatever the doctor has given you, you are not sure about it, …..you can refer to the protocols. And also the management, you can also know in case the doctor says I want you to put this patient on CPAP. Why does he want to put the patient on CPAP?" (FGD2)

Furthermore, participants emphasised that nurses don't have a specific protocol to guide the nursing care for the ventilated patients and those who have been in the unit for very long time (more than 5 years) can use this protocol because they have undergone an in-service training some years back. One of the participants expressed:

"….we don't have like…written protocols for ventilators for critical care professional nurses so we wean according to the doctors protocol …."

(FDG1)

Another participant added to say:

…we don't have protocols for ventilation, the doctors the protocol. So we are also doing the basic nursing care interventions… like, all the systems but we don't have the specified protocol" (FGD3).

In addition another participant also commented*:*

"…you set up the ventilator and they tell us when to wean according to saturation of the patient and then we wean accordingly as she has said. So, yes for us nurses we don't initiate anything". (FGD3)

The same participant added to say that those who worked in the unit for a long time know how to use this protocol because they were trained on job. This is what she said:

"…we used to have neonatal critical care course, we were taught intensively. So that's why at the front of the protocol …neeh, it is written in front that it is for doctors and others. And that others was including nurses who were adequately trained to be able to use the protocol. So now, things have changed, the teaching has been suspended for quite some time... so we mustn't exclude ourselves from this, it's just that there was a bit of …a cease…of imparting knowledge to people. Because even if the doctor is not there, as a neonatal intensivist or a critical care intensivist, those protocols were supposed to help you. It's just that the situation and environment at the moment doesn't allow it. But if a nurse is adequately trained, she can…because the professor approved that protocol and then you take the responsibility and actions that must be done in ICU…." (FGD3)

She further added to say:

> *"…you have to work for a year or two and you have to go for a training then after those years, you will be able to use this protocol. Like I'm saying, the course was suspended, so there's still that gap." (FGD3)*

The above quotes express that the current protocol is for doctor's use and nurses use it sometimes as reference source in management of ventilated patients and in monitoring the doctor's practice because they are not using it consistently. It was also described that it requires one to work one to two years or to go for a training inorder to use this protocol. The nurses in the unit don't have the nursing protocol to guide the nursing care.

Management of ventilated patients and the importance of knowing arterial blood gas

Nurses in this study described how they manage the ventilated patients in the unit. They said management of patients depends on the severity of the patient. One of the participants said:

> *"….as much as we got protocol…patients are different. So the way that we treat patients, it will be, what we see on that bed at that time". (FGD2)*

A participant added:

"Patients are nursed holistically. Physical, emotional and spiritually…."

(FGD3)

In addition, another participant also commented that:

> *"…you do the holistic care…you do the assessment every morning, you do the physical examination and you pick up problems ...and plan for those in the nursing care plan. Then you evaluate."(FGD1)*

And it was also highlighted that nurses are responsible for monitoring the ventilated patients as well as identifying and reporting any problem to the doctor and to provide other interventions. The general care that was mentioned was;

> "*respiratory care which includes suctioning, monitoring the endotracheal tube, monitoring the vital signs (temperature, respirations, pulse and blood pressure), performing arterial blood gas, correct hemo-dynamics and weaning the ventilation; infection prevention, assessing safety of the patient."(FGD1)*

Participants also stressed that to wean a patient from the mechanical ventilation depends on the clinical assessment judgment and the result of arterial blood gas. And knowing arterial blood gas reading and interpretation is important as it guides the nursing care of the mechanically ventilated patients just as these participants said:

> *"I understand clinically….. how would you know if the patients are accumulating Co2 or is blowing too much CO2 that can be detrimental to the patients?...I think arterial blood gas and mechanical ventilation go hand in hand because you wean according to arterial blood gas result……I don't think it's enough for you to wean without the blood gas." (FGD1)*

A participant added:

> *"…you know… you have to learn the condition of your patient...any changes in respiratory rate, change of colour, patient becomes pallor,… you check the vital signs and you do blood gas and sugars then intervene" (FGD1*

Despite the importance of arterial blood gas in the nursing care of ventilated patient, some nurses and doctors don't know how to read and interpret the results especially those who have joined the unit from other departments or straight from school. Just as these participants are saying:

"…not all of us know how to analyse the arterial blood gas…to be honest, I didn't know much about….how to interpret the Arterial blood gas when I just came…I depended on the doctor….". (FGD1)

A participant added that:

"Only those who are trained, they know and those with experience know how to interpret the arterial blood gas results … and sometimes you also find that new medical officers don't know how to interpret the blood gas and this delays the patient's interventions as well". (FDG2)

In addition, another participant also expressed:

"…you show the result to the shift leader and she guides you on what to do throughout... " (FGD1)

The participants also suggested that knowledge of arterial blood gas should be part of the general nurse's orientation program at the hospital so that even those working in the general wards are able to detect problems early and intervene accordingly as these participants are saying:

"*I was working in surgical ward previously but we were failing to understand why the patients that, we could see that the doctors were taking bloods for blood gas analysis but we did not understand what was going on. So now, that's when I'm opened while I'm in ICU. So, we need even in these wards someone who is able to interpret and understand the blood gas….because you find that patients are dying…. Or you will find that the child's condition is changing… but you don't understand …so...you need to know more about how to nurse that child" (FGD1)*

A participant added:

"*We have to introduce the reading of blood gas from an early level….and that will also reduce the number of patients going to intensive care unit…and patients will be healed quickly". (FGD1)*

As previously stated that they don't have the protocol to guide their nursing care, participants expressed that they follow doctors' instructions as well as consulting expert nurses whenever they are not sure of what to do. Some participants also revealed that when nurses are allocated to work in the unit for the first time, they go through an orientation program of which they are attached to the mentor. That is what guides their nursing care in the unit.

"…there's an orientation programme for the unit...and there is a list of things that you should know if you are working in this department. But a mentor is a crux of the whole thing because she is the one who is gonna take you from zero to z, she is gonna show you everything. But I don't know, there is no...

like, tangible protocol on ventilator written down..." (FGD3)

In summary, the participants felt that the current mechanical ventilation management protocol is for doctor's use and doesn't guide nursing care. Nurses' don't have the specific nursing protocol for managing ventilated patients. Some nurses lack knowledge on Arterial blood gas reading and interpretation which is important in guiding the nursing care of ventilated patients. Newly qualified nurses find it a challenge to work when they first come due to lack of the protocol hence rely on team leaders. This finding show a relationship with findings from a study results of Blackwood and Wilson-Barnette (2007) done in Northern Ireland which states that weaning protocols are particularly beneficial in providing safe guidance for junior staff.

THEME 2: IMPORTANCE OF PROTOCOLS

The emergent theme "importance of protocol" was expressed with regard to the nurse's experiences they have had in the unit, where they take care of the ventilated neonates and also the disadvantage in the lack of a nursing protocol

which limits their roles in provision of care as critical care nurses. Most nurses agreed that it's important to have a nursing protocol to guide them when taking care of ventilated neonates; it can be used to avoid the discrepancies and as a monitoring tool for quality care in practice. The following is what the participants had to say:

> "*….. I think without aah... if I may say….aah…without the protocol… aah… people tend to do multiple changes. So, people won't stick to the standard, the way it should be…aah….because there's nothing guiding them hence they use their discretion"(FGD1)*

A participant added to say:

> *"….the protocol makes the care uniform."(FGD3)*

The participants expressed that even though they have worked in the unit for a long time, there's a difference in how they practice individually. Participants emphasized that a protocol can be a teaching tool for mentoring new recruit for uniformity in what they are imparting in the unit. Participants also expressed that due to lack of protocol, they fail to share information to other institutions because they don't have the written nursing protocol as their based evidence just as described by this participant:

> *"……you find that the other hospitals call us here from Mpumalanga, "how do you do this?"…...but you are afraid even to say it loud because it's not…..eeh…..written somewhere but it works and that's how we do it. You understand, so we need it (protocol) please." (FGD3)*

And the same participant further said that it's difficult to mentor new recruit without a protocol as there are individual difference in practice though they have worked in the unit for a long time:

"It's not easy…to teach the new sisters, I will touch there and somebody will touch there. If I'm a disorganised person, at the end of the day, that student who is being mentored by me will not benefit anything. You know, if you are not systematic with the new recruit, definitely they will be lost, you know.

….we are like, 10 years in the unit most of us, but there's a difference…So, all I'm saying is that.……there's knowledge, there's capacity, it's just that people must come together and do one thing….there should be uniformity. " (FGD3)

Autonomy is one of the nurse's roles that helps in clinical judgement and actions with regards to patient care. In this current study, participants expressed that protocol empowers nurses to exercise their autonomy as well as empowering them with knowledge to provide quality care as these participants are saying:

"…we need a nursing protocol so that we can practice independently. Because most of the time we depend on the doctors to tell us what to do. but if we can have our own protocol, we can know that, okay, if this is what they want, then I need to do one- two- three." (FGD1)

A participant also added that:

"*...the protocol empowers nurses with knowledge in providing better ventilator care for patients…and we will even be able to work independently. We know these things, why did we go to school?"*(FGD3)

In addition, another participants also commented:

"*…there is a backing on what we are doing, not just doing what people are telling us to do. With a protocol, it's like… it's been researched and up briefed to guide you." (FGD1)*

The findings also provided insight into how nurses perceive protocols in terms of legal document in their practice. The participants explained that the protocol is also used as a legal document when it comes to legislative litigations. They felt that if one follows a protocol in providing care and something wrong happens, they could be covered as they have a written document of which they based on when doing that intervention just as this participant is describing:

> "*…it's something that is binding …it is something that is going to cover you even in times of …like if there are any legislative litigations…..." (FGD2)*

In addition, another participant also expressed that:

> "*…it actually covers you legally, at least you are covered legally that …I have…I have done this according to the protocol…" (FGD1)*

In this study, most participants expressed that not having a nursing protocol, limit their duties as critical care nurses because they don't have anything to back up their practice as described by this participant:

> *"…sometimes the patient deteriorates or you know…. the condition changes and the doctor is not there, then you apply what you know. If I have a guide, you know, that would be easy for me." (FGD1)*

In addition, another participant also added to say:

> *"…..We have nurses who have actually specialised in critical care and they actually have the knowledge, they know what to do, you know, but, I will say there's a restriction because … there are no guidelines, you know. It's not easy…." (FG2)*

One of the participant expressed that nurses becomes frustrated because they have vast knowledge, experience and skill but they wait to be told what to do.

