

## **Knowledge and Practice of Tracheostomy Care: A Case of Federal Medical Centre, Umuahia South East of Nigeria**

Article by Okam, Nwakaego  
BSN Nursing, Texila American University, Nigeria  
E-mail: udookam@gmail.com

### **Abstract**

*Tracheostomy as a medical procedure is carried out to help secure airway of patients with respiratory challenge. It is not without adverse effect. When tracheostomy stays for a long time there is usually an inherent discomfort which the nurse as a care giver will help to alleviate. This study was designed to explore the knowledge and practice of tracheostomy care for the patients.*

*The study was conducted at Federal Medical Centre, Umuahia, Abia State of Nigeria. The hospital is the major tertiary institution that serve the communities around as well as far away neighboring states.. This study was conducted among the nurses who work in this institution. It was a descriptive cross-sectional study with quantitative methods of data collection.*

*Data was analyzed using Statistical Package for Social Sciences (SPSS) version 17.0. Descriptive statistics were presented in frequency distribution tables. The t-test was used to determine associations between nurse in two major wards used as regarding knowledge if indication of tracheostomy and factors that influence outcome of care. Statistical significance was determined using a cut off value of 0.05*

*The results study showed that 80% respondents most favoured failed intubation as indication 82.5% were of the opinion that effective mobilization of secretion is the major area of scope in management of tracheostomy. Change in respiration as an indication for initiating suctioning to clear the patient's airway rather had low score which calls for in assessing the learning needs of the nurses. Their knowledge associated with proper techniques of suctioning is also a source of concern (21%). The nurses have high opinion about clinical outcome of tracheostomy (above 66%). The result also showed that there is significant difference between the ICU and surgical ward staff knowledge of indication for tracheostomy (. T-tab was 1.6 while t-cal was 5.04 at p-level of 0.05. the result showed a high value of t-cal of 5.04). Also, the result showed the values of mean and standard deviation which were collated and computed using t-test as; T-tab was 1.6 while t-cal was 3.69 at p-level of 0.05. The result showed a high value of t-cal of 5.04 showing significant difference between the Icu and surgical ward staff knowledge of care.*

### **Introduction**

#### **Background**

The basic role of the nurse is to care for patients to do what they could not do because of the inherent health challenge. Their tasks range from caring for airway, nutrition and fluid and making them comfortable as the need arises. Independent decision making forms the bedrock of this responsibility. The role he/she plays in tracheostomy cannot be overemphasized.

Tracheostomy is creating a surgical opening into the trachea between the second and third rings of cartilage. The main purpose is basically to secure airway for a patient with challenge of breathing. Tracheostomy helps to facilitate weaning a mechanically ventilated patient. By so doing there will be decreased dead space, managing secretions, relieving upper airway obstructions.

The creating an opening in the trachea is called tracheostomy. Tracheostomy tube is placed through the opening to secure airway to safe guard it from closing. In caring for the

tracheostomy cleaning around the stoma, dressing and replacing the inner cannula is done every eight hours (Esteban, 2000).

The main objective of tracheostomy care are to ensure a patent airway for the patient, prevent infection and skin breakdown. As a matter of fact, the use of sterile technique should not be ignored.

The tracheostomy has two parts namely; the inner cannula which can be removed if obstruction occurs especially in the case of copious secretion. Then is the tracheostomy tube itself which maintains the airway. Structurally the tube can be cuffed or uncuffed.

The nurses' main role is to care for the tracheostomy (Blot F, Similowski, 2005). Tracheostomy care is very important in both the intensive care setting and the general ward. It is, therefore, ever more important that trained nurses are equipped with the appropriate skills, knowledge and support to meet the unique needs of each patient safely and competently (Nieszkowska, Combes, Luyt, Ksibi, Trouillet, Gilbert, 2005)

Creative, responsive, holistic and individualized, based on sound knowledge in accordance with local policies is a necessary framework to be employed by the nurse. There is a need for training in order to improve nurses' competence (Griffiths, Barber, Morgan, Young, 2005)

### **Theoretical model**

The organizing framework for this study is a synthesis of an Intervention Theory. Neuman proposed that nurses assist clients in retaining, attaining, and maintaining optimal stability by implementing prevention measures to decrease risk factors that allow stressors to invade the clients' defense system (Neuman and Fawcett, 2002)

Neuman's system model provides a comprehensive flexible holistic and system based perspective for nursing practice. Neuman's model focuses on the response of the client's system to actual or potential environmental stressors and the use of primary, secondary and tertiary nursing prevention intervention for retention, attainment, and maintenance of optimal client health status.

Neuman's theory would support that one of many nursing intentions is to assist patients by implementing effective nursing care for prevention measures. This framework was appropriate for the study because it provides guidance and support necessary during the literature review, development of study tool and discussion of the results.

In this study primary prevention was taken into account where nursing intervention and knowledge of what they intervene to prevent adverse event occurrence to patients. Furthermore, nursing practices in relation to tracheostomy care prevention were assessed include suctioning.

### **Importance of the study**

As a surgical operation that can be done by the bedside, tracheostomy is usually performed on a critically ill patient especially in need of long stay in mechanical ventilation. Approximately 10 percent of critically ill patient on MV undergo tracheostomy to enhance longtime airway and ventilator support. In respiratory failure prolonged trachea intubation has inherent complications. These complications can be early or late complications.

*"Patients received a tracheostomy for airway obstruction (38%), chronic ventilation (53%), or multiple indications (9%). The mean duration of tracheostomy (adjusted for death and loss to follow-up) was 2.13 years. The tracheostomy-related mortality was 0.5%, and the nontracheostomy-related mortality was 22%. Nineteen percent of patients had complications in the first postoperative week, and 58% had 1 or more late complications. In comparison with the previous study from our institution, there was a great increase in long-term tracheostomy and a continuing trend away from tracheostomy for short-term airway management. Better monitoring and improvements in parental teaching may have contributed to a decrease in tracheostomy-related mortality"*

In long term ventilation tracheostomy prevalence was 10% as opined by Christophe et al (2007). Percutaneous or conventional surgical tracheostomy can be used. It has the risk of

being removed accidentally. Its major outcomes may range from patent airway to low mortality, short stay in ICU and easy weaning from MV. More importantly skin excoriations and breakdown is reduced with infection prevention.

The three major guideline for care include, mobilization of secretion, humidification and patent airway. Pulmonary complications can be easily prevented by applying the appropriate skills in mobilizing secretions.

### **Statement of the problem**

Tracheostomy is an important procedure carried out to help patients with respiratory distress to secure the airway for effective care to prevent event resulting to mortality. Proper management of patients on tracheostomy is unquestioning the major influence to clinical outcome.

Lucas and Gillis declared that every person has the right to enjoy the highest possible level of health and quality care in order prevent adverse outcome in area of morbidity and mortality.

Emphasizing the importance of quality of care for the ill patient, the care given by nurses could be more responsive to the patients needs and able to provide them with the care they deserve at the time mostly deserved.

The importance of nursing care has been drawn attention of all. Protocols have been put in place to improve outcome. Unfortunately, despite these efforts made by the nursing authority the protocols has not been implemented properly.

In spite of the laid down protocols of care the vulnerable patients problems has continued to swell to threaten the life of these patients. Problems that arise from tracheostomy has continued to influence them and their families significantly.

The investigator being a nurse clinician has on several occasions in the course of practice observed that some patients face adverse effect following tracheostomy procedures Although, ICN and individual hospitals have provided policies for management same is presently having ugly toll on the patients. Based on this backdrop the researcher was poised to ask the following questions;

What is the level of knowledge of indications of tracheostomy

What are the practice competencies and knowledge of basic skills in tracheostomy care

What are the clinical outcomes of tracheostomy care of the patients?

What is the extent of their knowledge about implications of inadequate care of tracheostomy.

### **Purpose of the study**

A study on the knowledge and practice of tracheostomy care: A case of Federal medical centre, Umuahia South East of Nigeria.

Specific objective

The specific objective of the study if to assess the knowledge and practice of tracheostomy care: A case of Federal medical centre, Umuahia South East of Nigeria

General objectives

1. To determine the knowledge about indication for tracheostomy by the nurses of FMC, Umuahia
2. To ascertain the scope of management known and areas of practice competencies of tracheostomy care by the nurses in FMC
3. To explore the knowledge of clinical outcome of tracheostomy care of patients by the FMC nurses
4. To find out the extent of knowledge about the implications of inadequate care of tracheostomy care by the nurses working in FMC

### **Research questions**

1. What knowledge do the nurses in FMC Umuahia have about indications of tracheostomy?

2. What are the scope of management known and areas of practice competencies by the FMC nurses
3. What are the clinical outcomes of tracheostomy care of the patients?
4. What are the factors that influence outcome of tracheostomy care?