"…So, you go to school, you learn what you learn but you come back to the ward but can't practice because you are restricted… you know, but the knowledge base is there. You wait, you watch your patient, you can't intubate, you need to call the doctor, but you know how to intubate. And it's so frustrating because you know what to do, you know what's need to be done but you need to wait for someone else, you know what I mean… yoo, yooo!"(FGD2)

In addition, another participants also commented on the same to say:

"…we are trained to be independent practitioner but we wait. And when the doctor come they say wean Fio2, wean rate, wean this but you are an independent practitioner, you've got the papers." (FGD2)

The same participant added:

"…*you are restricted but you have the qualification and the experience you have as well. There are very good nurses who are well advanced more than doctors. Sorry to say that, but it's true, more than doctors but they can't function because it's a tertiary hospital…..and because there's no protocol. But some time you feel so sorry for them because a sister with such knowledge, well qualified, she asks the doctor "what do I do now?" and she knows what to do, you know it's a waste! She has gone to school to ask the doctor 'what do I do?' 'Do I have to wean the Fio2?' Asking a doctor who is fresh from school?" (FGD2)*

In summary, the participants expressed that there's a need for a nursing protocol. They described that having a protocol will reduce discrepancies in practice. They recommended that a protocol can be used as: a monitoring tool for quality care; teaching tool for novices in the unit; a base for dissemination of interventions to other hospitals when asked and a legal document in case of litigations. They also perceived that a protocol enforces nurses' autonomy in their practice. Lack of a protocol also restricts nurses to perform their roles to the fullest as critical care nurses which leads to frustration at times. These findings are in accordance with

Hansen and Severinsson (2007) which in their study showed that the nurses perceived the protocol as useful, since it represents a common, interdisciplinary knowledge base and plan.

THEME 3: DEVELOPMENT OF PROTOCOLS IS A MULTIDISCIPLINARY TASK

The participants viewed that development of protocols is the task of a multidisciplinary team. They described that both nurses and doctors have the role to play in developing the protocols. The nurses have the responsibility of taking an initiative in coming up with the aspects of what is supposed to be included in the protocol to suit their practice and also to do the search of information from different resources to get the current and evidence based practice in order to come up with one tangible protocol. And then the doctor's responsibility will be to add in some inputs that suits their practice to avoid conflicts and to endorse its use since they are the ones heading the department. One of the participants as expressed:

> *"….. It's our initiative...eeeh… to see which things are important that we want them to be done in…eeeh …standard form and then we involve our professors, especially here in neonatal side, we involve them. We take that clear sheet that we want this to be done and we want their help, they will help us and we type those...eeeh….protocols and we file them nicely and then put them besides our patients." (FGD1)*

A participant added:

> "….*We are the ones to write it….to compile it. Our role, I believe that it should be us who need to take the initiative. There should be someone who will be doing the researches, gather information also, may be people with experience, what has been the past experiences to build on whatever….we are going to do." (FDG2)*

The roles of the doctors were also stipulated as the ones to add in some input to the protocol as well as endorse its use as this participant is saying:

"…..Professor as the head of department is the one who is supposed to attach his signature and give a go ahead with what to do on the protocols."

(FDG1)

In addition, another participant added:

"…because we need insight, we need people with experiences like the doctors because they authorise." (FGD2)

The participant also commented that the nurse's need to learn from how other hospitals are performing just as this participant is saying:

"….. I think it will be better to allocate people that will benchmark from other public hospitals and see how they do their protocols for little ones then we can try and introduce it too …may be it also can work for us. Like …may be …in private they also have protocols ….it's our duty to find out how they are doing it and how are they succeeding in doing that." (FGD1)

The participants came up with suggestions on aspects which can be included in the protocol for it to be useful for nurses. They expressed that the protocol should include the indications for ventilation, the assessments that need to be done when monitoring the patients, the nursing care plan, the arterial blood gas normal values then what needs to be done when there's a deviation and the weaning process from ventilation. Participants also suggested that nurses who have advanced to Master's and Doctor of Philosophy as well as those who specialised in education, paediatrics or neonatal must collaborate to come up with a nursing protocol. One of the participants expressed that:

"But what I'm saying is that people have been fortunate to study to further the ladder, like …eeeh masters, PhD's, doctorate, those nurses, those ones that are….like, you see...experienced and

educated, they come down to mother earth, to come and guide us so that we don't always rely on doctor, doctor, these, doctor, doctor protocols when many nurses have studied and they have progressed to those levels." (FGD3)

In summary, the findings in this theme revealed that development of protocol is a task that needs to be done by all disciplines involved in mechanical ventilation management to prevent conflicts in utilisation and authorisation of its use. The nurses have the role of searching the current information and come up with aspects that suits their practice whilst the doctors are to add in other aspects to suit their practice as well as authorising its use since they are the head of the department. It is also crucial to involve specialist in paediatrics / neonatology nursing and nursing education when developing the protocol. This finding correlates with findings from a study done in Ireland by Blackwood Wilson-Barnette and Trinder (2004) which found that team approach need to be deployed when developing protocols.

ADDITIONAL FINDINGS

Some issues also emerged in the discussion. One of the participant described that nursing studies are done at the institution but the findings are not implemented. One of the participants had a concern that in nursing there is also an attitude of discrimination against the different categories of registered, based on their education and nurses with a Diploma qualification are considered inferior and input in protocol development undermined. There is limited utilisation of the guidelines or protocols formulated by the junior nurses.

"….. It's like the researches are being done and shelved. They are not taken a step further and they….what is the term…..they don't apply the knowledge,….you cannot go and retrieve the research that was done by sister so and so in nineteen ….in two thousand and five with regard to the protocol of such and such a nature. We all do the proposal and everything

but they are not taken to the next level from the nursing side. You understand what I'm saying..." (FGD3)

One of the participants expressed on the attitude of discrimination against the Diploma qualified nurses:

"…*the ultimate goal is to create that protocol but it takes…..you know… knowledge is advanced ….and ….its broad and its international you know what I mean..... We can create our own but people here have got this thing of classing that "oooh who created this? Is it the diplomas, the basic diplomas, there's that class with the nurses. With the doctors they carry each other along until professorship or whatever. You know what I'm trying to say… but with nurses we are classifying, categorising, we try to discriminate…you know what I mean…." (FGD3)*

The participants suggested that there should be a Matron or someone in the higher ranks of nursing management to take responsibility for handling of the protocols and review into the current studies conducted in the units to improve the nursing practice as expressed by the participant:

"*another thing in nursing, what I realised is that, it's like when we have reached a certain level……like …...we don't have nurses in senior positions to deal with the protocol. If there was a Matron in the hospital who deals with protocols, we develop our own protocol and she will read it, she Okays it. But we know, at the end of day the doctors will help us to endorse it. We don't have nurses themselves with good protocol knowledge to guide." (FGD3)*

In summary, the additional findings revealed that nursing studies are done at the institution but the findings are not put into practice. The participants also felt that there is an attitude of discrimination against nursing staff when it comes to implementation of guidelines or protocols formulated by the junior nurses.

4.5 DISCUSSION OF FINDINGS

The current study findings revealed that the existing mechanical ventilation management protocol is a doctor's protocol as evidenced by expressions of majority of the participants. Nurses expressed that this protocol doesn't have the nursing care aspect to guide the nursing care but it only helps on the settings of the ventilators. The participants from the current study also observed that even though the protocol is present and meant for doctors, there is no consistency in its use. Doctors use this protocol somehow as evidenced by some of the interventions that they do on the patients. But in addition to using this protocol, they also use another protocol from another institution plus consulting the consultants when assessing the patients. This implies that the current protocol is not even enough or it lacks some information to guide their clinical practice. No literature was found to support this finding.

In the current study, it was found that there's no mechanical ventilator management protocol specific for nurses to guide nursing care. Generally, nurses follow instructions from doctors and some use their experience to render nursing care especially those who have worked for a long time (more than five years) while the new recruits, are guided by the old gurus through an orientation and mentorship program.

In nursing practice, protocols are very important in ensuring the patients safety and improvement in quality of care. In addition, the protocols enforces uniformity in practice, thus, to ensure that every nurse whether newly qualified or experienced nurses base their nursing practice on it. This finding show a relationship with findings from a study results of Blackwood and Wilson-Barnette (2007:219) done in Northern Ireland, which states that "weaning protocols provide a uniform practice and are particularly beneficial in providing safe guidance for junior staff." Kramer & Schmalenberg (2003) also established in their study that protocols help to reduce variations in patient care and also provide a means of continuous quality improvement in healthcare and support training. The importance of protocol in weaning was highlighted in an intervention study conducted in Australia by Keogh, Courtney and Coyer (2003), which aimed to examine the impact of guideline for

weaning ventilation found that interprofessional guidelines are effective and safe in guiding the weaning process for infants in intensive care. The same study also found that use of protocols reduced number of weaning failure and reintubation in children who were weaned using a guideline than those who were weaned traditionally.

In the current study, it was revealed that most of the experienced nurses use their clinical judgement or their past experience but it becomes a challenge for newly qualified nurses to make independent decisions when nursing neonates on mechanical ventilation as they don't have anything to guide them on what to do. This finding is similar to the finding in a study done in Northern Ireland by Blackwood and Wilson-Barnett (2007) which focused on the impact of nurse directed protocolised-weaning on nurses of which experienced nurses did not find the weaning protocol useful as it was what they know and do in their day to day practice while as junior nurses who lacked experience in weaning found protocols more useful as it helped them to be confident and comfortable to nurse ventilated patients. The protocol also helps inexperienced nurses to practice safely (Blackwood and Wilson-Barnett, 2007). According to Rycroft-Malone, Fontenla, Seers and Bick (2008:1497) "senior nurses tend not to refer to standardised care approach because as they become more experienced, familiar and confident with their practice, they less often refer to protocols." Arguably a study by Thompson, Bucknall, Estabrooks, Hutchinson, Fraser, DeVos, Binnecade, Barrat and Saunders (2009) stated that using clinical experience does not mean that one has high quality decision making and it doesn't predict that experienced nurses make better decisions than less experienced (Hoffman, Donoghue, & Duffield, 2004).

Nurses in NICU are responsible for the monitoring of the ventilated patients and to report any problem that occurs with neonates to the doctors since they work with neonates more than the doctors. It was highlighted in the current study that management of neonates depends on the severity of the condition and clinical judgement after assessment of the neonate. Arterial blood gas is one of the interventions that help in making clinical judgement and to determine the weaning process of the neonate. The participants emphasised that arterial blood gas (ABG) reading and interpretation is crucial as it guides the nursing care of the mechanical

ventilated patients. They felt that it's very important to have knowledge of the normal values of arterial blood gas results for detection of the abnormal reading and to appropriately and timely intervene. This knowledge of arterial blood gas would also help in making timely decisions when they want to wean off the ventilation than always waiting for doctors.

In the current study, it was found that experienced nurses' use of values of oxygen saturation and arterial blood gas analysis as a guide for changing ventilator settings to support their intervention in the absence of doctors. Thorens et al as cited in Rose et al. (2007) concurred with this finding that critical care nurses help improve weaning outcomes and reduce the duration of mechanical ventilation because the nurses recognize and correct acid-base disorders, electrolyte disturbances, hypoxia, tachypnea, pain, and discomfort soon after these conditions occur. On the other hand, in the current study, the inexperienced nurses rely on doctors and nursing team leaders to interpret the arterial blood gas results and make decision for intervention on their behalf.

It was also commented that if nurses have the knowledge on Arterial blood gas reading and interpretation, they will be able to assist the junior doctors to read the result because it has been observed that some of these junior doctors don't know how to interpret the blood gas results of which, in the end delays the patient's interventions. According to Lowe, Fulbrook and Aldridge (2001) protocols can also improve the quality of patient care as they guide nurses in their decision-making processes and reduce the time delay that would have resulted if the nurse had sought medical approval before continuing with the treatment.

Protocols can be used as a monitoring tool for quality care. Turner, Misso, Harris and Green (2008:46) states that "protocols provide a guide to best practice, a framework within which clinical decisions can be made, and are used as a benchmark against which clinical practice can be evaluated." The participants in the current study also commended that protocols can also be used as a teaching tool for novices in the unit and support when sharing information with other hospitals. One of the participants in the current study expressed that other hospitals from within and outside the Gauteng province call to ask about the care of

mechanical ventilation but it becomes difficult to share the intervention since they don't have a written protocol as a basis. A protocol can also be viewed as a legal document in case of litigations as it can stipulate the evidence on how the care was provided (Thomas, 2009).

Protocols also enforce nurses' autonomy in their practice and lack of it also restricts them from performing their roles to the fullest as critical care nurses which leads to frustration at times. Nurses in the study expressed that they have knowledge and skills obtained from their qualification and in-service trainings but they are restricted to practice due to lack of protocol. Nurses suggest interventions to the doctors most of the time as they work together in the ward. In correlation with this current finding, a study conducted in Australia by Rose, Nelson, Johnston and Presneill (2007) to characterize the role of critical care nurses in the management of mechanical ventilation in a setting without formalized protocols for mechanical ventilation and weaning and no respiratory therapists. The results of this Australian study, revealed that the critical care nurses has high level of responsibility for, and autonomy in the management of mechanical ventilation and weaning. Critical care nurses are also responsible for the majority of the decision episodes that results in a change to ventilator settings, ranging in complexity from the simple titration of FIO2 to a decision to commence weaning. Hansen and Severinsson (2007) found that nurses perceive protocol as motivating and time saving as well as providing a feeling of independence. Stewart, Shamdasani and Rook (2007) states that it is important that nurses use their own initiative in preventing patient adverse effects. Presence of a protocol would lead to autonomous role come into play of which in the end would bring job satisfaction. The study by Weston, (2010) concur with other studies by Hansen et al. (2007) and Stewart, et. al (2007) to say that clinical nurse autonomy over nursing practice is associated with increased job satisfaction and improved patient outcomes. The findings further state that nurses with autonomy have the responsibility and opportunity to provide input and make decisions related to their practice.

Due to lack of protocol, in some cases, the nurses get so frustrated when neonate changes condition in doctors absence because they can't do some of the interventions. Waiting for the doctor to come and prescribe the intervention even

though they know what to do on the neonate (due to lack of protocol) makes them to become frustrated. Hence they emphasized that having a protocol in the unit will help to boost their autonomy which will in the end, bring job satisfaction as well as timely response to neonate's needs. According to Blackwood and Wilson-Barnette (2007) nurses experience job satisfaction when they use a protocol to guide the weaning of mechanically ventilated patients as well as when engage in multidisciplinary collaboration. The participants admitted that nurses have the knowledge and skills from their qualification and on job trainings as well as from long service in the unit but can't initiate some interventions as it is the responsibility of the doctor to initiate the weaning process. This correlates with a study done in Australia by Rose, Nelson, Johnston and Presneill (2007:438) which described the roles of critical nurses in making decisions about mechanical ventilation and weaning in ICU that "decision making associated with mechanical ventilation is the responsibility of medical staff with nurses involved in the process but not directly responsible for the initiation of ventilator changes".

Weaning patients from mechanical ventilation is basically performed by medical staff but nurses also have a role to play (Kollef, Shapiro, Silver, St. John, Prentice, Sauer, Ahrens, Shannon, Baker-Clinkscale and Darnetta, 1997) therefore, they need to have adequate knowledge (Rushforth, 2004). Once the patient has been stabilized, the indication for ventilation has been resolved, and the patient meets the weaning criteria, the process of weaning begins. Weaning process is challenging hence requires practitioners to be systematic, safe and accurate when performing it (Fulbrook, Delaney, Rigby, Sowden, Trevett, Turner and Whittam, 2004). The use of ventilation management protocols shortens the time for weaning from mechanical ventilation and ensures safety in the practice (Blackwood et al. 2011; Kollef, et al. 1997). Therefore having a protocol in the unit will enable nurses to initiate the weaning process based on the patient's improvement which eventually shortens the ventilation period as well as reducing the ventilation complications.

Medicine and nursing are two professions with overlapping scopes of practice that interact frequently during ICU care (Van de Cappelle et al, 2012) hence there are often friction and miscommunication among the doctors and nurses (Baggs and

Schmitt, 1997). However, successful management of ventilated patients require team work approach. In this study, nurses suggested that, for the unit to have a uniform practice in managing ventilated patients, it requires a protocol which should be developed using multidisciplinary approach. The majority of the participants acknowledged that other members of the multidisciplinary team must be involved when developing the protocol to ensure validity and recognition of use by other disciplines as well. According to Taylor (2002) protocols should be jointly developed by nurses and doctors and made available as necessary to verify authority to provide medical aspect of care. Involvement of other disciplines in developing and introduction of protocols is important as it reduces frustrations and conflict amongst them than if it is done on individual discipline. Involvement of other disciplines in development of protocols is supported by a study done in Ireland by Blackwood and Wilson-Barnette (2007) in which they explored 11 intensive care physicians' views on utility of weaning protocol and nurses roles in the weaning process. The physicians stipulated that a team approach involving nurses, physicians and relevant others should be deployed to develop the protocols and plan the implementation process as this would ensure that protocolized weaning addressed unit-specific issues and to ensure that all medical and nursing staff receive in-service education in using them. "Involvement in collaborative practice ultimately increases one's experience and knowledge" (Gaberson and Oermann, 1999; Spencer, 2004 as cited in Blackwood and Wilson-Barnett 2007:218).

In this current study, the participants expressed that there's need to develop a nursing protocol for management of ventilated patients. The participants indicated that nurses are responsible to come up with the aspects of care to be included in the protocol by doing a thorough search of what is currently happening in world of nursing and then, compile the aspects that are applicable to their setting. The medical team task is to add in some inputs and authorise the use of this protocol because the department is headed by them. Taylor (2002) agrees with this finding that protocols must be developed by multidisciplinary teams because it helps to allocate the roles on the key areas of care or treatment.

Collaboration in the development of protocols is vital. The participants in the current study also suggested that nurses who have done masters' and PhD's in nursing,

nurse educators and the experienced nurses should come together as one to come up with the protocol in collaboration with doctors since they are the experts.

According to Fennessy (1998) specialists' clinical expertise is a fundamental part of evidence-based practice and inclusion of clinical expertise in the protocol development process guarantees proficiency as well as multidisciplinary involvement.

The introduction of protocols into an institution or ICU does not guarantee that the protocol will be used, or used correctly (Chatburn and Deem, 2007) hence the nurse managers should be vigilant to ensure that the nurses are practicing safely. The participants also suggested that the protocol must include the nursing care of a ventilated neonate, interpretation of arterial blood gas and actions to be taken when arterial blood gas results are abnormal. According to Coombs (2001) understanding the significance of the findings of arterial blood gases (ABG) is the first step in interpretation of them. Without this understanding, the nurse cannot be expected to realize the implication of the results.

In conclusion, the nurses perceived that the current protocol is for doctor's use since it doesn't have the nursing care aspects in it. The nurses also felt that introduction of protocol for managing mechanically ventilated patients will enhance uniformity in practice amongst nurses and other disciplines involved in the care. Multidisciplinary approach in developing protocols should be advocated since it helps to reduce conflicts between disciplines.

4.6 SUMMARY

This chapter presented the study results and the discussion. An integration of the findings revealed significant themes emerging in the following areas: current practice on the use of the protocol, importance of protocol and development of protocol as a multidisciplinary task. The connections amongst these were further expanded in the chapter and viewed in the context of the extant literature. The study limitations and recommendations for nursing practice, management and future research will be discussed in the next chapter.

CHAPTER FIVE

DISCUSSION OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The final chapter of the report presents the discussion of the results and conclusion of the study. This is followed by limitations of the study and recommendations for nursing management, nursing education, clinical practice and areas for further research arising from this study.

5.2 SUMMARY OF MAIN FINDINGS

In summary the participants felt that the current protocol was for doctor's use and nurses use it sometimes as a reference source in the management of a ventilated neonate and in monitoring the doctor's way of practice. Participants also explained that in order to use this current protocol, it required a nurse with one to two years of experience in the neonatal unit. The nurses in this unit didn't have their own nursing protocol to guide their nursing care hence they follow doctors' instructions as well as consulting expert nurses in the unit whenever they are not sure of what to do. New nurses usually undergo an orientation programme which does not have the written protocol on specific aspects of what the novices are to acquire. It is also not a structured orientation so it depends on the mentor's own developed objectives.