### **Hypothesis**

Ho1. There will be no significant difference in the mean responses of the ICU and surgical ward staff regarding the knowledge of indication of tracheostomy.

Ho2. There will be no significant difference in the level of practice competence of tracheostomy care of ICU and surgical wards staff participants.

### **Significance of the study**

It is an established fact that tracheostomy is a very important surgical procedure which ultimately has its basic function of securing patent airway to a patient that has respiratory challenge. In recent time the percentage of patients undergoing this procedure has increased because of awareness of its benefit in securing positive patient outcome

More specifically, the study would provide awareness on how to care for these patients. In this regard, it is hoped that the result obtained from this study would benefit the nurses by knowing what their learning needs are as regards tracheostomy care.

Data that were generated on indication of tracheostomy will benefit the care giver to identify target groups for tracheostomy. Prompt intervention of this group may help them recover.

Information generated on competence will provide help in ascertaining learning needs. The management of nursing will use the information to be able to establish continuing professional programme for the nurses to improve in evidence-based practice.

The information derived from inadequate care will be important in providing a foundation which the nurse will consider in the right care. Information may dissuade nurses from being complacent in the future management of patients.

Data from outcome will be of great benefit to the researchers to see the need to investigate more on the factors affecting care and its clinical outcome of patients.

### **Review**

This is the review of relevant past research related to the study. There is paucity of research, but relevant works to the study will be employed. This will be discussed in the following headings

Conceptual framework

Empirical studies on the following;

Indications of tracheostomy

Practice competencies and knowledge in tracheostomy care

Outcome of tracheostomy management/care and

Implication of inadequate follow-up post tracheostomy

Conceptual framework

This section deals with conceptualization of tracheostomy care and its practices. There are many reasons for the use of tracheostomy tube in the care of critically ill patients. For patients requiring prolonged respiratory support and airway support, tracheostomy is performed as a temporary measure. There could be many indications for tracheostomy. Whitmar et al (2013) grouped indications for tracheostomy tubes placement into general categories which include ventilation, airway obstruction, airway protection, and secretions. They submitted that category one are for patients with perceived long-term mechanical ventilation, patients that are unable to maintain respiratory function without assistance and patients that has problem from being weaned from intubation and mechanical ventilation. Hess. (2005) and Masoudifar, Aghadavoudi and Nasrollahi (2012) submitted that there is no consensus to when best to place tracheostomy from intubation because of variations in patients differences in terms of

conditions and comorbidities. However, Plummer and Gracey 1989 state that the American College of Chest Physicians considers patient who could be on endotracheal intubation for 21 days for tracheostomy which will benefit a patient in areas of decrease of laryngeal injury, comfort improved activities of daily living mobility, eating and communicating. Bittner and Schmidt (2012) identified the second category of patients as those with tumors within the airway, paralyzed vocal cords, swelling, stricture, or unusual airway anatomy because of the obstruction which compromises normal respiration. Thirdly are patients without ability to protect their airway and patients with an inefficient swallow and/or cough mechanism, common situations in patients who have a high spinal cord injury, cerebrovascular accident, or traumatic brain injury. The fourth group are those who cannot mobilize or manage their secretions.

In his view Durbin (2005), indications for tracheostomy are when there is prolonged airway support especially in failed extubation. When a patient with respiratory failure cannot be weaned within 7–10 days tracheostomy is most appropriately needed. Other cases are severely injured trauma patients who require intubation that may apparently be longer than 5 days, and where there is supratentorial intracranial bleeds necessitating that patient may not wake within 3–5 days. They argued that when there is a delay of tracheostomy in these categories of patients the inherent problem will be prolonged hospital stay and pneumonia.

Mahafza, Batarseh, Bsoul, Massad, Qudaisat, & Al-Layla, (2012), concurred with the previous authors that elective surgical tracheostomy for intensive care unit (ICU) patients should be done for patients with the need for prolonged translaryngeal intubation in order to evaluate the proper timing and advantages of early vs. late tracheostomy and more importantly to stress on the major risks associated with delayed tracheostomy.

Durbin (2010) categorically insisted that indications for tracheostomy should include the need for a prolonged artificial airway, copious secretion during in intubated patient, poor airway protective reflexes, and upper-airway obstruction for any of a number of reasons. In that case expected intubation for more than 14 days should be considered a common reason for tracheostomy. His general reasons are:

*“To relieve upper-airway obstruction due to tumor, surgery, trauma, foreign body, or infection*

*To prevent laryngeal and upper airway damage due to prolonged trans-laryngeal intubation*

*To allow easy or frequent access to the lower airway for suctioning and secretion removal*

*To provide a stable airway in a patient who requires prolonged mechanical ventilation or oxygenation support”*. pp 2.

Tracheostomy just as any other medical procedure is not without complication. Engles et al (2009), categorized the complications into three which include;

*“Intraprocedural (occurring during or immediately after insertion) Multiple attempts, paratracheal insertion, posterior tracheal wall laceration.*

*\*\*Early postprocedural (occurring before maturation of stomal tract)*

*Bleeding, pneumothorax, subcutaneous emphysema, Tracheoesophageal fistula accidental decannulation, stoma infection, loss of airway and aspiration.*

*Late postprocedural*

*Tracheal stenosis, tracheal malecia, tracheoesophageal and tracheoarterial fistula and delayed stoma closure*

*unesthetic scar/cosmetic deformity, vocal paralysis and airway symptoms”*.

In the same vein Walkevar and Myers (2008) affirm that perioperatively hemorrhage at the stoma or into the trachea forms a major complication. This type of bleeding may be a source of concern. Others are Tracheal stenosis, tracheal malecia, tracheoesophageal and tracheoarterial fistula. In another opinion Krishnamurthy and Vijayalakshmi (2012) reiterated that fracture leading aspiration of a tracheostomy tube in the tracheobronchial tree can occur but rare though which is a very medical emergency.

Impact of this procedure abound. Quan, (2006) generally view an outcome of care as the impact and or result of any form of treatment/intervention which the patient received during his/her admission in the hospital and/or during an outpatient visit to a health facility. Outcome of care is the term used to describe the effect or result of the treatment/intervention received by a patient in the course of hospitalization or visit to a health care facility [Quan, 2006]. The author affirmed that the contributory factors that influence patient outcome are input and process. According to the author resources, time, manpower, money and material are input. While process embraces knowledge, expertise and standard of practice of the human resources of the specific services to be rendered. Patient outcome can be adverse or positive. To achieve positive outcomes in patients with trach tubes, keep abreast of best practices and develop and maintain the necessary skills. Every nurse who performs trach care needs to be familiar with facility policy and procedure on trach tube care.

Adverse outcome as defined by Marang-van de, Stadlander and Kievit (2006) is; *“an unintended and unwanted event or state occurring during or following medical care, that is so harmful to a patient's health that (adjustment of) treatment is required or that permanent damage results. The adverse outcome may be noted during hospitalisation, until 30 days after discharge or transferral to another department. The intended result of treatment, the likelihood of the adverse outcome occurring, and the presence or absence of a medical error causing it, is irrelevant in identifying an adverse outcome.”*

They further explained outcome to be rated as the quality of care as lower, and more often indicated that both the patient–caregiver contact and medical care could be improved. These adverse events include development of complications like pneumonia, surgical wound breakdown, shock, hemorrhage, and pressure ulcer, poor functional status, and increased length of hospital stay, death, health status and dissatisfaction with care. Patient outcomes could be measured by the incidence of the following: length of stay (increased or decreased), hospital costs (high or low), medication error, nosocomial infection, surgical wound infection/breakdown, pneumonia, so on (Cho, 2008).

Positive patient outcome is characterized by reduced length of hospital stay, no complications, improve functional status. Patient admitted into the hospital are expected to go home within stipulated time all things being equal. In that case patients are expected to resume activities of daily living. Aiken and Needleman [2005] identified the following as the factors influencing patient outcome in hospitals; technology in use in the hospitals and units, available health personnel in the units, specialties of the health personnel [nurses and doctors], experience of the staff, severity of ill health, overall health status of patient, complexity of care required etcetera. Patient outcome is generally measured by length of patient stay, patient falls, medication errors, and patient satisfaction scores. So, outcome of patient with tracheostomy in the context of this study will be measured by mortality, morbidity, length of stay, weaning from mechanical ventilation infection and so on.

Tracheostomy as it were helps to reduce the complications rate, shortens the ICU stay, lower the mortality in the ICU, and consequently will result in decreasing the cost in cases with prolonged tracheal intubation. Therefore, close assessment of ICU patients for proper timing of doing tracheostomy is essential. Mahafza, Batarseh, Bsoul, Massad, Qudaisat, & Al-Layla, (2012). Patients, who had prolonged tracheal intubation and consequently had late tracheostomy, had more complications; airway injuries and ventilator-associated pneumonia than those who underwent early tracheostomy

According to Oreadi and Carlson (2012) tracheotomy procedure is a safe and frequently life saving manoeuvre in situations with an unsecured airway, and it provides better outcomes in patients requiring long term ventilatory support. Mortality rates are low and its potential morbidity is exceeded by its benefits.