Participants also expressed that nurses are responsible for the monitoring of the ventilated neonates and report any problem that occurs on the neonate to the doctors since they work with the neonates more than the doctors. They further highlighted that management of neonates depends on the severity of the condition and clinical judgement after assessing the neonate. They also mentioned that

arterial blood gas (ABG) reading and interpretation was crucial as it guides the nursing care of the mechanical ventilated patients. They felt that it's very important to have knowledge of the normal values of arterial blood gas results for detection of the abnormal reading and to intervene appropriately and timely. This knowledge of arterial blood gas would also help in making timely decisions when they want to wean off the ventilation than always waiting for doctors. Some participants also commented that if nurses have the knowledge, they will be able to assist the junior doctors to read the result because it has been observed that some of these junior doctors don't know how to interpret the blood gas results of which in the end delays the patient's interventions.

The participants expressed that there's need for a nursing protocol. They described that having a protocol would reduce discrepancies in practice. They recommended that a protocol can be used as: a monitoring tool for quality care; teaching tool for novices in the unit; a base for dissemination of interventions to other hospitals when asked; a legal document in case of litigations. They also perceived that protocol enforces nurses' autonomy in their practice and lack of protocol also restricts nurses from performing their roles to the fullest as critical care nurses which leads to frustration at times.

The findings also revealed that development of protocol is a task that needs to be done by all disciplines involved in mechanical ventilation management to prevent conflicts in utilisation and authorisation of its use. The nurses felt that they have a role of searching the information from current studies done and come up with aspects that suits their practice whilst the doctors are to add in other aspects to suit their practice as well as authorising and reinforcing its use since they are heading the department. They also suggested that it was crucial to involve experts in paediatrics / neonatology nursing and nursing education when developing the protocol.

5.3 JUSTIFICATION OF THE STUDY

The purpose of the study was to explore and describe nurse's views on whether current ventilator management protocol can be adopted to standardise nursing care in neonatal intensive care units at an academic Hospital in Gauteng. Chapter 3 described the research design and methods used in detail, whereas Chapter 4 presented the findings using Braun & Clarke, thematic analysis approach. The nurse's views on the mechanical ventilator management protocol in neonatal intensive care unit at an academic hospital were identified and discussed. It can therefore be stated that this study is justified in that the purpose has been achieved.

5.4 LIMITATIONS OF THE STUDY

According to Polit & Beck (2012) researchers must be able to point out deficiencies in the study design that may implicate the integrity of the results. These imply to features of the study design that may influence participants` expressions as well as the researcher`s interpretation of the study findings. Recognizing the limitations of the study provides understanding of the scope of the study and assist in evaluating the implications of the study findings (Kornhaber, 2009).

The following limitations in this study are worth noting:

- The study was done on small sample size (n=15), thus the findings from this study can only be generalized to other NICUs in this hospital. It may be necessary for replication of the study in other neonatal units using a larger sample size.
- It was a challenge to get 6-10 NICU nurses together in a group due to pressure of work in the department therefore the researcher was not able to obtain the planned number of participants. Nevertheless, the views obtained from these participants were utilised to meet the study objectives.

In view of these limitations, generalisation of the findings is limited. However, findings could be applied to intensive care units of other public sector hospitals. It is important to repeat the study in other settings to challenge or support the findings.

5.5 CONCLUSION

In conclusion, the purpose of this study was to explore and describe the nurse's views regarding the current mechanical ventilator management protocol with the aim of getting the recommendation whether it can be adopted to standardise nursing care in neonatal nursing care unit at a public tertiary academic hospital in Johannesburg. The results indicated that the current protocol does not guide nursing care hence there's need for a specific nursing protocol. Nurses also suggested that when developing the protocol it's important to incorporate other multidisciplinary team for validation and recognition of use.

5.6 IMPLICATIONS AND RECOMMENDATIONS

The primary goals of professional accountability in nursing are to maintain high standards of care and to prevent the patients from harm. Nurses are responsible for each action taken and should be able to defend their actions. In order to meet this objective the following recommendations have been made for the benefit of the subsequent disciplines.

5.6.1 Clinical nursing practice

In clinical nursing practice, "Care of the critically ill patients is diverse and ever-expanding field, as medicine and technology collaborate to support patients through increasingly acute life-threatening situations" (Schmollgruber, in Stellenberg and Bruce, 2007). So, it is therefore necessary to develop the ventilator management protocol for nurses which can guide and standardise the nursing care.

But for this to be effective, nurses must have a sound knowledge and understanding of physiology and the technical equipment and its functions to be able to use this

knowledge to generate competent skills and the judgement necessary to achieve the best possible outcome for patients.

5.6.2 Nursing education

The following recommendation was made for nursing education.

- There is a need for nurse experts or the old gurus in the unit to provide continuous education especially for the new recruits about the mechanical ventilation and arterial bloods gas interpretation. This is mainly for the purpose of increasing their understanding of the mechanical ventilator plus its effects as they make decisions when taking care of the ventilated patients.

5.6.3 Nursing management

As the ICU environment requires skilful, experienced and competent nursing staff in order to ensure optimum patient outcomes, the following recommendation was made for nursing management:

- The participants suggested that the management should offer educational support to ensure that every nurse in the unit understands and uses the protocols to improve the nursing practice.

5.6.4 Future nursing research

Research helps to generate knowledge which guides nursing practice. Further research is recommended to investigate the following issues which arose from the study:

- A descriptive study could be done on collaboration between nurses and doctors in the unit for the purpose of figuring out how the whole unit can come up with the one concession protocol for managing ventilated patient other than each having own protocol. This could include the roles of both

nursing and medical practitioners when taking care of mechanically ventilated patients which could then be validated and introduced for practice.

REFERENCES

Abubakar, K.M. 2012. *Complications of Mechanical Ventilation*. Textbook of Clinical Pediatrics, Springer-Verlag Berlin Heidelberg.

Adam, J.M. & Eichenwald, E.C. 2013. *Mechanical ventilation in neonates*. Wolters Kluwer health.

Ahmed A.I., Soliman S.M. & Awad L.A. 2012. *Validation of evidence-based clinical practice guideline*: Nursing intervention for newly diagnosed pulmonary tuberculosis patients at community setting. Alexandria Journal of Medicine, vol. 48, pp. 155–165.

American Association for Respiratory Care. 1992. *AARC Clinical Practice Guideline: humidification during mechanical ventilation*. Respiratory Care, vol. 37, no 2, pp. 887890.

Baggs, J.G., Schmitt M.H. 1997. *Nurses' and resident physicians' perceptions of the process of collaboration in an Neonatal Intensive Care Unit*. Research Nursing Health, vol. 20, no.1, pp. 7-180.

Benner, P., Tanner, C., & Chesla, C. 2009. *Expertise in Nursing Practice: Caring, Clinical Judgment & Ethics*. 2nd Edition New York: Springer Publication Company.

Biban, P., Gaffuri, M., Spaggiari, S., Silvagni, D., Zaglia, F. & Santuz, P. 2013. *Weaning newborn infants from mechanical ventilation*. Journal of Paediatric and Neonatal Intensive Care Medicine, vol. 2, pp. 1-7.

Blackwood B. 1999. *Normal saline instillation with endotracheal suctioning*: Journal of Advanced Nursing, vol. 29, no.4, pp. 928-34.

Blackwood, B., Alderdice, F., Burns, K., Cardwell, C., Lavery, G. & O'Halloran, P. 2011. *Use of weaning protocols for reducing duration of mechanical ventilation in critically ill adult patients: Cochrane systematic review and meta-analysis*. British Medical Journal, vol. 342, pp.1-14

Blackwood, B., Junk, C., Lyons, J.D.M., McAuley, D.F. & Rose, L. 2013. *Role responsibilities in mechanical ventilation and weaning in paediatric intensive care units*: A national survey. American Journal of Critical Care, vol. 22, no.3, pp.189-197.

Blackwood, B. & Wilson-Barnett, J. 2007. *The impact of nurse-directed protocolisedweaning from mechanical ventilation on nursing practice*: A quasi-experimental study.

International Journal of Nursing Studies, vol. 44, no. 2, pp. 209–226.

Blackwood, B., Wilson-Barnett, J. & Trinder, J. 2004. *Protocolized weaning from mechanical ventilation: ICU physicians' views*. Journal of Advanced Nursing, vol. 48, no. 1, pp. 26-34.

Boysen, P.C. 1987. *Respiratory muscle function and weaning from mechanical ventilation.* Respiratory Care, vol. 32, no. 7, pp. 572-581.

Bradley, E.H., Curry. A. & Devers, K.J. 2007. *Qualitative Data Analysis for Health Services Research.* Health Services Research, vol.42, no.4, pp.1758 -1772.

Braun, V. & Clarke, V. 2006. *Using thematic analysis in psychology*. Qualitative Research in Psychology, vol. 3, pp. 77-101.

Burns, S. M. 2005. *Mechanical Ventilation of Patients with Acute Respiratory Distress Syndrome and Patients Requiring Weaning*: The Evidence Guiding practice. Critical Care Nurse, vol 25, no. 4, pp. 14-23.

Burns, N. & Grove, S.K. 2005. *The Practice of Nursing Research*: Appraisal, Synthesis and Generation of Evidence. 6th Edition. USA: Saunders Elsevier Incorporated.

Burns, N. & Grove, S.K. 2007. *The practice of Nursing Research Conduct, Critique and Utilization*. 6th Edition. Philadelphia: Saunders Company.

Burns, N. & Grove, S.K. 2011. *Understanding Nursing Research*: Building an Evidence-Based Practice. 5th Edition. USA: Saunders Elsevier Incorporated.

Chatburn, R.L. & Deem, S. 2007. *Should Weaning Protocols Be Used With All Patients Who Receive Mechanical Ventilation?* Respiratory Care, vol. 52, no. 5, pp. 609–619.

Coombs, M. 2001.*Making sense of arterial blood gases.* Nursing Times.Net.vol 97, no. 27, pp 36.

Courey, A.J. & Hyzy, R.C. 2014. *Overview of mechanical ventilation*. Up To Date.

Crocker, C. 2002. *Nurse led weaning from ventilatory and respiratory support*. Intensive Critical Care Nursing, vol 18, no. 5, pp. 272-279.

Cronin, P., Ryan, F. & Coughlan, M. 2008. *Undertaking a literature review: a step-bystep approach*. British Journal of Nursing, vol.17, no.1.

De Beer, J., Brysiewicz, P. & Bhengu, B.R. 2011. *Intensive care nursing in South Africa*. Southern Africa Journal of Critical Care, vol. 27, no. 1, pp. 6 – 10.

De Vos, S.A., Strydom, H., Fouche, C.B. & Delport, C.S.L. 2012. *Research at Grass roots for the social science and human service professions.* 4th Edition. Pretoria: Van Schaik.

Department of Health, 2013. *Maternal and Neonatal Health-Neonatal Care Handbook*.

November, Republic of South Africa.

Department of Health, 2010, Millennium Development Goals for South Africa.

Dichter, J.R. 2003. *Teamwork and hospital medicine: A vision for the future*. Critical Care Nurse, vol.23, no. 3, pp.10-1.

Donn, S.M. & Sinha, S.K. 2003. *Invasive and Non-invasive Neonatal Mechanical Ventilation*. Respiratory Care, vol. 48, no. 4, pp. 426-441.

Ely, E.W., Meade, M.O., Haponik, E.F., Kollef, M.H., Cook, D.J., Guyatt, G.H. & Stoller, J.K. 2001. *Mechanical ventilator weaning protocols driven by non-physician healthcare professionals: evidence-based clinical practice guidelines*. Chest Journal, vol.

120, no. 6, pp.454S–463S.

Epstein, D. & Brill, J.E. 2005. *A History of Paediatric Critical Care Medicine*. International Paediatric Research Foundation Incorporated, vol 58, no. 5, pp 987-996.

Fennessy, G. 1998. *Guidelines and protocols.* Practicing Nurse Journal, vol. 9, pp 14-16.

Fisher, D. 2011. *Clinical guidelines*. Nursing Practice Issues. Online: www.rcn.org.uk .

Forbes, A. and Griffiths, P. 2002. *Methodological strategies for the identification and synthesis of evidence to support decision-making in relation to complex healthcare systems and practices.* Nursing Inquiry, vol. 9, no. 3, pp. 141-55.

Fraser, J., Walls, M. & McGuire, W. 2004. *Respiratory complications of preterm birth.* British Medical Journal, vol. 329, no. 7472, pp. 962-965.

Fulbrook, P., Delaney, N., Rigby, J., Sowden, A., Trevett, M., Turner, L. & Whittam, A. 2004. *Developing a Network protocol: nurse-led weaning from ventilation*. The World of Critical Care Nursing, vol 3, no. 2, pp. 28-37.

George, J.B. 2002. *Nursing Theories:* The base for professional nursing practice. 5th Edition. New Jersey: Upper Saddle River.

Girou, E., Schortgen, F., Delclaux, C., Brun-Buisson, C., Blot, F., Lefort, Y., Lemaire, F. &, Brochard, L. 2000. *Association of noninvasive ventilation with nosocomial infections and survival in critically ill patients*. Journal of the American Medical Association, vol. 284, pp. 2361-2367.

Graneheim, U.H. & Lundman, B. 2004*. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness*. Nurse Education Today, vol.24, pp.105-112.

Grossbach, I., Chlan, L. & Tracy, M.F. 2011. *Overview of Mechanical Ventilatory Support and Management of Patient- and Ventilator-Related Responses*. Critical Care Nurse, vol. 31, pp. 30-44.

Hall, P. 2005. *Interprofessional teamwork: professional cultures as barriers*. Journal of Interprofessional Care, vol. 19, no. S1, pp. 188-96.

Hansen, B.S. & Severinsson, E. 2007. *Intensive care nurses' perceptions of protocoldirected weaning: A qualitative study.* Intensive and Critical Care Nursing, vol. 23, pp.196-205.

Harris, D. & Chaboyer, W. 2002. *The expanded role of the critical care nurse*: a review of the current position. Australian Critical Care, vol. 15, no.4, pp. 133-137.

Hewitt-Taylor, J. 2004. *Clinical guidelines and care protocols*. Intensive and Critical Care Nursing, vol. 20, pp. 45-52.

Hoffman, K., Donoghue, J. & Duffield, C. 2004. *Decision-making in clinical nursing: investigating contributing factors*. Journal of Advanced Nursing, vol. 45, pp. 53- 62.

Jarvis, S., Burt, K. & English, W. 2012. *High frequency oscillatory ventilation*. Royal Cornwall Hospitals NHS Trust.

Jordan, P. J. 2011. *Evidence-informed clinical guidelines for nursing care practices related to the safety of mechanically ventilated patient*. Philosophy of Doctorate:

Nelson Mandela Metropolitan University.

Kacmareck, R.N. 1998. *Protocolized weaning from ventilator support*. Current Opinion in Critical Care, vol 4, pp. 59-63.

Keogh, S., Courtney, M. & Coyer, F. 2003. *Weaning from ventilation in paediatric intensive care: an intervention study*. Intensive and Critical Care Nursing, vol.19, pp.

186–197.

Kitzinger, J. 1994. *The methodology of focus groups: The importance of interaction between research participants*. Sociology of Health and Illness, vol. 16, no.1, pp. 103– 121.

Kollef, M.H., Shapiro, S.D., Silver, P., St. John, R.E., Prentice, D., Sauer, S., Ahrens, T.S., Shannon, W., Baker-Clinkscale & Darnetta. 1997. *A randomised, controlled, trial of protocol directed versus physician-directed weaning from mechanical ventilation*. Critical Care Medicine, vol. 25, pp. 567-574.

Kornhaber, R. 2009. *The Lived Experience of Nursing Severe Burns Injury Patients A Phenomenological Inquiry*. Master's degree: University of Adelaide

Kramer, M., & Schmalenberg, C. 2003. *Securing good nurse-physician relationship*. Nursing Management, vol. 34, no.7, pp. 34-38.

Krueger, R.A., & Casey, M.A. 2009*. Focus groups: A practical guide for applied research.* 4th Edition. Thousand Oaks, CA: Sage.

Krueger R.A. & Casey, M.A. 2000. *Focus Groups: A Practical Guide for Applied Research*. 3rd Edition. Thousand Oaks, CA: Sage Publications 101.

Lawson, S.J. 2008. *Introduction to mechanical ventilation of the neonate*. RC Educational Consulting Services, Incorporated.

Lowe, F., Fulbrook, P., Aldridge, H., Fox, S., Gillard, J., O'Neill, J. and Papps, L. 2001. *Weaning from ventilation: a nurse-led protocol***.** CONNECT Critical Care Nursing, vol.

1, pp. 124–133.

Liamputtong, P. 2011. *Focus group methodology: Principles and Practice*. London: SAGE publication Limited.

Lipes, J., Bojmehrani, A. & Lellouche, A. 2012. *Low tidal volume ventilation in patients without acute respiratory distress syndrome: a paradigm shift in mechanical ventilation.*

Critical Care Research and Practice, vol. 2012, pp. 1-12.

Maree, K. 2012. *First steps in research*. Revised Edition. Pretoria: Van Schaik publishers.

Mead, P. 2000. *Clinical guidelines: promoting clinical effectiveness or a professional minefield?* Journal of Advanced Nursing, vol. 31, no. 1, pp.110-116.

Meade, M.O. & Ely, E.W. 2002. *Protocols to improve the care of critically ill paediatric and adult patients*. Journal of the American Medical Association, vol. 288, no.20, pp. 2601-2603.

Miller, D. & Carlo, W.A. 2008. *Pulmonary complication of mechanical ventilation in neonates*. Clinics in Perinatology, vol 35, no. 1, pp. 273-281.

Miller, M. & Kearney, N. 2003. *Guidelines for clinical practice: development, dissemination and implementation*. International Journal of Nursing Studies, vol 41, pp. 813- 821.

Murray, M., O'Halloran, P., Chisakuta, A., Cardwell, C.R. & Blackwood, B. 2011. *Protocolized versus non-protocolized weaning for reducing the duration of invasive mechanical ventilation in critically ill paediatric patients (Protocol)*. Cochrane Database of Systematic Reviews, Vol.4.

Newmarch, C. 2006. *Caring for the mechanically ventilated patient: part one*. Nursing Standard, vol. 20, no.17, pp. 55-64.

Patton, M. & Cochran, M. 2002. *A Guide to using Qualitative research methodology*. Medicins San Frontieres'.

Polit, D. & Beck, C. 2012. *Nursing Research: Generating and Assessing Evidence for Nursing Practice*. 9th Edition. Philadelphia: Lippincott Williams & Wilkins.

Pretorius, R. & Klopper, H.C. 2012. *Positive practice environments in critical care units in South Africa*. International Nursing Review vol 59, pp. 66-72.

Rello, J., Sonora, S., Jubert, P., Artigas, A., Rue, M. & Valles, J. 1996. *Pneumonia in intubated patients: role of respiratory airway care*. American Journal of Respiratory and Critical Care Medicine, vol 154, pp. 111-115.

Robinson, N. 1999. *The use of focus group methodology: with selected examples from sexual health research*. Journal of Advanced Nursing, vol. 29, no.4, pp. 905-913.

Rose, L. 2012. *Management of critically ill patients receiving non-invasive and invasive mechanical ventilation in the emergency department*. Open Access Emergency Medicine, vol.4, pp. 5–15.

Rose, L., Blackwood, B., Egerod, I., Haugdahl, H.S., Hofhuis, J., Isfort, M., Kydonaki, K., Schubert, M., Sperlinga, R., Spronk, P., Storli, S., McAuley, D.F. & Schultz, M.J. 2011. *Decisional responsibility for mechanical ventilation and weaning: an international survey*. Critical Care, vol. 15, pp. R295.

Rose, L., Nelson, S., Johnston L. & Presneill J.J. 2007. *Decisions Made By Critical Care Nurses during Mechanical Ventilation and Weaning in an Australian Intensive Care Unit*. American Journal of Critical Care, vol.16, 5, pp. 434-43.

Rose, L. & Ramagnano, S. 2013. *Emergency nurse responsibilities for mechanical ventilation: A national survey*. Journal of Emergency Nursing, vol. 39, no. 3.

Royal College of Nursing. 2014. Defining Nursing. www.rcn.org.uk.

Rushforth, K. 2004. *A randomized controlled trial of weaning from mechanical ventilation in Paediatric Intensive Care: methodological and practical issues.* Intensive and Critical Care Nursing, vol. 12, pp. 76-86.

Rycroft-Malone, J., Fontenla, M., Seers, K. & Bick, D. 2008. *Protocol-based care: the standardisation of decision-making?* Journal of Clinical Nursing, vol.18, pp. 1490 1500.

Scribante, J., Muller, M.E. & Lipman, J. 1996. *Interpretation of the scope of practice of the South African critical care nurse*. South African Journal of Medicine, vol 5, no.5, pp. 437-441.

Shenton, A.K. 2004. *Strategies for ensuring trustworthiness in qualitative research projects.* Education for Information. IOS Press, vol 22, pp. 63–75.