## **Empirical studies**

### **Empirical studies on indications of tracheostomy**

Itamoto, Lima, Sato and Fujita (2010) conducted a study to evaluate the indications and complications of tracheostomies performed in children. It was a retrospective study with review of medical records of patients aged from 1 day to 16 years who underwent tracheostomy at a university hospital during the period of August 2000 to July 2008. They assessed data on age, gender, indications and intra and postoperative complications. Results showed that Fifty-eight children under 16 years of age underwent tracheotomy during the study period. The mean age was 3.7 years. Airway obstruction was the main indication for surgery (n = 40; 69%). The incidence of complications in the postoperative period was 19% (11 patients), the majority happening during the late postoperative period. A further complication observed was cannula clogging. There were no complications related to the procedure during the surgery so the main indications for tracheostomy in children were airway obstruction and prolonged OTI.

### **Empirical studies on scope of management known and areas of practice competencies of tracheostomy care**

Morris, Whitmer and McIntosh (2013) did a review to assess knowledge on how to provide care for Tracheostomy in the intensive care unit. One of the most important considerations is effective mobilization of secretions, and a suction catheter is the most important tool for that purpose. They considered that bedside should be equipped with a functional suctioning system, an oxygen source, a manual resuscitation bag, and a complete tracheostomy kit, which should accompany patients wherever they go in the hospital. They opine that Tracheostomy emergencies include hemorrhage, tube dislodgement and loss of airway, and tube obstruction and such emergencies are managed more effectively when all necessary supplies are readily available at the bedside.

This study by Vejdan and Khosravi (2013) was to evaluate the role of flexible bronchoscopy (FB) and bronchoalveolar lavage (BAL) on pneumonia prevention of tracheostomy patients in intensive care unit. Methodology: This clinical trial was conducted on 67 head-injury patients who needed tracheostomy. The eligible patients were divided into two groups of different methods for removing the airway secretions. In intervention group, FB and BAL was added to routine conventional methods for airway clearance. Patients were followed for signs and symptoms of pneumonia. Results showed that risk of nosocomial pneumonia decreased from 35% to 14% in intervention group. The days of hospital stay were significantly reduced with bronchoscopic method. Flexible Bronchoscopy is recommended to all ICU admitted patients that have tracheostomy tube and high volume of secretion in their airways. It can not only prevent the pneumonia formation decrease the morbidity and mortality rate but it can even shorten the ICU stay time and consequently reduce the costs of treatment.

Myers et al. (2004), conducted a study on emergency ventilation of the tracheostomy patient, Part 1: Knowledge assessment of healthcare professionals. A nurse-driven investigation, using a convenience sample and comparative descriptive design, was conducted within a large medical center to identify healthcare professionals' (N=885) knowledge of emergency ventilation strategies for the tracheostomy patient. Registered

nurses and physicians comprised the majority of survey respondents (n=587) who answered a three-item questionnaire to assess specific knowledge. Findings focused primarily on differences in knowledge among subgroups of nurses, including those in critical care and noncritical acute care settings. Although increasing knowledge levels are documented since the mid 1980's, concern for the knowledge available to manage the emergency ventilation of tracheostomy patients is voiced. Less than half of nurses and physicians in this sample were able to answer correctly all three questions asked regarding emergency strategies. Recommendations address this knowledge deficit.

Day et al. (2002), conducted an explorative study on nurses' knowledge and competence in acute and high dependency ward areas about tracheal suctioning. With an increasing demand for intensive care beds more nurses in acute and high dependency wards would be expected to care competently for patients with tracheostomy tubes. Aims of this study was

to explore nurses' knowledge and competence in performing tracheal suctioning in acute and high dependency ward areas and to investigate discrepancies between knowledge and practice using method triangulation. Twenty-eight nurses were observed using non participant observation and a structured observation schedule. Each subject was interviewed and questioned about their tracheal suctioning practices, and subsequently completed a knowledge-based questionnaire. Scores were allocated for knowledge and practice. The findings demonstrated a poor level of knowledge for many subjects. This was also reflected in practice, as suctioning was performed against many of the research recommendations. Many nurses were unaware of recommended practice. In addition, there was no significant relationship between knowledge and practice. However, during the interviews, many nurses were able to provide a rationale for specific aspects of practice that were perhaps not based on current research recommendations. The study raised concern about all aspects of tracheal suctioning and has highlighted the need for changes in practice, clinical guidelines and focused practice-based education.

Ania et al. (2004) conducted an assessment of practice competence and scientific knowledge of ICU nurses in the tracheal suctioning. Objectives of this study was to evaluate practical competence of the nurses, as well as the scientific knowledge that they have on this procedures in a Polyvalent Intensive Care Unit and analyze if there were discrepancies

between the practice competence and scientific knowledge. This descriptive study, performed in 34 nurses, analyzed the performance of tracheal suctioning by direct observation, using the data collection of a structured grid that included 19 aspects to evaluate, grouped into 6 categories. In the same way, knowledge on the procedure was analyzed, using a 19-item self-administered questionnaire, also grouped into 6 categories, which evaluated the same aspects observed. The total mean score obtained in the practice observation grid (P) was 12.09 for a maximum score of 19, while it was 14.24 in the knowledge questionnaire (Q). When analyzed by categories, discrepancies were obtained in the following aspects: in the need for hand washing prior to suctioning (P = 55.9%; Q = 97.1%), in cleaning of the suction catheter after each suctioning during the procedure (P = 0%; Q = 38.2%), in the correct performance of hyperoxygenation and hyperinsufflation, before, during and after the procedure (P = 11.8%; Q = 94.1%), in the correct selection of the size suction catheter in relationship with endotracheal tubes internal lumen (P = 0%; Q = 52.9%), in the maximum time the catheter remains in the trachea (P = 100%; Q = 23.5%), in the maximum number of times that the catheter should be introduced in each suctioning (P = 100%; Q = 73.5%) and in the non-instillation of saline solution (P = 29.4%; Q = 58.8%). When the total scores obtained were compared, both in practice and knowledge, with the years of experience in ICU, no statistically significant differences were found. It is concluded that the study nurses have scientific knowledge of the suctioning procedure that are better than their practice competence. Discrepancies between practice and knowledge were also found in several of the aspects evaluated, which oriented towards the specific needs of training in this procedure.

Day et al. (2001), conducted an evaluation of a teaching intervention to improve the practice of endotracheal suctioning in intensive care units. This study was designed to examine to what extent intensive care nurses' knowledge and practice of endotracheal suctioning is based on research evidence, to investigate the relationships between knowledge and practice, and to evaluate the effectiveness of a research-based teaching

programme. This quasi-experimental study was a randomized, controlled, single-blinded comparison of two research-based teaching programmes, with 16 intensive care nurses, using non-participant observation and a self-report questionnaire. Initial baseline data revealed a low level of knowledge for many participants, which was also reflected in practice, as suctioning was performed against many of the research recommendations. Following



teaching, significant improvements were seen in both knowledge and practice. Four weeks later these differences were generally sustained, and provided evidence of the effectiveness of the educational intervention. The study raised concern about all aspects of endotracheal suctioning and highlighted the need for changes in nursing practice, with clinical guidelines and focused practice-based education

Crimlisk et al. (2002) conducted a study on closed tracheal suction system: implications for critical care nursing. The Closed Tracheal Suction System (CTSS) is a multiple-use suction catheter available for suctioning the ventilator dependent patient. While research has been reported on its impact on oxygen desaturation, ventilator function, and nosocomial pneumonia, the practical issues of the technical design of the catheter and its advantage in decreasing exposure of staff to infected respiratory secretions have not been investigated. This study reported the critical care nurses' perceptions in the use of the SteriCath (Concord/Portex)

CTSS focusing on hemodynamic stability, effectiveness of suctioning, patient safety and staff personnel exposure. The techniques for effective suctioning of are paramount in the care of an ill patient with tracheostomy.

Ackerman et al. (1996) conducted review of normal saline instillation: implications for practice. Nurses commonly use normal saline instillation (NSI) as a component of the suctioning procedure. The current research on NSI has not clearly identified many positive aspects of the procedure. Much of the research suggests it may actually be harmful. There has been little investigation into the reasons NSI is used. It is presumed that NSI is used to increase secretion removal when patients have thick endotracheal secretions due to inadequate humidity to the airway. Nurses need to be aware of the potential negative effects of routine NSI as well as alternative.