Simon, M. 2011. *Assumptions, Limitations and Delimitations*. Dissertation and scholarly research: Seattle, WA, Dissertation Success, LLC.

Solberg, M.T., Hansen, T.W.R. & Bjork, I.T. 2014. *Oxygen and Ventilator Treatment: Perspectives on Interprofessional Collaboration in a Neonatal Intensive Care Unit*.

Journal of Research in Interprofessional Practice and Education, vol.4.1.

South African Nursing Council. 1984. *Government notice regulation 2598 as amended*.

Regulation related to the scope of practice of person registered or enrolled under the Nursing Act, 2005.

Stellenberg, E.L & Bruce, J. 2007. Nursing Practice: Medical –Surgical Nursing for Hospital and Community. African Edition. Elsevier Churchill Livingstone.

Stewart, D.W., Shamdasani, P.N. & Rook, D.W. 2007. *Focus groups: Theory and practice*. 2nd Edition. Thousand Oaks, CA: Sage.

Suhara, F., George, J., Thomas, J., Chacko, J., Gee Varghese, J. & Dharmarajan, B. 2013. *Assessment of knowledge regarding mechanical ventilation among staff nurses working in selected hospital, Mangalore with a view to develop an information*

pamphlet. International Journal of Recent Scientific Research, vol 4, no. 9, pp.1410 - 1413.

Taylor, F. 2006. *A comparative study examining the decision-making process of medical and nursing in weaning patients from mechanical ventilation*. Intensive and Critical Care Nursing, vol. 22, pp. 253-263.

Taylor, J. W. 2002. *Collaborative Practice: Shared responsibilities and outcomes*. Excerpt from a Margaret J. Stafford Educational Research Lecture at the Edward Hines Veterans Administration Hospital.

Thomas, J. 2009. *Medical records and issues in negligence*. India journal of Urology, vol. 25, no. 3, pp 384–388.

Thompson, C. & Dowding, D. 2002. *Clinical decision-making and judgement in nursing*.
New York: Churchill Livingstone.

Thompson, C., Bucknall, T., Estabrooks, C.A., Hutchinson, A., Fraser, K., De Vos, R., Binnecade, J., Barrat, G. & Saunders, J. 2009. *Nurses' critical event risk assessment: a judgement analysis*. Journal of Clinical Nursing, vol.18, pp. 601–612.

Tuner, T., Misso, M., Harris, C. & Green, S. 2008. *Development of evidence-based clinical practice guidelines: comparing approaches*. Implementation Science, vol. 3, pp. 45.

Urden, L.D., Lough, M.E. & Stacy, K.M. 2006. *Thelan's Critical Care Nursing: Diagnosis and Management.* 5th Edition. St Louis, Missouri: Mosby Elsevier.

Van De Cappelle, C., Hui, Y. & Yan, A. 2012. *Interdisciplinary collaboration and relevant perspectives in critical care: suggestions to the medical student*. Faculty Reviewer: Anonymous Reviewer. University of Western Ontario Medical Journal, vol.

81, pp.1.

Weston M.J. 2010. *Strategies for Enhancing Autonomy and Control over Nursing Practice*. The Online Journal of Issues in Nursing, vol. 15, no.1.

World Health Organisation Constitution, 1948.

Wong, D.L. 2012. *Wong's Nursing Care of Infants and Children*. 9th Edition. St. Louis Missouri: Mosby Publication.

Wood, K.A., Lewis, L., Von Harz, B. & Kollef, M.H. 1998. *The use of noninvasive positive pressure ventilation in the emergency department: Results of a randomised clinical trial.* Chest Journal, vol. 113, pp. 1339-1346.

Woolf, S.H., Grol, R., Hutchinson, A., Eccles, M. & Grimshaw, J. 1999. *Clinical guidelines: potential benefits, limitations and harm of clinical guidelines*. British Medical Journal, vol. 318, pp. 527-530.

LIST OF APPENDICES

APPENDIX A: PARTICIPANT DEMOGRAPHIC DATA

Nursing Focus Group Participant Demographics
Date: **Time:** **Place:**
Gender: o Male o female
Age: o less than 30 o 30 to 40 o 41 to 50 o 51 to 60 o over 60
Qualification on basic nursing: o Bachelor's degree o Diploma
What is your specialty: o Neonatal nursing o Paediatric nursing o ICU nursing o other
How long have you been in practice in this unit? o 2 to 5 years o 6 to 10 years o more than 10 years

APPENDIX B: INTERVIEW GUIDE

TITLE : EXPLORATION OF NURSES VIEWS ON MECHANICAL VENTILATOR MANAGEMENT PROTOCOL IN NEONATAL INTENSIVE CARE	
DATE :	**PLACE:**
INTERVIEWER:	

INSTRUCTIONS

Copies of informed consent and confidentiality forms should be provided to each participant. Participants should be provided an opportunity to ask any questions.
Encourage participation of all group members in the conversation. Start by explaining the ground rules.

THE RESEARCH QUESTION

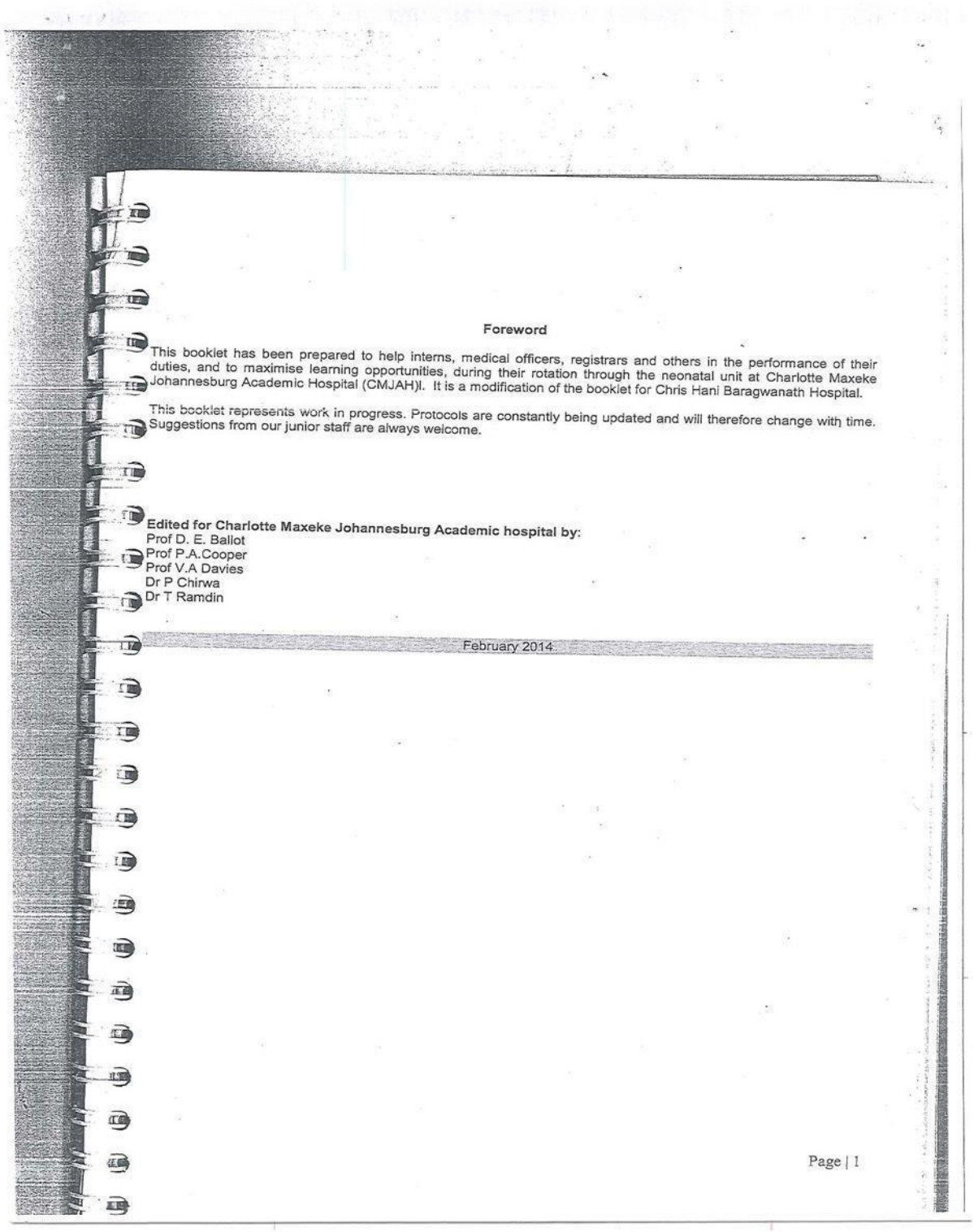
Based on your experience and expertise

- Are you aware that there is a protocol which is used by medical practitioners in managing neonates on mechanical ventilators?
- What are your views regarding the use of ventilator management protocol in delivering nursing care to neonates?

THE PROBES FOR THE QUESTION

- How is neonatal ventilation managed in NICU?
- What guides the management of a ventilated neonate in ICU?
- What are the responsibilities of nurses in ventilator management? • What are the nurses' responsibilities in developing a ventilator management protocol?

APPENDIX C: MECHANICAL VENTILATION PROTOCOL



Foreword

This booklet has been prepared to help interns, medical officers, registrars and others in the performance of their duties, and to maximise learning opportunities, during their rotation through the neonatal unit at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH)l. It is a modification of the booklet for Chris Hani Baragwanath Hospital.

This booklet represents work in progress. Protocols are constantly being updated and will therefore change with time. Suggestions from our junior staff are always welcome.

Edited for Charlotte Maxeke Johannesburg Academic hospital by:
Prof D. E. Ballot
Prof P.A.Cooper
Prof V.A Davies
Dr P Chirwa
Dr T Ramdin

February 2014

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RESPIRATORY DISTRESS

Introduction: Signs of respiratory distress include tachypnoea (RR >60/min), recession, nasal flaring, grunting and cyanosis. These signs may occur on their own or in various combinations. These signs may also be manifestation of non-respiratory causes, e.g. perinatal asphyxia, cardiac disease, metabolic acidosis, infection, anaemia and polycythaemia.

Causes: Common causes of respiratory distress in the new-born include hyaline membrane disease (HMD) (also known as respiratory distress syndrome of the newborn), pneumonia, meconium aspiration syndrome (MAS) and transient tachypnoea of the new-born (TTN).

Guidelines to differential diagnosis: HMD is the most likely cause in preterm infants (<37 weeks). However, prematurity is a risk factor for infection, therefore pneumonia is also a consideration. An infant born to a mother with meconium staining of amniotic fluid (MSAF) and respiratory distress would be diagnosed with MAS if there are typical changes on Chest X-ray. Respiratory distress in a term infant without a history or evidence of MSAF is most likely due to pneumonia or TTN. Other pulmonary causes of respiratory distress to consider are pneumothorax, congenital abnormalities such as congenital diaphragmatic hernia, oesophageal atresia with tracheo-esophageal fistula (TOF), congenital lung abnormalities and obstruction to the airways (choanal atresia) and cyanotic congenital heart disease..

Management: Ensure adequate oxygenation, ventilation and circulation. Temperature must be maintained to minimize oxygen consumption and requirements.

1. Administer oxygen. Oxygen can be administered by nasal cannula or nasal CPAP. Nasal cannula may result in marked variations in inspired oxygen due to mixture with inspired environment air (usually a maximum of 2l/min [40%] can be delivered). Oxygen via nasal CPAP is preferable in VLBW and ELBW infants with significant respiratory distress. Preterm infants started on NCPAP should be given surfactant. Term babies with respiratory distress (probable TTN) can be observed in oxygen with monitoring of oxygen saturations for a few hours. If not weaning or very distressed, they should be admitted, bloods taken and antibiotics started. If they settle, they can be discharged back to mother.
2. Start antibiotics. Pneumonia may mimic respiratory diseases such as HMD or meconium aspiration, both clinically and on chest X-ray. Therefore, start all infants with newly diagnosed respiratory distress on antibiotics - penicillin G and gentamicin on admission. Take bloods for blood culture and full blood count.
3. Keep nil per mouth. Infants with respiratory distress may not tolerate feeds. Therefore, start on intravenous fluids (60 mls/kg for term infants, 60-80 mls/kg for preterm infants) potassium-free neonatelyte.
4. Indications for mechanical ventilation are recurrent apnoeas, respiratory failure as evidenced by PaCO2 >55 mmHg associated with pH <7.25; PaO2 <50 mmHg or O2 saturations <89% in >70% oxygen. Where possible, nasal continuous positive airway pressure (NCPAP) should precede mechanical ventilation, followed by conventional mechanical ventilation where NCPAP is unsuccessful.

SURFACTANT REPLACEMENT THERAPY

Introduction
Effects of surfactant therapy include an increase in functional residual capacity, rapid improvement in oxygenation, increase in lung compliance, decrease in pulmonary VQ mismatch and a decrease in pulmonary artery pressures. It results in a reduction in the risk of developing pulmonary air leaks (30-65%) and mortality (40%).

Requirements for surfactant therapy

- Preterm infant (<37 weeks) with a birth weight above 750 grams.
- Changes suggestive of HMD on chest X-ray.
- Preterm infant with HMD who has increasing respiratory distress and oxygen requirements.
- Ventilated infant requiring ≥ 40% oxygen to keep oxygen saturations >89% with an a/A ratio < 0.22.
- Infant haemodynamically stable.

Administration

- Stabilization: Not to be used during resuscitation. Stabilize the infant first.
- Type of surfactant: Exogenous surfactants available in SA include Curosurf (poractant) and Survanta.(beractant)
- Timing of initial dose: The natural history of HMD is to get worse in the first 48 to 72 hours. Delay in administration of surfactant may mean that the baby deteriorates and requires mechanical ventilation. Administer surfactant in babies with severe HMD as soon as possible, preferably within the first hour of life, before putting the baby on Nasal CPAP.
- Dose:

  - Survanta: 4mls/ kg, can be repeated 6 hourly up to 2 additional doses
  - Curosurf: 2.5 mls / kg then 1.25 mls/kg administered 12 hourly as needed (up to 2 additional doses)
- Route: Through endotracheal tube, using a catheter or feeding tube or intubate with a large bore feeding tube and administer directly.
- Procedure: Intubate and administer the warmed surfactant as a single rapid push in. It is not necessary to reposition the baby. If the baby is on NCPAP, leave the NCPAP in place and administer the surfactant
- Subsequent doses: Repeat doses may be considered at least 6 hours from the previous dose and in the first 48 hours of life may be considered. Indications for repeat dose are the same as the first dose. Consider other reasons for deterioration or failure to wean (tube problems, pneumothorax, and atelectasis). Order chest X-ray as indicated. Discuss with consultant
- Prescription: Please write up the surfactant dose under Stat medication and complete a motivation form so that the surfactant can be replaced.

VENTILATOR MANAGEMENT

Introduction: Conventional positive pressure ventilation remains the mainstay of assisted ventilation in neonates despite the development of new ventilatory techniques. Management of infants on mechanical ventilation requires specialized personnel. A registrar or consultant should be available at all times. Ideal nurse to patient ratio for infants on assisted ventilation is 1:1. Because of limited human resources we accept ratios of 1:2 to 1:3 in our unit.

Indications for ventilator therapy: Mechanical ventilation is often required for primary lung disease or central respiratory failure (apnoea).

1. Respiratory failure:
   - $PaCO_2$ >55 mmHg associated with falling pH <7.25 and/ or
   - PaO_2 <50 mmHg or oxygen saturations <89% on >70% supplemental oxygen.
2. Increasingly severe work of breathing
3. Severe or recurrent apnoeas
4. Post-operative

Choice of ventilatory strategy: The choice between continuous positive airway pressure (CPAP) and conventional mechanical ventilation (CMV) depends on the goal to be accomplished.

- CPAP is generally used to recruit collapsed or fluid filled alveoli, thereby improving ventilation-perfusion mismatch. Therefore, it will improve oxygenation but may or may not significantly improve ventilation (CO_2 removal). It may actually impair CO_2 removal at high pressures.
- The use of CPAP is advantageous because it is relatively traumatic, causes less barotrauma, avoids the need for an endotracheal tube, and is simple to setup and maintain.
- NCPAP with surfactant therapy is the first line of ventilation for preterm infants with respiratory failure due to HMD. CMV is generally used in apnoeic infants, when NCPAP fails to improve respiratory function, in post-operative patients and in older infants who require ventilation
- High Frequency Ventilation (HFOV) is reserved for use in circumstances when conventional ventilation has failed, or in the management of significant air leaks. HFOV is efficient in removal of CO_2 and permits oxygenation without over distention of the lungs. Therefore consider HFOV if infant on CMV requires PIP >30 mmHg and/or rates >60 to maintain oxygenation and/ or ventilation despite being on FIO_2 >1 or Oxygen Index
- $(MAP \times FIO_2 \times 100 \div PaO_2) = >20$.

Initiation of ventilation

Nasal Continuous Positive Airways Pressure (NCPAP)

- Bubble CPAP is administered in 177 to babies > 750grams birth weight that require surfactant therapy for HMD.
- NCPAP can also be used for neonates with apnoea in ward 177.
- Early surfactant therapy is more effective than later, so surfactant should be given as soon as possible after the baby is stabilised and within 2 hours of birth. NCPAP and surfactant are the first line of therapy for babies with HMD – mechanical ventilation would be for those who fail NCPAP.
- Please ensure correct sizing and placement of the nasal prongs or nasal mask, in order to prevent avascular necrosis of the nasal septum and nasal cartilage. Don't over tighten the prongs or mask.
  - The nasal prongs must be sized for both the nares and nasal septum.
  - 5 mm of prongs should be visible between the nose and CPAP system
  - Protective granuflex should be placed on the nose and upper lip to protect the baby's skin.
  - The nasal prongs must be reassessed every 3 to 4 hours for signs of vascular compromise.
  - The nasal mask should comfortable cover the baby's nose.

- NCPAP is started at 5 cm water. The bubble chamber must be filled with water to the correct level. The "stick" determines the level of CPAP. Bubbling indicates that the system is functional, there are no other alarms.
- Oxygen is delivered at 6 to 10 litres minute, through a wall blender. Oxygen levels are weaned on the blender.
- The baby is weaned according to oxygen saturations (Target 88 to 94%) and on signs of clinical respiratory distress. It is unnecessary to do frequent blood gases.
- Once the baby has weaned to less than 30% oxygen and a CPAP level of 4 cm water, the NCPAP can be discontinued and the baby placed on nasal prongs.

- CMV: Start on PIP of 20-25 mmHg, PEEP of 5, Rate of 30-40/ min, inspiratory time of 0.4- 0.6 seconds. Note that it is better to use low pressures and high rates than the opposite to achieve adequate ventilation and oxygenation.
- HFOV: Starting mean airway pressure 1-2 cmH_2O above the one used while on CMV, Rate 10–15 Hz (10-12 Hz for bigger babies and 12-15 Hz for infants <1.6 kg). The amplitude should be based on the clinical assessment of chest wall movement, or start at amplitude of PIP-PEEP + 20. The inspiratory time is generally fixed at 33%. After 2-4 hours of HFV get a Chest X-ray. The level of the diaphragm should be ideally at T9-T10.
- Check an arterial blood gas 30-60 minutes after putting infant on the ventilator.

Monitoring of oxygenation and ventilation of patients on mechanical ventilators

- The gold standard for assessing oxygenation and ventilation is the arterial blood gas.
- Note that an arterial blood gas may not reflect the resting state if the infant is crying when the PaO_2 may decrease and $PaCO_2$ may increase or decrease.
- An umbilical arterial catheter (UAC) can serve as an easy access in obtaining frequent arterial blood gas samples without disturbing infant. Therefore, it should be inserted in all ventilated infants, especially those on CMV and HFOV.
- If UAC cannot be inserted, a peripheral arterial line can be inserted.
- Capillary blood samples for blood gas can be obtained, as they are less invasive than arterial stabs. If the heel is warmed appropriately, the capillary pH and $PaCO_2$ usually correlate with arterial samples, but capillary PaO_2 is unreliable, usually considerably lower. Therefore, capillary gas can only be used to assess pH and $PaCO_2$, and use pulse oximetry to assess oxygenation. If $PaCO_2$ is high on capillary gas, repeat blood gas using arterial stab before making changes on the ventilator.
- Pulse oximetry allows continuous non-invasive monitoring of oxygenation. Aim to keep saturations between 88 to 94% unless ordered otherwise.
- For most infants with acute pulmonary disease on mechanical ventilation aim for a pH of 7.25-7.40, PaO_2 of 50–70 mmHg, $PaCO_2$ of 45 – 55 mmHg, unless a different range is preferred for conditions such as persistent pulmonary hypertension of newborn, chronic lung disease and congenital heart disease.
- To improve oxygenation adjust FiO_2, PIP, PEEP and inspiratory time on CMV and adjust FiO_2 and MAP on HFOV.
- To improve ventilation (pCO_2) adjust ventilator rate and PIP on CMV and adjust Amplitude and frequency on HFOV.