Ania González, Martínez, Eseberri Sagardoy, Margall Coscojuela, Asiain Erro (2004) evaluated practical competence of the nurses, as well as the scientific knowledge that they have on this procedures in a Polyvalent Intensive Care Unit and analyze if there are discrepancies between the practice competence and scientific knowledge. This descriptive study, performed in 34 nurses, analyzed the performance of tracheal suctioning by direct observation, using the data collection of a structured grid that included 19 aspects to evaluate, grouped into 6 categories. In the same way, knowledge on the procedure was analyzed, using a 19-item self-administered questionnaire, also grouped into 6 categories, which evaluated the same aspects observed. The total mean score obtained in the practice observation grid (P) was 12.09 for a maximum score of 19, while it was 14.24 in the knowledge questionnaire (Q). When analyzed by categories, discrepancies were obtained in the following aspects: in the need for hand washing prior to suctioning (P = 55.9%; Q = 97.1%), in cleaning of the suction catheter after each suctioning during the procedure (P = 0%; Q = 38.2%), in the correct performance of hyperoxygenation and hyperinsufflation, before, during and after the procedure (P = 11.8%; Q = 94.1%), in the correct selection of the size suction catheter in relationship with endotracheal tubes internal lumen (P = 0%; Q = 52.9%), in the maximum time the catheter remains in the trachea (P = 100%; Q = 23.5%), in the maximum number of times that the catheter should be introduced in each suctioning (P = 100%; Q = 73.5%) and in the non-instillation of saline solution (P = 29.4%; Q = 58.8%). When the total scores obtained were compared, both in practice and knowledge, with the years of experience in ICU, no statistically significant differences were found. It is concluded that the study nurses have scientific knowledge of the suctioning procedure that are better than their practice competence. Discrepancies between practice and knowledge were also found in several of the aspects evaluated, which orients towards the specific needs of training in this procedure.

### **Empirical studies on outcome of tracheostomy**

A study by Brotfain, Koyfman, Frenkel, Semyonov, Peiser, Hayun-Maman, Boyko, Gruenbaum, Zlotnik and Klein (2014) in assessing bed side tracheostomy concluded that it has the advantage of saving medical staff and operating room resources de Mestral, Iqbal,

Fong, LeBlanc, Fata, Razek and Khwaja (2011) studied on the impact of dedicated tracheostomy care nurse program on outcomes of tracheostomized patients. A tracheostomy care nurse program was improvised by the critical care physicians, with the objective of improving care of tracheostomized patients, wherein nursing staff from noncritical areas were selected for training purposes. The training included evidence-based knowledge and hands-on training. After a written assessment and a skill test, they were certified as 'Tracheostomy Care Nurse.' At least one of the tracheostomy care nurses was supposed to be responsible for tracheostomy care in specific wards. Comparative data of two periods, a pre-intervention period from January 2011 to November 2011 and a post-intervention period from December 2011 to October 2012, were analyzed. According to the result, during the pre-intervention period, of 82 tracheostomized patients, 28 (34.15 %) had complications including 20 (24.39 %) readmissions to the ICU. During the post-intervention period, 107 patients had a tracheostomy, of which 7 (6.54 %) had complications with only 2 (1.87 %) readmissions, which was significant ( $p < 0.05$ ). Decannulations nonsignificantly increased during the post-intervention period (25 vs. 16 %,  $p > 0.05$ ). The average length of hospital stay (ALOS) decreased from 36 to 27 days ( $p < 0.05$ )

Jeon, Hwang, Lim, Lee, Woo and Park (2014), conducted a study to determine the effect of the timing of tracheostomy on clinical outcome in mechanically ventilated neurosurgical patients admitted to the surgical intensive care unit. They used 125 patients that underwent tracheostomy and mechanical ventilation. They find out that early tracheostomy reduced the MV duration, ICU length of stay, and incidence of ventilator associated pneumonia in critically ill patients. However, there is no evidence that tracheostomy reduce either the ICU or hospital mortality.

Huang H, Li, Ariani, Chen and Lin, (2014) conducted a study to compare important outcomes between early tracheostomy (ET) and late tracheostomy (LT) or prolonged intubation (PI) for critically ill patients receiving long-term ventilation during their treatment. They performed a computerized searches for relevant articles on PubMed, EMBASE, and the Cochrane register of controlled trials (up to July 2013). Included in the study was a randomized controlled trials (RCTs) that compared ET (performed within 10 days after initiation of laryngeal intubation) and LT (after 10 days of laryngeal intubation) or PI in critically ill adult patients admitted to intensive care units (ICUs). Two investigators evaluated the articles; divergent opinions were resolved by consensus. They evaluated a meta-analysis from nine randomized clinical trials with 2,072 participants. Compared to LT/PI, ET did not significantly reduce short-term mortality [relative risks (RR) = 0.91; 95% confidence intervals (CIs) = 0.81-1.03;  $p = 0.14$ ] or long-term mortality (RR = 0.90; 95% CI = 0.76-1.08;  $p = 0.27$ ). Additionally, ET was not associated with a markedly reduced length of ICU stay [weighted mean difference (WMD) =

Shan, Hao, Xu and Chen (2013) conducted a study to assess if tracheostomy improves patients outcome. It was a meta-analysis using 2103 subjects from 6 observational studies. The result showed that tracheostomy decreased mortality and reduced ICU stay, hospital stay, and mechanical ventilation duration in ICU patients. Contrary to this view, Speed and Harding (2013) argue that there is insufficient evidence to determine that tracheostomy reduce hospital or intensive care unit LOS.

Another study was carried out by Penueles, Frutos-Vivar, Gordo, Apezteguia, Restrepo, Gonzalez, Arabi, Santos, Alhashemi, Perez, Esteban and Anzueto (2013) to determine the outcome of tracheotomized patients following re-intubation. Secondary analysis from a prospective, multicenter and observational study including 36 Intensive Care Units (ICUs) from 8 countries was employed. A total of 180 patients under mechanical ventilation for more than 48 hours, extubated and reintubated within 48 hours were used. The result showed that the length of ICU stay was significantly longer in the tracheotomy group compared with the group without tracheotomy and ICU mortality in the tracheotomy group was not significantly different

K Vejdani and Khosravi (2013) affirm that tracheostomy does not only prevent pneumonia, morbidity and mortality rate but also shorten the ICU stay time and consequently reduce the costs of treatment. Surprisingly in a study by Koch, Hecker, Hecker, Brenck, Preus, Schmelzer, Padberg, Weigand and Klasen (2012), tracheostomy is not in any way associated with decreased mortality and morbidity. In agreement with K Vejdani et al (2013) early ICU discharge, shorten duration of mechanical ventilation, and decreased length of overall hospital stay without affecting mortality are the major outcome of tracheostomy. Devarajan, Vydyanathan, Xu, Murthy, McCurry, Sessler, Sabik and Bashour (2012) were of the same opinion with the foremost writers.

Other authors have noticed the additional risks of having a tracheostomy tube, as compared to a standard translaryngeal tube in place, even when the patient resides in an ICU environment.

Kapadia (2000) reported airway accidents occurring in all intubated patients in a 16-bed multidisciplinary ICU. The study population was 5,046 patients intubated for 9,289 days during a 4-year period. They prospectively collected data, including the number and timing of airway accidents, the type of tracheal tube used the duration of intubation, description of the type of accident, the severity of the accident, impact on the course of the patient's illness, and whether the accident was preventable. Result showed that even when monitored in an ICU, airway accidents associated with tracheostomy tubes occurred more frequently and resulted in higher mortality (10%) than in patients with conventional ETTs. The clinician's reassurance of a secure airway by having a tracheostomy may not translate into actual greater safety.

Binyamin et al (2010) did a study where they found that 63.5% of most tracheostomies are done on men and their average age is 59.8 years. In this study, patients who survived for 30 days after the procedure had a lower burden of background morbidity as reflected by their Charlson Score. Mortality in one year was 56.6% of which 70% died in the first month following the procedure. Survival rate here was high among the group of patients who underwent tracheostomy during the first 10 days after initiation of mechanical ventilation.

Bhandary and Niranjani (2011) in a related study did a cohort analysis which included nearly 11,000 critically ill patients. They sought to evaluate the impact of tracheostomy timing on mortality. They concurred with Binyamin et al (2010) that there was a slight improvement in survival in patients who underwent tracheostomy within the first 10 days of intubation.

The above studies are however opposed by a tracheostomy management study which was cited by Bhandary and Niranjani (2011), where patients were randomized to early and late tracheostomy. The patient characteristics were similar across both groups and it was found out that there was no significant difference in mortality between the early and late tracheostomy groups at 30 days or even at 2 years post randomization with a 74% follow up rate.

In a different study, Engoren and Engoren (2004) found out that overall survival and functional status are poor in patients with tracheostomy for respiratory failure. Patients who are liberated from mechanical ventilation and have their tracheostomy tubes removed have the best survival; however, it comes at a higher hospital cost and longer length of stay. It then seen that in this particular characteristic, tracheostomy is not very successful in patients with respiratory failure but would succeed in a longer length of stay in hospital which of course comes with more costs.

Jeon, Hwang, Lim, Lee, Woo and Park (2014) conducted retrospective study to determine the effect of the timing of tracheostomy on clinical outcome in mechanically ventilated neurosurgical patients admitted to the surgical intensive care unit (ICU). A total of 125 neurosurgical patients, who underwent tracheostomy and had total mechanical ventilation (MV) duration of >7 days from October 2007 to December 2011, were enrolled. Patients were divided into 2 groups based on the timing of tracheostomy. Tracheostomy was performed within 10 days of MV in the early group (group E, n=39), whereas in the late group, it was performed after 10 days of MV (group L, n=86). The ICU and in-hospital mortality rates,

total duration of MV, length of stay (LOS) in the ICU, hospital LOS, and incidence of ventilator-associated pneumonia (VAP) were compared between both the groups. Result showed that total MV duration and ICU LOS were significantly longer in group L than E (21.5+15.5 vs. 11.4+5.6 d,  $P < 0.001$ ; 31.1+18.2 vs. 19.9+10.6 d,  $P < 0.001$ ). The incidence of VAP before tracheostomy was higher in group L than group E (44 vs. 23%,  $P < 0.05$ ). No significant difference was found in the ICU and in-hospital mortality rates and hospital LOS between the groups. They concluded that early tracheostomy reduced the MV duration, ICU LOS, and incidence of VAP in critically ill neurosurgical patients. However, early tracheostomy did not reduce either the ICU or hospital mortality

### **Empirical Studies on the factors that influence outcome after in the ward**

Mondrup F, Skjelsager K, Madsen KR (2012) performed an electronic questionnaire survey among heads of unit at registered Danish ICUs. A total of 34 out of 43 ICUs responded. 56% of the ICUs do not document individual plans for decannulation in the patient's chart. 91% of the ICUs do not perform daily follow-up of tracheotomised patients on the ward. No guidelines for decannulation on the ward were found, and only 6% have a guideline for accidental decannulation. Furthermore, as little as 47% of the ICUs report any formalized education or training of staff nurses in the management of tracheotomised patients. Guidelines relevant to patients discharged from Danish ICUs with a tracheal cannula in situ are scarce; few ICUs employ individualized plans for tracheostomy management and decannulation; there is largely no daily intensivist-led post-ICU follow-up, and formal staff education in tracheostomy management on the ward is scarce. They affirmed that these factors create a potential for adverse events and increased morbidity in this high-risk, high-cost patient population. Possibly individualized plans for tracheotomised patients as well as intensivist-led follow-up on the ward can improve patient outcome and safety and this should be confirmed in a future study.

In another study Martinez et al (2009) tried to determine the relationship between tracheostomy tube in place after intensive-care-unit (ICU) discharge and hospital mortality. It was a prospective observational cohort study in a medical-surgical ICU in a tertiary-care hospital that does not have a step-down unit. They recorded clinical and epidemiologic variables, indication and timing of tracheostomy, time to decannulation, characteristics of respiratory secretions, need for suctioning, and Glasgow coma score at ICU discharge. A total of 118 patients were tracheostomized in the ICU, and 73 were discharged to the ward without neurological damage. Of these, 35 had been decannulated. Ward mortality was 19% overall, 11% in decannulated patients, and 26% in patients with the tracheostomy tube in place; that difference was not statistically significant in the univariate analysis ( $P = .10$ ). However, the multivariate analysis, which adjusted for lack of decannulation, age, sex, body mass index, severity of illness, diagnosis at ICU admission, duration of mechanical ventilation, Glasgow coma score, characteristics of respiratory secretions, and need for suctioning at ICU discharge, found 3 factors associated with ward mortality: lack of decannulation at ICU discharge (odds ratio 6.76, 95% confidence interval 1.21-38.46,  $P = .03$ ), body mass index  $> 30$  kg/m<sup>2</sup> (odds ratio 5.81, 95% confidence interval 1.24-27.24,  $P = .03$ ), and tenacious sputum at ICU discharge (odds ratio 7.27, 95% confidence interval 1-55.46,  $P = .05$ ).

Fernandez, Bacelar, Hernandez, Tubau, Baigorri, Gili and, Artigas (2008) carried out a study to determine the effect of discharge from the ICU with a tracheostomy tube on ward mortality and its relation to patient vulnerability. It was a retrospective single-center cohort study Database (2003-2006) review of patients undergoing mechanical ventilation (MV)  $> 24$  h and discharged from the ICU with or without tracheostomy tube in place and followed up to hospital discharge or death was used. From 3,065 patients admitted to the ICU, 1,502 needed MV  $> 24$  h. Only 936 patients (62%) survived the ICU and were transferred to the ward; of these, 130 (13.9%) had a tracheostomy tube in place. Ward mortality was higher in patients with a tracheostomy tube in place than in those without (26 vs. 7%,  $P < 0.001$ ). Increased ward mortality among cannulated patients was seen only in those with intermediate Sabadell

score (24 vs. 9% in score 1,  $P = 0.02$ , and 38 vs. 24% in score 2,  $P = 0.06$ ), but not in the "good prognosis" (2 vs. 2%, score 0) and "expected to die in hospital" (80 vs. 75%, score 3) groups. Multivariate analysis found three factors associated with ward mortality: age, tracheostomy tube in place, and Sabadell score. Lack of tracheostomy decannulation in the ICU was associated with ward mortality.

Fernandez, Tizon, Gonzalez, Monedero, Garcia-Sanchez, de-la-Torre, Ibañez, Frutos, del-Nogal, Gomez, Marcos and Hernández (2011) carried out a research to analyze the impact of decannulation before intensive care unit discharge on ward survival in nonexperimental conditions. Prospective, observational survey was used. Population was Thirty-one intensive care units throughout Spain. Ans sample was all patients admitted from March 1, 2008 to May 31, 2008. Multivariate analyses for ward mortality, with Cox proportional hazard ratio adjusted for propensity score for intensive care unit decannulation. included in the study were 4,132 patients, 1,996 of whom needed mechanical ventilation. Of these, 260 (13%) were tracheostomized and 59 (23%) died in the intensive care unit. Of the 201 intensive care unit tracheostomized survivors, 60 were decannulated in the intensive care unit and 141 were discharged to the ward with cannulae in place. Variables associated with intensive care unit decannulation (non-neurologic disease [85% vs. 64%], vasoactive drugs [90% vs. 76%], parenteral nutrition [55% vs. 33%], acute renal failure [37% vs. 23%], and good prognosis at intensive care unit discharge [40% vs. 18%]) were included in a propensity score model for decannulation. Crude ward mortality was similar in decannulated and nondecannulated patients (22% vs. 23%); however, after adjustment for the propensity score and Sabadell Score, the presence of a tracheostomy cannula was not associated with any survival disadvantage with an odds ratio of 0.6 [0.3-1.2] ( $p=.1$ ). they concluded that intensive care unit discharge before decannulation is not a risk factor.

Paul (2010) carried out a literature review to identify current perspectives and areas for research regarding care and management of tracheostomized adult patients discharged to general wards and the community. Database searches of MEDLINE, BRITISH NURSING INDEX and CINAHL (1998-2009) was used. Inclusion criteria was literature regarding tracheostomized adult patients discharged to non-specialized areas. Exclusion criteria was paediatric literature. They concluded that even though best practice is applied to the care of tracheostomized adult patients in some areas, including support for ward staff from specialist nurses or teams, this is not always formalized or consistent. Moreso, the search showed a lack of medical follow-up once the patient is discharged from specialized areas with a tracheostomy. They noted that research is very limited in relation to the care and management of tracheostomized adult patients outside specialized areas, yet there is morbidity and mortality associated with this patient group. Staff education is widely recommended, but further development is needed to determine the best methods of delivering education, especially for health care professionals who care for tracheostomized patients on an infrequent basis.

However, in the study conducted by Norwood, Spiers, Bailiss and Sayers (2003) to evaluation of the role of a specialist tracheostomy service. A total of 170 patients were studied. After service implementation, fewer patients (17.6%,  $n=21$ ) were discharged from the intensive treatment unit to the wards with tracheostomy tubes compared with the first group (39%,  $n=20$ ) ( $p=0.006$ ), and the number of tracheostomy related complications on the wards were significantly reduced ( $p=0.031$ ).

#### Summary of literature review

In this study various literatures were reviewed based on conceptualization of tracheostomy.

Theoretical framework used in this study is Betty Neuman system theory development developed by Neuman and Fawcett.

The review of literature also presented some studies carried out by researchers that indicated the variables in the study. Most of the research were mostly foreign based. Though some studies has been conducted on same topic but none has been conducted in Umuahia to the best knowledge of the researcher.

### **Operational definition of terms**

Knowledge: - Knowledge in this study means the score obtained in the knowledge test on tracheostomy prepared by the investigator.

Practice, an implementation of measures to prevent ventilator associated pneumonia, according to the current study a score of 50% and above is considered adequate

Suctioning – removal of material through the use of negative pressure, e.g. removal of operative wound exudates during and after surgery, and also removal of respiratory secretions from the respiratory passages that the patient cannot remove by coughing.

Tracheostomy - This consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea. The resulting stoma can serve independently as an airway or as a site for a tracheostomy tube to be inserted.

#### Chapter Three

This chapter discusses the research method used for this study, area of study, target population, sample, sampling technique, inclusion/exclusion criteria, data collection instrument, instrument validation and revalidation and test of reliability of instrument. It will also discuss ethical consideration, procedure for data collection and method of data analysis.

### **Research design**

A cross sectional descriptive design was used for this study because it is concerned with the present situation (status quo). This is considered appropriate because the general purpose of descriptive survey is to observe, describe and document aspect of a situation as it naturally occurs and to show the need for change

#### Area of study

The area of study is the Federal Medical Centre (Queen Elizabeth Hospital) Umuahia, the largest and the most active tertiary hospital in Abia state, south East, Nigeria. It is the oldest mission Hospital East of the Niger, built in the early 1950's and taken over by the Federal Government of Nigeria in 1992 and renamed Federal Medical Centre Umuahia.

This hospital serves both self and non-self referred patients with diabetes mellitus from the seventeen local Government areas of Abia state and the neighbouring states like Imo, Ebonyi and Akwaibom state. It is located at NO 29 Aba Road Umuahia, Abia state capital. It is bounded on the South East by Afara Village and Nigerian Prisons Umuahia. On the East by Ibeku Central School and World Bank Housing Estate. On the North by Ndume Village and on the West by Umuahia/IkotEkpene Road

Being a tertiary health institution, it has facilities for training, research, clinical practice and specialty services. It was chosen because of the specialist services it offers. It runs both in- patients and out-patients facilities. The clinics run from Monday to Friday weekly by different consultants.

### **Target population**

The target population refers to all the nurses ICU and surgical wards in Federal Medical Centre Umuahia, Abia state.

#### Sample size

This consists of all the nurses working in these two areas; ICU and surgical ward with staff. The sample size is fifty nurses.

#### Sampling technique

Convenient sampling technique was used to select the participants which will include all the nurses in the selected areas.

#### Data collection

A self report instrument (Pre-tested Questionnaire) shall be used to source information primarily from the subjects. Secondary data will be collected by the researcher through review of literature

## Method of data analysis

The data gathered will be grouped and analysed using descriptive statistics to present data in percentages, frequency table etc. Inferential statistics will also be employed too. The SPSS software which will be used to calculate the mean and the standard deviation for all the variables. The association of outcome with independent variables will be assessed using multivariate analysis tool.

## Validation of instrument

Face validation of the instrument will be done by one project supervisor. Her input will be used to effect some corrections before using the instrument for field testing.

## Content validity

The researcher-made questionnaire will be given to two experts in the field of study to evaluate.

## Reliability and instrument

Reliability testing with test-retest method will be done. The coefficient of reliability of 0.85 - 0.9 using Pearson product moment correlation coefficient formula will be accepted.

## Result and discussion

**This chapter presents and discusses the result of the study.** Data for this study were analyzed and presented based on the research questions and hypothesis that guided the study. The findings of the study were organized in three parts; demographic data, data answering research questions and the third part verifying the hypothesis.

**Table 1.** showing the demographic data of the participants

Variables		Frequency	Percentage
Age	21-30	15	18.75%
	30-40	42	52.5%
	41-50	15	18.75%
	51+	8	10%
Sex	Male	16	20%
	female	64	80%
Marital status	Single	23	28.75%
	Married	50	62.5%
	Separated	2	2.5%
	Divorced	3	3.75%
	Widowed	2	2.5%
Professional qualification	RN/RM	25	31.25%
	Diploma	20	25%
	Bsn	30	37.5%
	Postgraduate	5	6.25%
Years of experience	1-10	30	37.5%
	11-20	32	40%
	21-30	20	25%
	31-35	18	22.5 %

Table 1 showed the bio-data of the participants. Age 21-30 were 15 (18.75%), 31-40 were 42 (52.5%), 41-50 were 15 (18.75%) and 50+ were 8 (10%). Out of 80 participants 16(20%)

were males and 64(80%) were females. In marital status Single were 23 (28.75%), married were 50 (62.5%), separated were 2 (2.5%), divorced were 3 (3.75%) and widowed were 2 (2.5%). Data on years of experience were RN/RM 25 (31.25%), Dp were 20 (25%). Bsn were 30 (37.5%) and postgraduate were 5 (6.25%). In Years of experience 1-10 were 30 (37.5%) 11-20 were 22 (40%), 21-30 were 20 (25), 31-35 were 18 (22.5%).

Research question one

What knowledge do the nurses in FMC Umuahia have about of indications of tracheostomy ?

**Table 2.** Respondents' knowledge of indications of tracheostomy

Indications	Yes		No	
	Frequencies	Percentages	Frequencies	Percentages
Airway obstruction	55	68.75	25	31.25
Prolonged airway support	61	76.25	19	23.75
Airway tumor	30	37.5	50	62.5
Copious secretion	38	18.05	42	81.95
Failed extubation	64	80	16	20
Intubation over 21 days	51	63.75	29	36.25

Table 2 showed result of the respondents on indication of tracheostomy. Airway obstruction recorded 55(68.75%), Prolonged airway support recorded 61(76.25%). Others include Airway tumor 30 (37.5%), Copious secretion, 38(18.05%), Failed extubation 64(80%) and Intubation over 21 days, 51(63.75%). from the data failed intubation with frequency of 64(80%) rated high level of knowledge by the participants while airway tumor rated low with 30(37.5%).

What are the scope of management known and areas of practice competencies by the FMC NURSES?

**Table 3.** Respondents' knowledge scope of management n=80

Scope of management	Agree		Disagree	
	F	%	F	%
1. Effective mobilization of secretion	66	82.5	14	17.5
2. Prevention of pneumonia	41	51.25	39	48.75
3. Promoting skin integrity	45	56.25	35	43.75
4. Humidification	39	48.75	41	51.25

When asked about the area of competence using scope of management, the nurses had generally above average knowledge of the expected scope of management

Table 3: This table showed that the respondents had above average of knowledge in Effective mobilization of secretion 66(82.5%). Prevention of pneumonia 41(51.25) Promoting skin integrity 45(56.25) Humidification 39(48.75)



**Table 4.** Response on competence i; Assess need for suctioning

	Yes		No	
	F	%	F	%
1. Increased work of breathing	42	51.21	38	48.79
2.Changes in respiration	30	37.5	50	62.5
3.Decreased Spo	47	58.75	33	41.25
4.Copious secretion	48	60	32	40
5.Wheezing	44	55	36	45
6.Unable to clear airway	36	45	44	55

In evaluating competence knowledge of need assessment of patients was applied.

**Table 4 indicated that the nurses had just a little above average of how to assess patients need. The data showed that Increased** work of breathing has respondents of 42(51.21%). Changes in respiration were 30 (37.5%). Decreased Spo<sub>2</sub>, was 47 (58.75%) Copious secretion, indicated 48 (60%) Wheezing was 44 (55%) and Unable to clear airway, 36 (45%). surprisingly well above average did not accept that changes in respiration is an alert for action with score of 50(62.5%).

**Table 5.** Competence ii. Proper techniques of suctioning

Applying Proper techniques	F	%	F	%
1.Hyperoxygenate before suctioning	30	37.5	50	62.5
2. Suction pressure for open system is not more than120mmhg;closed system not more than 160mmhg	21	26.25	69	73.75
3. Limit suction to three catheters only	40	50	40	50
4.Allow 20-30 seconds in between passes	52	65	28	35

In competence evaluation Table 5 showed that the practice of Hyperoxygenate before suctioning rated 30(37.5%); Suction pressure for open system is not more than120mmhg;closed system not more than 160mmhg had 21(26.25%) respondents while 69 (73.75%) disagreed. Limit suction to three catheters only 40(50%), Allow 20-30 seconds in between passes rated 52(65%)

What are the clinical outcomes of tracheostomy care of the patients?

**Table 6.** Response on clinical outcome of tracheostomy

Outcomes	Agree		Disagree	
	F	%	F	%
Reduced ICU and hospital length of stay	52	65	28	35
Reduced mechanical ventilator support	56	70	24	30
Decreased mortality	64	80	16	20
Reduced ventilatory associated pneumonia	46	57.5	34	12.5

Table 6 showed knowledge of outcome as in Reduced ICU and hospital length of stay, 52 (65%) and 28 (35%) disagree. Reduced mechanical ventilator support 56 (70%). Whereas 24 (30%) disagree. Decreased mortality were 64 (80%) Reduced ventilatory associated pneumonia 46(57.5%).

What are the factors that influence outcomes in the ward ?

**Table 7.** Response on factors that influence outcome

Factors	Yes	
	F	%
Lack of follow up on discharge	64	80
Scarce staff education	40	50
Timing of decannulation	66	82.5

Discharge to the ward with tube	15	18.75	65	81.25
Co-morbidity	62	77.5		

In responding to the factors that influence outcome after discharge to the ward, there was relatively high score for all the variables.

Table 7 showed Lack of follow up on discharge 64 (80%) which is above average. Scarce staff education rated 40 (50%). Timing of decannulation was 66 (82.5%). Discharge to the ward with tube had 15 (18.75%) while 65 (81.25%) disagree entirely. Co-morbidity had 62 (77.5%)

### Hypothesis

Hypothesis 1: There will be no significant difference between ICU and surgical ward staff regarding the knowledge of indication of tracheostomy.

**Table 8.** showing t-test summary of ICU and surgical wards

variables	N	X	SD	df	t-tab	t-cal	P
ICU	12	32.62	4.32	78	1.62	5.04	0.05
Surgical wards	68	41.63	5.76				

Table 8 above showed the values of mean and standard deviation were collated and computed using t-test. T-tab was 1.6 while t-cal was 5.04 at p-level of 0.05. the result showed a high value of t-cal of 5.04 showing significant difference between the ICU and surgical ward staff knowledge of indication for tracheostomy.

Hypothesis 2: There will be no significant difference in the level of practice competence of tracheostomy care of ICU and surgical wards staff participants.

**Table 9.** showing

variables	N	X	SD	df	t-tab	t-cal	p
ICU	12	38.04	4.47	78	1.62	3.69	0.05
Surgical wards	68	42.41	5.38				

Table 9 above showed the values of mean and standard deviation were collated and computed using t-test. T-tab was 1.6 while t-cal was 3.69 at p-level of 0.05. The result showed a high value of t-cal of 3.69 showing significant difference between the ICU and surgical ward staff knowledge of care.

## Discussion summary and recommendations

### Discussion

In this study 80% respondents most favoured failed intubation as indication for tracheostomy and this conforms the opinion of Whitmer et al (2013). Durbin (2005), says that tracheostomy is a helpful procedure to secure airway in long or failed extubation. However the participants' response indicated that copious secretion is far from being an indication for tracheostomy. This is against the assertion made by Durbin (2010). Effective mobilization as the first to consider in the scope of management of tracheostomy (82.5%). As quoted by Morris, Whitmer and McIntosh (2013) it has been a concern in the care of critically ill patients.

In need assessment for suctioning the concern is that above average of the response did not accept change in respiration as an indication for initiating suctioning to clear the patient's airway. This calls for concern in assessing the learning needs of the nurses.

Their knowledge associated with proper techniques of suctioning is also a source of concern (table 5). This is not in keeping with the assertion of Crimlisk et al. (2002). The nurses have high opinion about clinical outcome of tracheostomy (table 7) which is consistent

with Martinez et al (2009). These outcomes are considered either to be positive or negative which should not be allowed to arise in the course of patient's admission.

The nurses have above average of the influence of outcomes of tracheostomy procedure. However, discharge to the ward with tube was not viewed as a factor over patient outcome. **Norwood, and Sayers (2003)** has a different opinion.

### **Summary and recommendations**

This is a study to explore the knowledge and practice of tracheostomy care by the nurses at FMC, Umuahia. It was across-sectional study and descriptive analysis was employed to analyze data collected.

The results study showed that 80% respondents most favoured failed intubation as indication.

82.5% were of the opinion that effective mobilization of secretion is the major area of scope in management of tracheostomy. Change in respiration as an indication for initiating suctioning to clear the patient's airway rather had low score which calls for in assessing the learning needs of the nurses. Their knowledge associated with proper techniques of suctioning is also a source of concern (21%). The nurses have high opinion about clinical outcome of tracheostomy (above 66%).

The result also showed that there is significant difference between the ICU and surgical ward staff knowledge of indication for tracheostomy (. T-tab was 1.6 while t-cal was 5.04 at p-level of 0.05. The result showed a high value of t-cal of 5.04). Also, the result showed the values of mean and standard deviation which were collated and computed using t-test as; T-tab was 1.6 while t-cal was 3.69 at p-level of 0.05. The result showed a high value of t-cal of 5.04 showing significant difference between the Icu and surgical ward staff knowledge of care.

Findings from this study suggest that there is a great need for education for nurses focusing on tracheostomy. Nurses need to be encouraged to assess their learning needs which will help them get required knowledge which they can translate into practice. Education for these nurses poses a great challenge to the hospital and health system at large. Learning resources made accessible in the units for nurses will go a long way to improve their practice.

To avoid untoward events and reduce mortality, it is necessary to audit nursing practice in order to offer the best of practice. Continuous program development need to be put in place by the policy makers to improve their knowledge especially in area of tracheostomy and its proper care.

### **Acknowledgement**

I would like to express my sincere appreciation to the following people who assisted me in one way or another during the project writing. My supervisors, Jayalakshmi C for guidance and follow up in my research proposal, the Texila American University, School of Nursing Sciences' Lecturers and classmates for their encouragement and support.

### **References**

- [1]. Ackerman MH, Ecklund MM, Abu-Jumah M.(1996). A review of normal saline instillation: implications for practice. *dimens Crt Care Nurs*.15(1):31-8
- [2]. Aiken L, H. Clarke, S., Cheung. R, Sloane. D, Silber, J [2006.]: Educational Levels of hospital nurses and surgical patient mortality. *JAMA*. 290 (12):16
- [3]. Ania González N, Martínez Mingo A, Eseberri Sagardoy M, Margall Coscojuela MA, Asiain Erro MC.(2004) Assessment of practice competence and scientific knowledge of ICU nurses in the tracheal suctioning *Enferm Intensiva*. 2004 Jul-Sep; 15(3):101-11.
- [4]. Bhandary R, Niranjana N.(2011) Tracheostomy. *Anesthesia tutorial of the week*. 241:1-12
- [5]. Binyamin Y, Frenkel A, 2010; Bedside Percutaneous Tracheostomy in Critically Ill Medical Patients; Clinical Characteristics, Outcome and Complications. *PubMed* 149(3):143-7

- [7]. Bittner EA, Schmidt UH.(2012). The ventilator liberation process: update on technique, timing, and termination of tracheostomy. *Respiratory Care*, October 2012, vol./is. 57/10(1626- 34), 0020-1324;0020-1324 (2012 Oct)
- [8]. Blot F, Similowski T, Trouillet JL, Chardon P, Korach JM, Costa MA, (2005).. Early tracheotomy versus prolonged endotracheal intubation in unselected severely
- [9]. Brotfain E, Koyfman L, Frenkel A, Semyonov M, Peiser JG, Hayun-Maman H, Boyko M, Gruenbaum SE, Zlotnik A, Klein M. (2014). Bedside Percutaneous Tracheostomy versus Open Surgical Tracheostomy in Non-ICU Patients. *Critical Care Research & Practice*, 2014, vol./is. /156814, 2090-1305;2090-1305
- [10]. Cho, S.H. (2008). The effect of nurse staffing on adverse events, morbidity and medical costs, *Nursing Research* 52(2), 71-79.
- [11]. Christophe et al (2007). Tracheostomy does not improve the outcome of patients requiring prolonged mechanical ventilation: A propensity analysis. *Critical Care Medicine: January 2007 - Volume 35 - Issue 1 - pp 132-138*
- [12]. Crimlisk., (2002), "closed tracheal suction system: implications for critical care nursing", *Journal Of Advanced Nursing*, 19(1), 191-8.
- [13]. Day T, Wainwright SP, and Wilson-Barnett J.(2001). An evaluation of a teaching intervention to improve the practice of endotracheal suctioning in intensive care units. *J. Clin Nurs* [14]. (5):682-96
- [15]. Day T., Farneii. S., Haynes. S., Wainwright. S., Wilson-Barnett. J.,(2002), de Mestral C, Iqbal S, Fong N, LeBlanc J, Fata P, Razek T, Khwaja K (2011). Impact of a specialized multidisciplinary tracheostomy team on tracheostomy care in critically ill patients. (*Can J Surg*. 2011 Jun;54(3):167-72. doi: 10.1503/cjs.043209
- [16]. Devarajan J, Vydyanathan A, Xu M, Murthy SM, McCurry KR, Sessler DI, Sabik J, Bashour CA. (2012) Early tracheostomy is associated with improved outcomes in patients who require prolonged mechanical ventilation after cardiac surgery. *Journal of the American College of Surgeons*, June 2012, vol./is. 214/6(1008-16.e4), 1072-7515;1879-1190
- [17]. Durbin CG. Indications for and timing of tracheostomy. *Respir Care*. 2005;50:843-7
- [18]. Engels, P.T, Bagshaw, S.M, Meier, M, and Brindley, P.G (2009). Tracheostomy: from insertion to decannulation. *Can J Surg*. 2009 Oct; 52(5): 427-433
- [19]. Engoren M, Arslanian-Engoren C, and Fenn-Buderer N (2004). Hospital and long-term outcome after tracheostomy for respiratory failure. *Chest* 125(1):220-7
- [20]. Esteban A, Anzueto A, Alia I, Gordo F, Apezteguia C, Palizas F,.(2000) How is mechanical ventilation employed in the intensive care unit? An international utilization review. *Am J Respir Crit Care Med* 2000, 161; 1450-1458.
- [21]. Fernandez R, Bacelar N, Hernandez G, Tubau I, Baigorri F, Gili G and Artigas.(2008). AWard mortality in patients discharged from the ICU with tracheostomy may depend on patient's vulnerability. *Intensive Care Med*. 2008 Oct;34(10):1878-82. doi: 10.1007/s00134-008-1169-6. Epub 2008 Jun 3.
- [22]. Fernandez R, Tizon AI, Gonzalez J, Monedero P, Garcia-Sanchez M, de-la-Torre MV, Ibañez P, Frutos F, del-Nogal F, Gomez MJ, Marcos Aand Hernández G. (2011) Intensive care unit discharge to the ward with a tracheostomy cannula as a risk factor for mortality: a prospective, multicenter propensity analysis. *Crit Care Med*. 2011 Oct; 39(10):2240-5. doi: 10.1097/CCM.0b013e3182227533
- [23]. Griffiths J, Barber VS, Morgan L, Young JD (2005). Systematic review and meta-analysis of studies of the timing of tracheostomy in adult patients undergoing artificial ventilation. *BMJ* 2005; 330(7502): 1243.
- [24]. Harumi I, Bruno, I Sato, Regin, Ido Raimundo F. (2012). Indications and complications of tracheostomy in children *Braz. j. otorhinolaryngol. (Impr.)* vol.76 no.3 São
- [25]. Hess D. Tracheostomy tubes and related appliances. *Respir Care*. 2005; 50(4):497-510.
- [26]. Huang H, Li Y, Ariani F, Chen X, Lin J (2014). Timing of tracheostomy in critically ill patients:a meta-analys *PLoS ONE [Electronic Resource]*, 2014, vol./is. 9/3(e92981), 1932-6203; 1932-6203.
- [27]. Itamoto CH, Lima BT, Sato J, Fujita RR.(2012). Indications and complication of tracheostomy. *Braz J Otorhinolaryngol*. 2010 May-Jun;76 (3):326-3

- [28]. Jeon YT, Hwang JW, Lim YJ, Lee SY, Woo KI, Park HP (2014). Effect of tracheostomy timing on clinical outcome in neurosurgical patients: early versus late tracheostomy. *Journal*
- [29]. Kapadia FN, Bajan KB and Raje KV. (2000), Airway accidents in intubated intensive care unit patients: an epidemiological study. *Crit Care Med.* 28(3): 659-64
- [30]. Koch T, Hecker B, Hecker A, Brenck F, Preus M, Schmelzer T, Padberg W, Weigand MA, Klasen J (2012). Early tracheostomy decreases ventilation time but has no impact on mortality of intensive care patients: a randomized study. *Langenbecks Archives of Surgery*, August 2012, vol./is.397/6(1001-8), 1435-2443;1435-2451
- [31]. Krishnamurthy A, Vijayalakshmi R. (2012). Broken tracheostomy tube: A fractured mandate *Journal of Emergencies Trauma & Shock*, January 2012, vol./is. 5/1(97-9), 0974-2700;0974-519X
- [32]. K Vejdan A, Khosravi M (2013). BAL for pneumonia prevention in tracheostomy patients: A clinical trial study. *Pakistan Journal of Medical Sciences*, January 2013, vol. 29/1(148-51), 1682-024X;1681-715X
- [33]. Mahafza T, Batarseh S, Bsoul N, Massad E, Qudaisat I, Al-Layla AE.(2012). Early vs. late tracheostomy for the ICU patients: Experience in a referral hospital. *Saudi journal of anaesthesia*, April 2012, vol./is. 6/2(152-4), 0975-3125 (2012)
- [34]. Martinez GH, Fernandez R, Casado MS, Cuenca R, Lopez-Reina P, Zamora S and Luzon E (2009). Tracheostomy tube in place at intensive care unit discharge is associated with increased ward mortality. *Respir Care.* 2009 Dec; 54 (12):1644-52.
- [35]. Marang-van de Mheen P J, Stadlander M C, Kievit J. (2006). Adverse outcomes in surgical patients. Implementation of a nationwide routine reporting system. *Qual Saf Health Care* 2006;15:320-324.324
- [36]. Masoudifar M, Aghadavoudi O, Nasrollahi L.(2012) Correlation between timing of tracheostomy and duration of mechanical ventilation in patients with potentially normal lungs admitted to intensive care unit. *Adv Biomed Res.* 2012; 1:25. doi:10.4103/2277-9175.98148.
- [37]. Mondrup F, Skjelsager K, Madsen KR (2012). Inadequate follow-up after tracheostomy and intensive care. *Danish Medical Journal*, August 2012, vol./is. 59/8(A4481), 2245-1919; 2245-1919.
- [38]. Morris LL, Whitmer A, McIntosh E (2013) Tracheostomy care and complications in the intensive care unit. *Critical Care Nurse*, October 2013, vol./is. 33/5(18-30), 0279-5442;1940-8250 (2013 Oct)
- [39]. Myers.S. T., Sharp. D., (2004), "Emergency ventilation of the tracheostomy patient, Part 1: Knowledge assessment of healthcare professionals" *Journal of ORL head neck nursing*, 22(4), -20. of *Neurosurgic Anesthesiology*, January 2014, vol./is. 26/1(22-6), 0898-4921;1537-1921
- [40]. Needleman, J. [2005]; Nurse staffing in hospitals :I s it a business case for quality health affair[Millwood];25[1]204-11.
- [41]. Neuman, B. and Fawcett, J.(2002). Neuman, B, & Fawcett, J. (Eds.). (2002). *The Neuman systems model* (4th ed). Upper Saddle River, NJ: Prentice Hall. Upper Saddle River, NJ: Prentice Hall 2002.
- [42]. Nieszkowska A, Combes A, Luyt CE, Ksibi H, Trouillet JL, Gilbert C, Chastre J. Impact of tracheostomy on sedative administration, sedation level, and comfort of mechanically ventilated intensive care unit patients. *Crit Care Med* 2005; 33(11): 2527-2533.
- [43]. Norwood, M.G.A Spiers, P. Bailiss, J. Sayers, R D Evaluation of the role of a specialist tracheostomy service. From critical care to outreach and beyond. *Postgrad Med J* 2004;80:478-480 doi:10.1136/pgmj.2003.016956
- [44]. Oreadi D, Carlson ER (2012). Morbidity and mortality associated with tracheotomy procedure in a university medical centre. *International Journal of Oral & Maxillofacial Surgery*, vol./is. 41/8(974-7), 0901-5027;1399-0020
- [45]. Paul F (2010). Tracheostomy care and management in general wards and community settings: literature review. *Nurs Crit Care.* 2010 Mar-Apr;15(2):76-85. doi: 10.1111/j.1478- 5153.2010.00386.x.
- [46]. Quan, V (2006): Patient outcome in hospitals <http://www.suite107.com/content/outcomes/5734>, retrieved 2016.
- [47]. Shan L, Hao P, Xu F and Chen Y (2013). Benefits of early tracheotomy: a meta-analysis based on 6 observational studies. *Respir Care* 58(11):1856-62

[48]. Speed L, Harding KE. (2013). Tracheostomy teams reduce total tracheostomy time and increase speaking valve use: a systematic review and meta-analysis. *Journal of Critical Care* 2013; 28(2): 216.e216.e10

[49]. Walkevar RR, Myers EN (2008). Technique and complications of tracheostomy in adults. In: Myers EN, Johnson JT, eds. *Tracheotomy: Airway Management: Communication, and Swallowing*. 2nd ed. San Diego, CA: Plural PublishingInc; 2008:35-67.