Weaning

- Wean FiO_2 based on pulse oximetry saturations. Remember to keep oximeter saturations between 88-94%. Generally wean FiO_2 to below 0.6 before weaning pressure/rate
- The approach is to decrease PIP as tolerated until 16-18 cm H_2O is reached. Remember it is better to ventilate with low pressures and high rates than the opposite.
- Wean PIP by 2 cm at a time if PaO_2 is >60 mmHg and $PaCO_2$ <45 mmHg. Attention is then directed to the rate. Wean rate by 2 at a time if $PaCO_2$ <45 mmHg.
- Most infants can be extubated at a PIP of 16-18, a FiO2 of 30% or less, a PEEP of 4-5 and a rate of 8 to 12.
- Extubation on to NCPAP may reduce the incidence of failed extubations but is not routinely practised.

APPENDIX D: ETHICS CLEARANCE CERTIFICATE

R14/49 Mrs Leah Sinyiza

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140752

NAME: (Principal Investigator)	Mrs Leah Sinyiza
DEPARTMENT:	Nursing Education Charlotte Maxeke Johannesburg Academic Hospital
PROJECT TITLE:	Exploration of Nurses Views on Mechanical Ventilator Management Protocol in Neonatal Intensive Care at an Academic Hospital in Gauteng
DATE CONSIDERED:	27/07/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Ms Sizakele Khoza
APPROVED BY:	Professor Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	12/11/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature

Date 20th NOVEMBER 2014

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX E: REQUEST TO CONDUCT THE STUDY AT THE HOSPITAL

Faculty of Health Sciences

Department of Nursing Education

7 York Road, Parktown, 2193

20th November 2014

The Nursing Services Manager

Charlotte Maxeke Johannesburg Academic Hospital

5 Jubilee Road, Parktown, 2193

Dear Ms Pule,

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered postgraduate student at University of the Witwatersrand pursuing Master of Science in Child Nursing. I would like to ask for permission to conduct research study at Charlotte Maxeke Johannesburg Academic Hospital as one of the requirements for the programme. The title of the study is *"Exploration of nurse's views on mechanical ventilator management protocol in neonatal intensive care"*.

Mechanical ventilation is one of the major interventions in neonatology which provides life-saving support for infants with respiratory failure. Despite its important use, it may cause chronic lung injury resulting in broncho-pulmonary dysplasia if not used with caution. Looking at the effects mechanical ventilation can cause, it is important to have clinical guidelines for standardized care for both nursing and medical practitioners. It has been observed that medical practitioners have guidelines/protocols specifically developed and designed to guide them on management of children who require and/ are on mechanical ventilation. It is therefore important to acquire nurse's views on the implementation of this mechanical ventilator protocols in nursing practice. The purpose of the study is to explore and describe nurses' opinions on whether current ventilator management protocols can be adopted to standardise nursing care in neonatal intensive care units at an academic Hospital in Gauteng.

The sample for data collection will be drawn from professional paediatric and neonatal nurse experts involved in neonatal intensive care units. Their participation to this study is completely voluntary, confidential and anonymous. The interviews will be conducted in a private place for 45-60 minutes. An informed written consent to be included in the study and recorded will be obtained from all participants. The participants may withdraw at any point of the study without incurring any penalty. The information collected will be used for the intended purpose only. The Human Research Ethics Committee (Medical) of the University of Witwatersrand has approved the proposed study.

Please do not hesitate to contact me, should you require any further information regarding this study, via the Department of Nursing Education or on my cell number 074 458 8934.

Yours sincerely,

Leah Sinyiza

APPENDIX F: LETTER OF SUPPORT FROM THE DEPARTMENT OF NURSING

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

DEPARTMENT OF NURSING EDUCATION

Matron M Pule
Director of Nursing Services
Charlotte Maxeke Johannesburg
Academic Hospital

26 November 2014

LEAH SINYIZA STUDENT NUMBER 752903

This serves to confirm that Mrs L Sinyiza is registered at the University of the Witwatersrand, Johannesburg in the School of Therapeutic Sciences, Department of Nursing Education for the degree Master of Science in Nursing.

The Department of Nursing Education, supports her request to undertake the research study entitled, *"Exploration of Nurses views on mechanical ventilator management protocol in neonatal intensive care at an academic hospital in Gauteng. "*

Mrs L Sinyiza has obtained ethical clearance, clearance certificate number M140752

Kindly assist with conducting the requested study in the required clinical areas.
Please do not hesitate to contact me should you require any further information.

Yours sincerely

Professor JE Maree
Head: Department of Nursing Education

Department of Nursing Education | School of Therapeutic Sciences | Faculty of Health Sciences
7 York Road, Parktown, 2193, South Africa, Tel: +27 11 488-4272 | Fax: +27 11 488-4195
www.wits.ac.za/therapeuticsciences/nursing

APPENDIX G: APPROVAL TO CONDUCT THE RESEARCH AT THE HOSPITAL

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

Enquiries:
Ms. G. Ngwenya
Office of the Nursing Director
Tell: (011): 488-4558
Fax: (011): 488-3786
27 November 2014

Leah Sinyiza
Department of Nursing Education
Faculty of Health Sciences
University of Witwatersrand

Dear. Leah Sinyiza

RE: "Nurse's view on mechanical ventilator management protocol in neonatal intensive care"

Permission is granted for you to conduct the above recruitment activities as described in your request provided:

1. Charlotte Maxeke Johannesburg Academic hospital will not in anyway incur or inherit costs as a result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.
5.

Please liaise with the Head of Department and Unit Manager or Sister in Charge to agree on the dates and time that would suit all parties.

Kindly forward this office with the results of your study on completion of the research.

Supported / not supported
Ms. M.M Pule
Nursing Director
Date: 28/11/2014

Approved / not approved
Ms. G. Bogoshi
Chief Executive Officer
28/11/2014

RECEIVED CEO
28 -11- 2014
CMJAH

APPENDIX H: STUDY INFORMATION LETTER

EXPLORATION OF NURSES VIEWS ON MECHANICAL VENTILATOR MANAGEMENT PROTOCOL IN NEONATAL INTENSIVE CARE

Dear Colleague,
My name is Leah Sinyiza. I am currently studying for a Master's degree in Nursing Science (Child Nursing) at the University of the Witwatersrand. As part of my course requirement, I am expected to conduct a research study under supervision and would like to ask for your consent to participate in my study.

The purpose of the study is explore and describe nurses opinions on whether current ventilator management protocols can be adopted to standardise nursing care in neonatal intensive care units at an academic Hospital in Gauteng. I intend to conduct focus group interview expected to extend from 45- 60 minutes. In the process you will be asked to give your views on the current mechanical ventilator management protocols. The discussion is planned to be audio taped with your permission. Should you consent to take part in the study, I will ask you to sign a consent form. Only my supervisor, co coder and I will have access to the audio taped information and it will be destroyed as soon as after transcription. The transcribed information will be kept confidential and the results will be reported in general terms and no identifying information will be reported.

Your participation is voluntary. You may choose not to participate, or to withdraw from the study at any time. Please be advised that your identity will be known to other focus group participants and the researcher cannot guarantee that others in the group will respect the confidentiality of the group. However, measures will be taken to ensure anonymity by using pseudonyms for each participant. And I will also ask you to sign a consent form to indicate that you will keep all comments made during the focus group confidential and not discuss what happened during the focus group outside the meeting.

No names or identifying information will be asked of you. I appreciate that you may not benefit directly from participation in this study; however, the results of the study will provide essential information towards developing nursing protocols to guide neonatal ventilation. The appropriate people and research committees of the University of the Witwatersrand and your health care institution have approved this study.

Please do not hesitate to contact me, should you require any further information regarding this study, via the Department of Nursing Education or on my cell number 074 458 8934.

Thank you for taking the time to read this information letter. Yours sincerely

_____
Leah Sinyiza.

APPENDIX I: CONSENT FORM FOR PARTICIPATION IN THE STUDY

EXPLORATION OF NURSES VIEWS ON MECHANICAL VENTILATOR MANAGEMENT PROTOCOL IN NEONATAL INTENSIVE CARE

I have been given the information sheet on the research Title: *"Exploration of nurses views on mechanical ventilator management protocol in neonatal intensive care".* I have read and understood the information sheet. If I agree to participate in the study, I will be engaged in a group discussion for 45-60 minutes to express my views towards the medical mechanical ventilator management protocol.

I understand that participation is voluntary and I may withdraw from this research process at any stage without penalty.
I understand that the researcher will ensure that confidentiality and my name will not be used in the study reports. No identifying information will be included when the discussion is transcribed.
I have been given the contact details that I may call if I have any questions or concerns about the research.
I have read and understand this consent form, I agree voluntarily to participate in the focus group discussion for this study.

I also agree to maintain the confidentiality of the information discussed by all participants and researcher during the focus group session.

Date…… Signature……

CONSENT FOR AUDIO TAPED RECORDING THE STUDY INTERVIEW

EXPLORATION OF NURSES VIEWS ON MECHANICAL VENTILATOR MANAGEMENT PROTOCOL IN NEONATAL INTENSIVE CARE

I, …….have consented to be a participant in the study being conducted by Mrs. Leah Sinyiza. I have been given and read the information document on the research Title: *"Exploration of nurses views on mechanical ventilator management protocol in neonatal intensive care".*

I have understood the information document and been asked to give my consent to the interview being audio-taped to aid accurate collection and analysis of information. I also understand that I can decide whether or not to be recorded and that there will be no penalty if I decide not to be recorded.

I give my consent to be audio-taped ☐

I do not consent to be audio-taped ☐

Date…… Signature

APPENDIX J: APPROVAL FROM POSTGRADUATE COMMITTEE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Ms Thokozile Nhlapo
E-mail: thokozile.nhlapo@wits.ac.za

09 January 2015
Person No: 752903
PAG

Mrs L Sinyiza
Bwaila Maternity Unit
P. O. Box 1274
Lilongwe
Malawi

Dear Mrs Sinyiza

Master of Science in Nursing: Approval of Title

We have pleasure in advising that your proposal entitled *Nurses views on mechanical ventilator management protocol in neonatal intensive care at an academic hospital in Gauteng* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences