EDUCATIONAL INTERVENTION ON NURSES' USE OF CLINICAL GUIDELINE INDICATORS IN TRACHEOSTOMY CARE IN FEDERAL TEACHING HOSPITALS IN SOUTH-WEST NIGERIA

BY

MERCY OYEINBRAKEMI KOROYIN

B.Sc Nursing (Ibadan), M.Sc Nursing (Ibadan)

Matric No 65210

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ABSTRACT

Quality nursing decisions in tracheostomy care are guided by clinical indicators and research evidence. Application of these clinical indicators lessen noisy respirations, excessive coughing, skin maceration and infection. Studies showed that tracheostomy care decisions in some clinical settings are not guided by evidence-based clinical indicators. Research findings suggest poor knowledge and utilisation of recommended clinical indicators in tracheostomy care in Nigeria. This study was designed to examine nurses' knowledge and determine effect of use of clinical guideline indicators in evidence-based tracheostomy care decisions.

This Quasi-experimental study was conducted in three Federal Teaching Hospitals in South-West Nigeria: University College Hospital (UCH), Lagos University Teaching Hospital (LUTH), Obafemi Awolowo University Teaching Hospital Complex (OAUTHC). Specific units included were Intensive Care, Neurology, and Ear, Nose and Throat. Due to limited number of nurses, LUTH and OAUTHC were purposely labelled control group (CG), and UCH intervention group (IG). All the 121 nurses in the units were recruited. Data were collected using validated structured decision-making and documentation checklists (inter-observer reliability 0.75-1.0 and 0.76-1.0), and questionnaire (Cronbach's Alpha Coefficient 0.8 and 0.83). Stage 1 involved participant observation of nurses' utilisation of clinical indicators for 10 evidence-based tracheostomy assessment, care, and documentation practices per participant in each of; suctioning, airway maintenance, dressing, and tie change decisions in both groups. In stage 2, pre intervention knowledge was assessed in both groups. Educational intervention of five modules on clinical guideline indicators, assessment, care, and documentation of evidence-based tracheostomy care decisions was conducted only in the IG. Knowledge was assessed immediately post intervention in both groups. At 3 months post intervention (stage 3), only participant observation of 10 evidence-based care decisions per participant was conducted as in stage 1 in both groups. Data were analysed using Chi-square, Independent t-test and Mann-Whitney U at $\alpha_{0.05}$.

Sixty-seven of 121 nurses completed the three stages (IG=32; CG=35). There was significant difference in mean knowledge of evidence-based tracheostomy care at pre-test (IG:20.3±3.1; CG:22.0±4.6); which increased in both groups at post-test (IG:31.3±3.3; CG:22.9±3.9). The mean knowledge of decision-making was comparable at pre-test (IG:5.6±1.7; CG:5.5±2.0); but increased at post-test (IG:6.7±1.3; CG:5.9±1.1) in both groups. The mean knowledge of use of clinical guidelines was similar at pre-test (IG:3.0±0.9; CG:3.1±1.1) and post-test (IG:3.2±0.9; CG:3.1±0.91). There was no significant difference in nurses' performance of evidence-based tracheostomy suctioning assessment decisions: median_pre (IG:5.0; CG:45.0); median_post (IG:0.0; CG:20.0), suctioning care decisions: median_pre (IG:4.0; CG:32.0); median_post (IG:0.0; CG:20.0), and airway maintenance care decisions: median_pre (IG:86.6; CG:0.0); median_post (IG:63.6; CG:50.0). Nurses' performance of documentation of evidence-based decision-making practices in tracheostomy assessment and care decisions for suctioning, airway maintenance, dressing, and tie change were also not significant in IG and CG, pre and post intervention.

Despite the educational intervention there is poor application of clinical guideline indicators to direct evidence-based tracheostomy care decisions and documentation amongst nurses. There is need for regular audit and continuous monitoring of nurses' decision-making, and periodic research-based continuing education in practice to improve nurses' clinical competence of evidence-based decision-making, in tracheostomy care.

Key Words: Evidence-based decision-making, Tracheostomy care decisions, Best Practices.

Word Count: 493

CERTIFICATION

I certify that this work was carried out by Mercy Oyeinbrakemi Koroyin in the Department of Nursing, Faculty of Clinical Sciences, College of Medicine, University of Ibadan

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Supervisor

Dr F. A. Okanlawon

Ph.D (Nursing), Ibadan, FWACN

Senior Lecturer, Department of Nursing,

University of Ibadan, Nigeria.

DEDICATION

To my late husband Dr Godwin A. Koroyin (MBBS) (1954-1994) for setting my path in graduate nursing.

To my beloved first child and daughter, a jewel who passed on to glory at the close of this project write-up: Mrs Oyinpreye M. Pabor (19th January 1987- 12th January 2016).

To Jayden Oyinpreye Pabor (5th January, 2016), my wonderful grandson: a God given crown of grace to my family, of His everlasting goodness and sovereignty.

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CHAPTER ONE
INTRODUCTION

1.1   Background of the Study

Decision making has been described in literature as nurses' most critical function central to delivery of safe and effective nursing care practices (Jones, 2007). The ultimate goal of nursing practice is provision of evidence based (EB) care that promotes quality outcomes for patients, families, healthcare providers, and the health care system (Kelleher and Andrews, 2008). The idea that nurses need to engage in research and integrate research findings into practice is not new; however, Kelleher and Andrews (2008) found that many established nursing practices not underpinned by sound evidence have been reported in literature. It has also been reported that practices based on tradition or established ritual appear to be widespread amongst a variety of nurses and practice settings (Vincent, Hastings-Tolman, Gephart and Alfonzo, 2015, Stetler, Ritchie, Rycroft-Malone, Schultze and Charns, 2009). As the demand for evidence-based practice (EBP) in nursing increases, it has become imperative that nurses make quality decisions in patient care (Hughes and Young, 1990, Tanner et al, 1987 and Royal College of Nursing, 2002 cited in Twycross and Powls, 2006, Larrabee, 2009, Hancock and Easen, 2006). Nurses combine clinical and background information in their skills to reach decisions about treatment and management of patients in their care (Jones, 2007). To maximize effectiveness and appropriateness of clinical nursing decisions that ensure patient safety, clinical guidelines, best practice resources, and other research evidence have been developed to support nurses clinical decision processes (New South Wales Nurses Association, 2009).

Interest in clinical guidelines as an instrument to implement new knowledge in the use of specific patient presentations and research recommendations as clinical guideline indicators into EB care decisions, has increased over the past decade. Clinical guidelines are important components in the delivery of EB health care practice, and may lead to improved quality of care by decreasing inappropriate variation in clinical practice. They are systematically developed statements to assist practitioner and patient decisions about appropriate health care, for specific clinical circumstances. Incorporating clinical guidelines into nursing

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practice enable nurses anticipate minimizing risks to patients, improving quality of care given, and increasing cost effectiveness (Forsner, Hansson, Brommels, Wistedt and Forsell, 2010; Watkins, 2005).

Performance improvement in the nursing profession has also evolved in the last two decades resulting in the growth of research relevant to nursing procedures. It has also been noted that as nursing moves forward in this age of increasing accountability, there will be mounting pressure on the profession to demonstrate the outcomes and effectiveness of nursing (St. Clair, 2005). As hospitals are facing increased demands to participate in a wide range of quality improvement activities, they are reliant on nurses to help address these demands because of their day-to-day patient care responsibilities (Drapper, Felland, Liebhaber and Melicher, 2008). Engaging clinical nurses in work of quality and performance improvement is essential to achieving excellence in clinical care. Education of nurses about performance and quality measures, enable recognition and value of these activities, in nursing practice (Albanese, Evans, Schantz, Bowen, Disbot, Moffa, Piessieski and Polomano, 2010).

Many areas of clinical practice in nursing such as tracheostomy care currently have little or no research evidence; whereas, the implementation of EBP is the key to clinical effectiveness. EBP enables nurses to make sound clinical decisions about appropriate interventions in patient care (Cullen and Titler, 2004). Tracheostomy is a surgical procedure aimed at establishing an alternative airway by creating a surgical opening in the anterior wall of the trachea and maintained with a tube (Okafor and Nwosu, 2009). It is one of the most frequent procedures carried out in critically ill patients who require prolonged mechanical ventilation, frequent suctioning for broncho-pulmonary toileting, or have obstruction of the upper airway. Indications for tracheostomy are diverse with a changing trend. Okafor and Nwosu (2009) noted that the number of tracheostomies performed in Nigerian hospitals is small compared to that in more developed countries. Nurses managing this type of patient condition make complex and ever-changing decisions in the care environment, and have the goal of providing the best care to their patients (Pelosi and Severgnini, 2004, Casserly, Lang, Fenton and Walsh, 2007, Larrabee, 2009). Nurses also have an instrumental role in complication prevention, and identification of problems in

tracheostomy patients, before they become emergencies (Morris, Whitmer and McIntosh, 2013). Eziyi, Amusa, Musa, Adeniji, Olarinoye et al (2011) observed complications of tracheostomies include stoma infections and tracheal stenosis. Although there is very limited research in relation to care and nursing management of tracheostomized patients, studies have found that nurses have knowledge deficit in tracheostomy care - requiring the need for specialized support (Paul, 2010). Study findings of Casserly, Lang, Fenton and Walsh (2007) also emphasized the need for provision of tracheostomy-related education as routine to healthcare workers, directly involved in the care of these patients.

Literature also shows that, basing nursing decisions on the best available evidence has become a highly valued aspiration for nurses, and nursing leaders have been encouraging nurses to engage in 'research based practice' in the last 50 years (Joanna Briggs Institute, 2010). According to St. Clair (2005), it has been argued by some authors in literature that nursing is a discipline which needs to conduct investigations that will improve practice, and the knowledge upon which clinical practice is based. The author also asserted that research findings have continued to document discrepancy of available research relating to the practice of clinical nursing, and has been labelled as "research-practice gap". The interest in finding ways to bridge the gap between nursing research and their application into practice according to Profetto-McGrath, Smith, Hugo, Taylor and El-Hajj (2007) is also on the increase. Cullen and Titler (2004) reported that clinicians at the bedside have the vantage position of questioning practice, and using scientific knowledge when making clinical decisions. Nurses therefore, need to ask why they do the things they do, rather than continuing in a practice because it has always been done that way. Impetus for this study arose from the researcher's observation in clinical practice that tracheostomy care decisions seem not to be guided by clinical indicators and are far in-between, resulting in prolonged retention of trachea secretions and poor performance of tracheostomy care in some clinical settings.

The researcher intends to undertake this study to determine nurses' knowledge, and examine the realities of nurses' use of clinical guideline indicators in tracheostomy care decisions on the Neurological, Ear, Nose, and Throat, and Intensive Care units. It is the belief of the

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researcher that the study will enhance quality of care, improve clinical performance of nurses' EB decision making, and reduce risks associated with tracheostomy care. There is dearth of literature on tracheostomy care limiting information on nurses' use of clinical guideline indicators in the performance of care decisions. This limitation however, is a strength in this work.

1.2   Problem Statement

The movement towards research and EBP in health care demands that the best available evidence guided by clinical indicators is applied to practice. While clinical care of tracheostomy patients require nursing decisions based on sound scientific evidence and judgements, routine practice of care resulting in poor performance of tracheostomy care decisions, has been observed. Performance of care decisions are observed to be far in-between not guided by evidence of clinical indicators. One of the goals of healthcare quality is determination of degree to which care providers adhere to processes based on scientific evidence or agreed professional consensus, in care practices. Time and again patients with tracheostomies were observed to present with noisy respirations, excessive coughing, and skin maceration from prolonged retention and contact with trachea-bronchial secretions (St. Clair, 2005). These present threat to patient safety, infections, long hospital stay, airway complications, and even death. Despite the potential complications little empirical evidence exist of how well clinical guideline indicators are applied in tracheostomy care decisions (St. Clair, 2005).

Furthermore, Vincent, Hastings-Tolsma, Gephart and Alfonso (2015) reported research findings indicate that many nursing decisions are often not based on explicit robust evidence. Rather, decisions are underpinned by value judgments, tradition or habit, and a mixture of evidence from a variety of sources that may or may not include robust research. Observation of continued engagement in ineffective or harmful practices for patients was also reported by the authors. Research findings suggest poor knowledge level and variation in practice of tracheostomy care amongst nurses, with no significant relationship between the two (St. Clair, 2005, Dennis-Rouse and Davidson, 2008, Day, Farnell, Haynes, Wainwright, and Wilson, 2002a). Without specific strategies to address tracheostomy care

decisions, patients may receive sub-optimal care (Paul, 2010). There is dearth of information of studies on tracheostomy care conducted in Nigeria. It is vital nurses are trained in the use of established clinical guideline indicators and recommendations in EB tracheostomy care for the reason that, inappropriate or inadequate care decisions is associated with increased morbidity and mortality (Dennis-Rouse and Davidson, 2008).

1.3   Broad Objective

The aim of this study is to examine nurses' use of clinical guideline indicators in EB tracheostomy care in: suctioning, dressing, airway maintenance and tie change decisions. The study seeks to determine nurses' knowledge of clinical guideline indicators and recommendations in EB tracheostomy care. The study also seeks to implement and determine the effect of educational intervention on nurses' knowledge and utilization of clinical guideline indicators in the performance of EB tracheostomy care decisions.

1.4   Specific Objectives of the Study

These were to:

1. assess nurses' knowledge level of clinical guideline indicators and recommendations in EB tracheostomy care before and after educational intervention.

2   assess nurses' knowledge level of decision making before and after educational intervention.

3   determine nurses' knowledge level of use of clinical guidelines in decision making before and after educational intervention.

4   examine nurses' self-report of EB practices in tracheostomy care decisions for suctioning, airway maintenance, stoma dressing, and tracheostomy tie change before and after educational intervention.

5	examine nurses' performance level in the use of clinical guideline indicators in EB tracheostomy care decisions before and after educational intervention.

6	determine nurses' performance level in documentation of clinical guideline indicators utilized in EB tracheostomy care decisions before and after educational intervention.

1.5   Research Questions

1. What is nurses' knowledge level of EB tracheostomy care?

2. What is the level of nurses' knowledge of decision making?

3. What is the level of nurses' knowledge of use of clinical guidelines in decision making?

4. What is nurses' self-report of EB processes practiced in tracheostomy care decisions for suctioning, airway maintenance, stoma dressing, and tie change?

5. Are nursing decisions in tracheostomy care based on evidence of clinical guideline indicators and what is their performance level?

6. What is the performance level of nurses in documentation practices of clinical guideline indicators utilized in EB tracheostomy care decisions?

1.6   Significance of the Study

Changes in role boundaries mean nurses are assuming increased responsibility, especially in relation to decision making. While nurses' roles are increasing, literature reports that there has been limited consideration about application of best evidence and decision making by nurses, in the context of practice (Hancock and Easen, 2006). However, clinical practice based on tradition or established rituals, appear to be widespread amongst nurses and some practice settings. This study is set to promote the use of clinical guideline indicators in EB tracheostomy care decisions, and to support nurses educationally and professionally in this process, by training.

Nurses managing patients with tracheostomy need to make complex and ever-changing decisions that are affected by multifaceted contextual issues like individual values, experience, knowledge, clinical judgement, changing patient conditions, work environment etc, in patient care. The nurse is accountable for the care given. It is imperative therefore, nurses are adequately trained and fully competent in the use of clinical guideline indicators in EB tracheostomy care decisions. The educational intervention will provide a performance improvement model to better facilitate the use of clinical guideline indicators and recommendations in EB tracheostomy care decisions. The programme may form a basis for capacity building of nurses, and may aid, and expedite the application of research evidence and recommendations into practice.

There is dearth of information of studies conducted in clinical nursing on EB tracheostomy care decisions and its consequences on, nurses' performance of clinical care in Nigeria. Hence, the findings of the study will have implication for nurse clinicians, educators, administrators and researchers, management of health institutions, and policy makers. Findings will also provide deeper understanding of how nurses make decisions in the care of tracheostomy patients, facilitate more efficient care decisions, and promote effective outcomes of independent and collaborative nursing care interventions. It is hoped that the training will improve nurses' knowledge, promote adherence to use of clinical guideline indicators in EB care decisions, bridge research-practice gap, aid reduction of variance in the care of tracheostomy patients, and improve patient safety.

1.7   Delimitations of the Study

The study will be delimited to Intensive Care Units, Ear, Nose and Throat (ENT), and Neurological wards where tracheostomy patients are nursed in Federal Teaching Hospitals in South-West Nigeria. Only nurses working in the selected units will be recruited for the study. Only nurses' knowledge of EB tracheostomy care, use of clinical guideline indicators, and documentation practices in EB tracheostomy: suctioning, airway maintenance, stoma dressing and tie change decisions will be studied.

1.8   Operational Definition of Terms

Tracheostomy is the placement of an assistive device in the airway through an opening created into the trachea through the neck via surgery to aid free airflow and breathing in patients with breathing difficulties.

Tracheostomy Care is the care activities and decisions taken by nurses for cleaning, dressing, suctioning, and changing of securing tube ties in the management of persons with assistive breathing device in the airway.

Decisions Making is the steps taken by nurses for assessment of relevant observations in a patient's clinical condition, that result in appropriate choice of care options in the delivery of evidence-based care in tracheostomy care decisions.

Educational Intervention is the developed instructional modules on evidence-based decision making taught to nurses to promote attainment of 60% knowledge and competence level in the practice of use of cues from patient presentations and research recommendations as evidence in systematic assessment, care, and documentation practices for: suctioning, airway maintenance, stoma dressing, and tie change decisions in management of persons with assistive breathing device in the airway.

Clinical Guideline Indicators are recognized signs and symptoms in patient condition and research recommendations that serve as cues for EB assessment, care and documentation practices in nursing management of persons with assistive breathing device in the airway. Clinical indicators in this study was limited to: chest auscultation, oxygen saturation level, tracheal secretions, respiratory pattern and rate, application of suction pressure, tube rotation, suction passes, suction duration, sodium bicarbonate or normal saline instillation practices, evidence of crusts, reduced secretions and free air low, application of humidified oxygen, administration, oral/naso-gastric feeds and intravenous fluids, soils and dressing change, signs of infection and breakdown, pressure of tracheostomy flange on stoma, removal and replacement of inner cannula, EB dressing technique, use of normal saline for stoma cleansing, cleanliness, security of tube ties, and measurement of 1-finger width.

Nurses' Use of Clinical Guideline Indicators is nurses' practice level in utilization of observed cues and research recommendations in the management of persons with assistive

breathing device in the airway as evidence for direction of systematic assessment, care, and documentation decisions in suctioning, airway maintenance, stoma dressing, and tube tie change decisions: measured as an attainment of 60% level of competence.

Nurses are professionally trained, registered and licensed persons with Nursing and Midwifery Council of Nigeria responsible for caring for sick persons in the study units.

Federal Teaching Hospitals are health care institutions owned by the Federal Government of Nigeria. They are centres for training of health care personnel, and promotion of clinical excellence through research in nursing, medical, and other related health disciplines to improve quality of care. Federal Teaching Hospitals in this study are: Lagos University Teaching Hospital, University College Hospital, Ibadan, and Obafemi Awolowo University Teaching Hospital Complex Ile-Ife.

Clinical Guideline Indicators, Clinical Guidelines, Clinical Indicators, and Indicators will be used interchangeably in this study.

<center>**CHAPTER TWO**</center>
<center>**LITERATURE REVIEW**</center>

Review of literature consist of relevant literature, concepts, theories and framework that give direction to the study. Literature on decision making, clinical decision making in nursing, tracheostomy care, evidence-based practice, evidence-based nursing, evidence-based decision making, clinical guidelines, critical thinking in nursing decisions, judgement and decisions, quality decision making in nursing, performance improvement, quality improvement, nursing documentation, empirical studies, and conceptual model for the study were reviewed.

2.1   Decision Making

Jones (2007) noted in her text that decision making is one of the most frequent activities performed by professional nurses. Life-altering events as we have in tracheostomy procedure require nursing decisions to be made with structured thought and problem solving techniques, based on knowledge, clinical indicators, and research evidence. Arries and Nel (2004) observed that despite the obvious importance of this nursing activity in care delivery, it has received little attention even as nurses' decisions influence lives of individuals, communities and the society at large. The authors also observed that neither research nor nursing education has emphasized this area of nursing practice. According to Hancock and Easen (2006) there is an increasing emphasis on a multidisciplinary approach to delivery of care due to changes in health service delivery. The changes include nurses taking on more clinical work, and engagement in EBP using systematic problem solving approaches derived from scientific knowledge, in patient care.

According to Cherry and Jacob (2005), Yoderwise (2003) defined decision making as a purposeful and goal directed effort using a systematic process to choose among options. The decision process involves the evaluation of several possible solutions and making a choice among them. Critical thinking skills are required by the nurse to be able to differentiate among alternative solution, and selecting the most appropriate in clinical situations. Winters and Echeverri (2012) wrote that nurses as professionals are required to adhere to accepted standards of practice and professional performance in decision making. These standards

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mandate the use of evidence-based interventions and the integration of research findings into practice. The authors also reported the position of the American Nurses Association that, the science of nursing is based on a critical-thinking framework that serves as the foundation of clinical decision making, and evidence-based practice. Research findings were also identified by this association as the basis for clinical and organizational decision making, at all practice levels (Winters and Echeverri, 2012).

2.1.1 Decision Making Process

Decision making according to Effective Practitioner (2015), range from fast, intuitive or heuristic "rule of thumb" approach through a well-reasoned, analytical evidence-based decision in patient care. The decision making process is likened to a continuum where at one end, is the use of intuition and experience in decision making. This end is typically made of high volumes of simple decisions. On the other end of the continuum, there may be complex decisions to be made. Uncertainty level is high at this point, and, analytical and evidence-based approach is required in decision making. The theoretical approach to the process of decision making emphasize a number of steps which includes:

(i)   Information collection and problem identification

(ii)   Consideration of alternative strategies

(iii)   Selection of a course of action for implementation (Hancock and Easen, 2006).

Rubenfeld and Scheffer (2006) also indicated that nurse clinicians make a huge range of decisions daily, most of which are made in microseconds but can have very serious consequences. Some decisions allow for more thinking time, consultation with others, and a search for resources before arriving at a conclusion. However all decisions made must be accurate, and made in a timely manner. Banning (2008) observed that as nurses become more experienced as care providers, the process of making clinical decisions becomes easier and more manageable, and the forms of decision making become increasingly complex.

2.2   Judgment and Decisions

Clinical judgment and decision-making are key attributes of professional practice, and feature highly in most models for EBP, as well as in much of the guidance available on

clinical leadership, quality improvement, and organisational change. Clinical judgment is central to the safe and effective functioning of health services, and is the most difficult element to define in professional practice (Lockwood, 2011). Many definitions of judgments and decisions exist. Judgment is defined as the assessment of alternatives while decisions refer to the act of choosing between alternatives (Thompson, Aitken, Doran and Dowding, 2013). Judgement in professional context is viewed as a professional choice rather than a task (Shaban, 2012).

Nurses are significant decision makers in any developed healthcare system and have, a key role to play in overcoming the major challenges facing developed healthcare systems: ageing populations; rising healthcare costs; promoting population health through preventative healthcare; reducing health inequalities; and employing EBP to produce the biggest health gains, in the most efficient and acceptable manner possible. The health system is reported to require nurses whose clinical judgments and decisions contribute to, not detract from, the quality of health systems (Thompson, Aitken, Doran and Dowding, 2013). The authors reported that WHO (2011) wrote, 19 million nurses worldwide exercise clinical judgment before making choices with, for and on behalf of patients, and that patients trust nurses to make decisions that do more good than harm. In the context of health care practice, judgment and decision are inter-linked and often discussed as a single entity.

The emphasis of research on judgement and decision in nursing is, how nurses use different types of clinical information about the patient to arrive at a judgement of the patients' current health status, and how particular courses of action are chosen in patient care, especially in situations of uncertainty where consequence of actions are unknown (Dowding and Thompson, 2003).

2.2.1   Developing Clinical Judgment in Nursing

The development of clinical judgment in nursing is gradual. It is developed as nurses gain broader, deeper knowledge base and clinical experience. Developing sound clinical

judgment require: recall of facts, pattern recognition in patient behaviours, putting facts and observations together to form a meaningful whole, and acting on the resulting information, in a meaningful and appropriate way. Knowing the limitations of one's expertise is an important aspect of clinical judgment (Chitty, 2005). Nursing decisions made therefore must be within the scope of practice, as nurses are accountable for their decisions (Chitty, 2005).

2.3   Clinical Decision Making in Nursing

Effective Practitioner (2015) stated that clinical decision making is a balance of experience, awareness, knowledge and information gathering using appropriate assessment tool, colleagues and evidence-based practice to guide decisions. Clinical decision making according to Banning (2008) is a unique process that involve the interplay between knowledge of pre-existing pathological conditions, explicit patient information, nursing care and experiential learning. It is an essential part of nursing practice, constantly undertaken by nurses on daily basis when they make judgement about the care they provide to patients and management issues (Ramezani-Badr, Nasrabadi, Yekta and Taleghani, 2009, Banning, 2008). Decisions are outcomes of cognitive processes, with their contents based on knowledge of the decision maker. Clinical decision making is therefore a complex activity that require practitioners to be knowledgeable in relevant aspects of nursing, have access to reliable sources of information and appropriate patient care networks, and to work in a supportive environment (O'Neill, Dluhy, and Chun, 2005 in Banning, 2008). Clinical decisions are integral part of nursing in which nurses combine clinical and background information in their skills to reach decisions about treatment and management of patients in their care (Jones, 2007, Lauri, Salantera, Chalmers, Ekman, Kim, Kappeli and MacLeod, 2001).

The kind of decisions nurses face range from routine to life and death situations. Jones (2007) wrote that nurses need to make decisions that are appropriate to the care situation driven by, critical thinking, multidisciplinary knowledge base, and consideration of the culture where the services are being provided. She also noted that care situations may require a quick response or allow for reflection, collaboration with others, and a carefully

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considered response. Nurses need to develop and enhance ways to see all sides of an issue, find various approaches to solve problems, and make careful, intelligent decisions.

Literature is noted to indicate two main phases in nursing clinical decision making: (a) diagnostic phase in which observation of patient condition, data collection and data processing lead to identification of patient problems and (b) management phase in which plans of action and treatment options lead to nursing intervention (Lauri, Salantera, Chalmers, Ekman, Kim, Kappeli and MacLeod 2001).

2.3.1.   Core Skills Required in Clinical Decision Making

(a) Pattern Recognition: from past experiences

(b) Critical Thinking: ability to clarify goals, examine assumptions, being open-minded, recognition of personal attributes and biases, and ability to evaluate evidence

(c) Communication: development of active listening and provision of information in a comprehensive manner to patients, carers, and family to allow their involvement in care decisions

(d) Evidence-based Approach: ability to use available evidence and best practice guidelines in decision making process

(e) Team Work: sharing and learning with gathered evidence, enlisting help, support, and advice from colleagues

(f) Reflection: ability to use feedback from others and outcome of decisions to   reflect on decisions taken in other to enhance future practice delivery (Effective Practitioner, 2015).

2.3.2   Clinical Decision Making Models in Nursing

Nurse practitioners employ a variety of techniques for reaching decisions which are collectively referred to as decision strategies. They inform the ability of the nurse practitioner to make relevant observations, gather patient information, evaluate information in order to recognize health problems, and to make appropriate decisions that result in the delivery of appropriate care.

Banning (2008) observed that historically, two models of nurses' decision making strategies have been discussed in nursing literature and illustrated in nurse publications: the information processing model and the intuitive-humanist model. The author also noted another theoretical model, developed by O'Neill, Dluhy and Chun (2005) which contains elements of the information processing model has also been mentioned. Other models mentioned in literature are decision analysis theory, pattern recognition, Wheeler's and nursing process (Ramezani-Badr, Nasrabadi, Yekta and Taleghani, 2009, Jones, 2007).

(1)   The Information Processing Model or Hypothetico-Deductive Approach

This model of decision making is rooted in the medical model. It uses scientific or hypothetico-deductive approach to assist cognitive reasoning essential to medical diagnosis. In this model decision making is seen as a continuum. It consists of short and long-term memory. Short term memory contains the stimuli information necessary to unlock the factual and experiential knowledge stored in the long term memory. The approach is adopted by nurses to assist clinical decision making. Decision trees in nursing were developed from this model to assess potential patient outcomes (Banning, 2008, Jones, 2007). Hypothetico-deductive reasoning also allows seemingly unmanageable problems in patient care to be transformed into a manageable one by providing different endpoints, and proceeding to test further their appropriateness.

The approach involves several stages as follows:

- Cue Recognition – this takes place at the initial encounter of the nurse with the patient. At this time the nurse collates clinical information about the client and selects cues presenting in the situation.

- Hypothesis Generation – is the stage whereby a tentative hypothesis specific to the information collected is developed in relation to the decision maker's previous experience and education level.

- Hypothesis Evaluation – this stage involves interpretation of cues and selectively seeking for cues that confirm the original hypothesis or disconfirm it.

- Identification of Alternative Actions to be taken in patient care.

- Consideration of Outcomes/Risk Attached/Context of decision and the achievement of desired goal (Tanner et al cited in Banning, 2008, Elstein and Bordage, 1988 cited in Harbison, 2001).

(2)   The Intuitive-Humanist Model

The focus of the intuitive-humanist model of decision making is intuition. According to Banning (2008), Benner and Tanner (1987) defined intuition as understanding without rationale. Intuition has also been described as immediate knowing of something with the use of sixth sense, instinct, common-sense, hunch or without conscious use of reason. Dreyfus and Dreyfus (1986) cited in Rovithis and Parrissopoulos (2005), examined the characteristics of intuitive judgement in-depth, and outlined pattern recognition, similarity in recognition, common-sense understanding, skilled know-how, sense of salience and deliberate rationality as six key aspects of intuition.

Intuition is the hallmark of expert judgement. It enables the decision maker to identify important factors rapidly, and limits number of alternatives to be evaluated, thereby reducing decisional conflicts and stress. Intuition is a tool used by both expert and novice nurses in decision making strategies. Hypothesis testing is however, not used as a marker of accurate or inaccurate propositions and reasoning in this strategy for decision making. Lack of scientific reasoning in this model has led to scepticism in its use as a decision strategy (Banning, 2008).

In clinical practice, attending to salient information and understanding, and responding to patient issues or concerns often takes place without any conscious deliberation in nurses' use of intuition, in decision making. The question then is, how do nurses' collect information, and how do they transform through intuition into decision making and action?. Literature states that Benner and Tanner posit that knowing the patient and being involved in his care are key elements which strengthen nurses' intuition, and that as the nurse gains experience, decision making becomes intuitive (Banning, 2008, Harbison, 2001, Rovithis and Parrissopoulos, 2005)

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Review of literature revealed that Benner (1982, 1984) was the first nurse researcher to explore intuition within clinical expertise in nursing. Her work empowered and influenced nursing practice. However, her persistence for the acceptance of intuition as a privileged characteristic of expert nursing was contradicted by findings of other studies, which suggested that intuition is not an exclusive characteristic of expert nursing practice (Rovithis and Parrissopoulos, 2005).

(3) Decision Analysis Theory

Decision analysis is a systematic approach to decision making under conditions of uncertainty. This method of decision making seeks to maximize the quality of individual decisions, thus promoting choice by providing different options. Decision choices can only be selected if they have been made available in the first instance. Decision analysis is explicit in that, it requires the decision maker to break down the decision into a number of actions so that they can be analysed individually, and then reassembled in a systematic way to provide an option. It is quantitative in that, the decision maker is forced to provide evidence about uncertainties arising from the clinical problem, and to place values on possible outcomes. The theory is prescriptive, and the intention is to assist the clinician in deciding what decision should be taken, under a given set of circumstances. Thus decision theory has been used as a model for rational decision making. Consequently, any lack of agreement between the patient's responses and the model is taken as evidence that, individuals do not make decisions rationally.

(4) Pattern Recognition

Pattern recognition is the process of making a judgment on the basis of a few critical pieces of information. In many cases nurses compare patient situations with similar ones encountered in the past. Pattern recognition can be viewed at two levels: analytically where information is chunked or intuitively where the whole situation is grasped. Much of clinical diagnosis is based primarily on categorization as a result of previous patients seen. The primary feature of pattern recognition postulates that new cases are categorized by similarity

to patients seen earlier, and therefore same diagnosis is given (Ramezani-Badr, Nasrabadi, Yekta and Taleghani, 2009).

(5) Wheeler's Model

According to Jones (2007), Wheeler (2000) suggests that having choices and knowing the context in which choices are made, are the most important elements of proactive decision making. Being proactive allows the anticipation of events and allows the decision maker to generate actions before the event. Having choice involves having at least two options, one of which may be not to act at all, which in itself constitutes a choice. In such situation the decision maker allows other people or events to determine the outcome.

(6) Nursing Process

The nursing process is an on-going process of decision making. The process consists of phase I – assessment, which includes defining the assumption and context, collecting data, identifying and naming the problem, and deciding on actions or interventions. Phase II is implementation or interventions. Phase III is evaluating the outcomes (Jones, 2007). Based on the evaluation, the process begins over again with more data collection, if indicated. The nursing process may be the most familiar and comfortable model for nurses in decision making. Aside from its familiarity, the strength of the model lies in its feedback mechanism (Jones, 2007).

(7) O' Neill's Clinical Decision Making Model (2005)

The O'Neill' Clinical Decision Making Model (2005), is a recent hybrid model developed based on computerized decision support system that uses both hypothetico-deduction reasoning and pattern recognition, as a basis for capturing nursing knowledge and clinical decision process (Banning, 2008). Fortier, Michael, Dluhy and O'Neill (2004) highlighted that this architecture has three major components: *data rules, meta-rules, and state information* which equates to *knowledge rules, process rules, and the patient chart in nursing terminology*. The design also includes structure that allows rules to be grouped together to manage the temporal state of the nursing process. The logical arrangement of

these blocks forms a decision tree through which there are many correct paths. This tree is traversed as follows – the data rules produce or act on patient information, the information is stored in the state, if the state changes, meta-rules operate to enable or disable blocks of data rules. In this way the architecture as well as the individual data-rules and meta-rules capture nursing knowledge (Fortier, Michael, Dluhy and O'Neill, 2004).

The central features of the model in relation to nursing are pre-encounter data, anticipating and controlling risk, provision of standard nursing care, situational and client modification, and triggers to hypothesis generation, followed by nursing action.
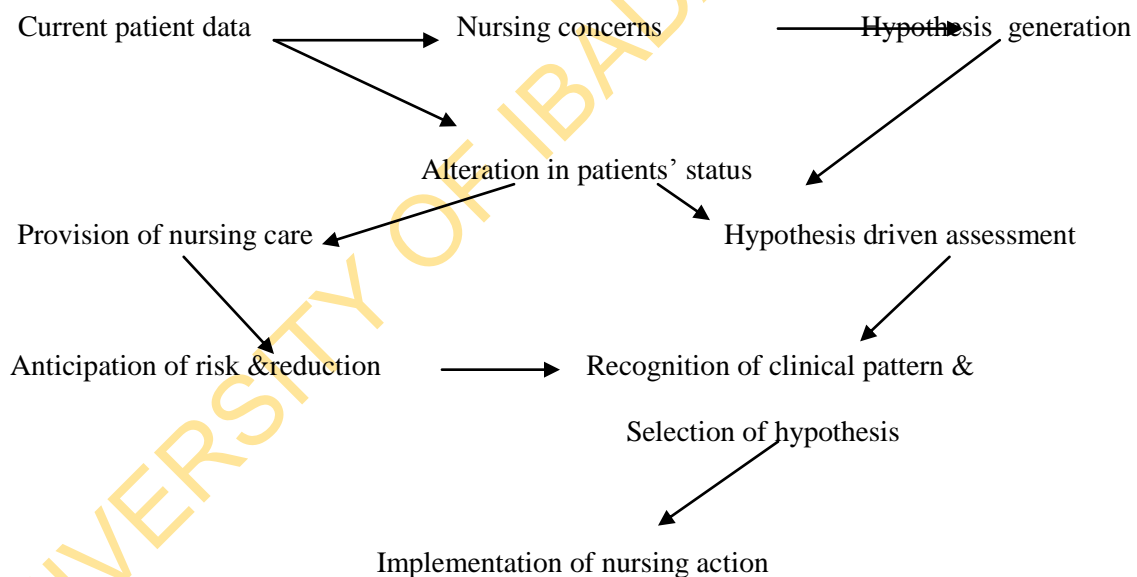
Figure 2.1: O'Neill's Clinical Decision Making Model

Source: Banning (2008). A Review of Clinical Decision Making: Models and Current Research

2.3.3   Clinical Decision Making in Critical Care

According to Ramezani-Badr, Nasrabadi, Yekta and Taleghani, (2009), providing nursing care in difficult and complicated situations as we have in critical care units highlights the complexity and importance of clinical decision making, as critical care is different from other areas of nursing. Decision making in critical care settings is dynamic and often unpredictable requiring that, critical care nurses develop ability to make decisions in different and complex situations. Ineffective clinical decisions in critical care units may have serious consequences on patient outcomes. Making accurate decisions is essential for both patients and nurses in the improvement of patient care outcomes (Ramezani-Badr, Nasrabadi, Yekta and Taleghani, 2009).

It is noted in literature that nursing decisions are influenced by individual values, clinical judgment, experiential knowledge, ethics, legislation, as well as pressures and working conditions, within given organizations and work environments. The effects of these contextual factors on critical care nursing cannot be overlooked. Research into the nursing domain of clinical decision making in critical care is a basic tool of practice, and a professional imperative to the progress of nursing profession.

2.4   Care of the Tracheostomy Patient

Tracheostomy is one of the oldest known surgical procedures. First reference to the procedure dates back to 1500 BC in an ancient Indian book of medicine (Kurkowski and McCalla, 2007). It was first performed successfully on children in the late 19th century (Cooke, 2012). A tracheostomy is a surgical opening or stoma into the trachea below the larynx. It is performed primarily on patients who have airway obstruction, difficulty with airway clearance, or those who will be intubated for long a period. It may be done as a planned procedure or an emergency, and may be permanent or temporary (St. James's Hospital, 2013, Dennis-Rouse and Davidson, 2008). After surgical incision through the skin, underlying muscles are separated and a hole is made in the anterior wall of the trachea, usually between the 2nd and 4th tracheal rings (St. James's Hospital, 2013). The tracheostomy tube is inserted immediately after incision and can be held in position by suturing the flanges to the skin or by tying tapes around the neck (Hunt, Cook and Mackay, 2006). The procedure can be performed either in the theatre or at the bedside. When

performed at the bedside in critical care areas, it is referred to as percutaneous insertion (Higgins, 2009a). According to Paul (2010) the number of tracheostomies being performed is increasing internationally.

Tracheostomy patient care should be planned and delivered by a specialist multidisciplinary team in accordance with current EBP guideline, and delivered in accordance with individual patient needs and preferences, to ensure effective care that facilitates optimal patient outcomes (St. James's Hospital, 2013). Traditionally, tracheostomy care has been specific to specialized areas (ear, nose and throat (ENT) department and intensive care units (ICU) (Paul, 2010). The demand for beds in the intensive care unit (a high-dependency unit) over the years, however, has resulted in transfer of patients who require tracheostomy beyond the acute phase for secretion and maintenance, to general wards and the community (Paul, 2010; Morris, Whitmer and McIntosh, 2013). Subsequently, more tracheotomized patients are being nursed in these settings. It is expected that nursing staff in these areas are capable of providing safe and effective tracheostomy care. The management of tracheostomy tubes, though associated with several complications and risks, there is very limited research in relation to the care and management of tracheostomized patients by nurses, outside specialty areas (Day, Farnell, Haynes, Wainnwright and Wilson-Barnett, 2002a; Paul, 2010).

2.4.1 Indications for Tracheostomy

- Bypass to an obstruction

- Maintenance of an open airway

- Easy removal of secretions

- Provision of oxygenation and mechanical ventilation on long term basis as a result of facial and neck trauma

- Malignancies in the upper airway

- Inability to swallow or clear oro-pharyngeal secretions, preventing breathing (Salmon and Herzerger, 2012, The Joint Commission Perspectives on Patient Safety, 2010).

2.4.2 Bedside Equipment

Some preparations are necessary on the ward before the patient is received from theatre. This includes assembly of necessary equipment as follows:

- Sterile suction equipment

- Ventilator if indicated

- Adaptor to fit the tracheostomy tube

- Oxygen administration equipment

- Tray with various sizes of sterile tubes in case the one inserted becomes dislodged

- Sterile tape for securing tube in place, gauze squares, tracheal dilator, artery forceps, and a sterile syringe to inflate the cuff

- A catheter mount which can be used to connect an Ambu-bag to the tracheostomy tube should emergency resuscitation be necessary

- Humidifier which should be switched on ready for use, the type depends on whether the patient is to receive mechanical ventilatory assistance, if not a nebulizer may be available that fits over the opening of the tube.

- Equipment for frequent mouth washing

- Pencil and pad for written communication (Walsh and Crumbie, 2007).

2.4.3 Research Recommendations as Guidelines for Evidence-Based Tracheostomy Care

Walsh and Crumbie, (2007) wrote that nurses should appreciate that the tracheostomy patient is dependent upon the patency of the tube for breathing. Care plans in the management of this condition should be specific and rely on clinical indicators and research recommendations as guidelines for EB care practices.

Immediate postoperative priority of care for a patient with a new tracheostomy is to ensure the tracheostomy tube is securely in place and patent. Routine care and prompt management of postoperative complications is facilitated by ensuring, proper equipment and supplies are available at patient's bedside (Morris, Whitmer and McIntosh, 2013). The model or framework of care for the patient should be creative, responsive, holistic and individualized, based on sound knowledge in accordance with local policies. Constant attention and meticulous care is therefore required to reduce the patient's fear of choking. It is also important that the nurse is sensitive to the patient's fears and evident clinical indicators of care needs because the patient cannot communicate verbally.

- **Position**

The head of the bed is usually elevated to an angle of approximately 45^0, if the patient is conscious with stable blood pressure and pulse rates. Patient's neck should be well supported with tapes around the neck, and properly tied to secure the tracheostomy tube in position (Stellenberg and Bruce, 2004, Walsh and Crumbie, 2007).

- **Assessment**

The patient's health status should be monitored and clinical indicators assessed at regular intervals. This includes blood pressure, respiratory rate, chest sounds, pulse, and colour monitoring. Indicators like increase in respiratory rate, crackles, and wheezes may be signs for suctioning need. If the patient experiences respiratory insufficiency due to obstruction below the tracheostomy tube, it could be evidenced by marked respiratory effort, unequal movement of the sides of the chest, and retraction of soft tissues in the intercostal and supraclavicular spaces. Observed cyanosis and distress not relieved by suctioning should be reported promptly. It should be noted that increasing restlessness in the patient, especially if accompanied by rapid pulse rate may be an indication of hypoxia or bleeding. Frequent

inspection of the neck and surgical area is necessary for early identification of interstitial emphysema, possibly due to leakage of air into the subcutaneous tissue. The wound is observed at all times for bleeding in the immediate post-operative period, and checked daily for indicators of infection and sloughing. The tracheostomy tube is checked frequently for patency. Characteristics of trachea-bronchial secretions in terms of consistency, colour, and amount are checked frequently and documented. The nurse clinician should note that increased secretions occur in response to the tracheal trauma. Secretions are usually coloured by blood post-operative which usually diminish gradually and disappear (Serra, 2000, Walsh and Crumbie, 2007).

- **Humidification**

Following bypass of upper airway with the insertion of a tracheostomy tube, the natural warming and humidification of air are adversely affected, requiring maintenance of a systemic hydration of the airway. Humidification is required following tracheostomy to warm and moisten inspired air, and prevent encrustations within the trachea and the tube, as these will increase airway resistance. In patients receiving mechanical ventilator assistance or oxygen, the patient may be hyper-oxygenated with 100% oxygen 35 minutes before suction. Suctioning removes air and oxygen, as well as secretions from the respiratory tract. It is important to note duration of suctioning as the frequency of passing the suction catheter may cause hypoxaemia and ensuing arrhythmia (Serra, 2000, Walsh and crumbie, 2007).

- **Suctioning**

Suctioning of the tracheostomy tube is done for clear airway maintenance and normal breathing patterns using best practice clinical indicators. Suctioning ensures breathing is without exaggerated effort or awareness of the breathing sensation without trauma or hypoxia. Clinical guideline indicators for suctioning are: coarse breathe sounds, noisy breathing, increased or decreased respiratory rates, decreased oxygen saturation, copious secretions, and patient attempting to cough (Liverpool Health Service, 2006). Accurate respiratory assessment should be carried out to determine EB suctioning need of patients. Tracheostomy suctioning should be done only when necessary, and not on routine basis

(Doncaster and Bassetlaw Hospital, 2014). Research recommendations include appropriate size of suction catheter to be determined for individual patients. Suction catheter should not exceed one-half of the internal diameter of the tracheostomy tube to allow air entry into the lungs at suctioning. Calculation of an appropriate suction catheter for a size 8 tracheostomy tube is as follows: $(8mm/2) \times 3 = 12$ (Nance-Floyd, 2011, Doncaster and Bassetlaw Hospital, 2014).

Frequency of suctioning is determined by indicators from patient's assessment data of his breathing, and rate of production of secretions. It is done when a patient is unable to clear his or her own secretions, or is only able to clear them into the tube with cough-like mechanisms. An apparent decrease in secretions is a clinical indication that they just became thicker, and so are more readily retained. According to Doncaster and Bassetlaw Hospital (2014) suctioning is associated with potential problems, and that many of such complications can be avoided by EBP.

Further recommendations in tracheal suctioning are: use of sterile glove, and sterile suction catheter moistened in sterile water and normal saline. Negative pressure is not applied during insertion of catheter but when it is in position, and during withdrawal to prevent trauma of the tracheal mucosa. Applied suction pressure should not exceed 100-150mmq. Depth of catheter insertion should be approximately ≤ 15cm. Suctioning duration must be brief, lasting not longer than 10–15 seconds. Number of suction passes per session should not exceed 3 times. If suctioning must be repeated, the patient is allowed to take several breathes, or is given oxygen again before suction. Cough may be initiated in the patient, causing secretion to escape from the tracheostomy tube. Gently wipe away mucus and exudates quickly with sterile gauze, to prevent secretion from being drawn back into the tube with a breath. Tube rotation during withdrawal of suction catheter is discouraged. Rotation of catheter has not been associated with significant increase in secretion removal (Walsh and Crumbie, 2007, Day, Farnell, Haynes, Wainwright and Wilson-Barnett, 2002a, Day, Farnell and Wilson-Barnett, 2002b, Nance-Floyd, 2011).

The use of sodium chloride to loosen secretions has no clear scientific basis but, many health professionals remain convinced of its benefits through their own experiences. The use

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of sodium chloride is not recommended. It is noted however that the benefit is probably related to the associated cough (Doncaster and Bassetlaw Hospital, 2014, Nance-Floyd, 2011).

Post suctioning, the patient should be reconnected to oxygen within a maximum period of 10seconds. Patient's heart rate, rhythm, oxygen saturation levels, colour, perfusion, and comprehensive respiratory assessment including, auscultation for breathe sound and air entry, should be observed (Day, Farnell and Wilson-Barnett, 2002b).

- **Stoma or Wound Care**

The stoma or opening into which the tracheostomy tube is inserted is a potential route of infection, and the proximity of secretions according to Higgins (2009b), can increase infection risk. The author suggests that the decision to dress a tracheostomy wound should be based on clinical need, should follow a comprehensive stoma assessment of clinical indicators, and consideration of patient comfort and respiratory secretions. The wound and surrounding skin according to (Walsh and Crumbie, 2007), should be kept as much as possible from secretions. Literature also suggests that frequency of dressing and cleaning of the wound site varies, depending largely on the amount of secretions or soiling.

Higgins (2009b) went on to say that while some tracheostomies are sutured in place, tracheostomy dressing carries a significant risk particularly as the fixation device is temporarily adjusted, and may not be secure. He noted that this indicates, dressing change always requires two persons: one to secure the device in position, while dressing is performed by the other. If a patient is on oxygen therapy disruption should be kept to the minimum with a second practitioner providing oxygen flow, during wound dressing.

After removal of old dressing, the stoma should be inspected for clinical indicators like colour, amount of secretions and, signs of infection which includes: purulent discharge, pain around the site, odour, abcesses, cellulitis or discolouration. If there are signs of infection, wound swab is taken from the site or from the discharge, sent to the laboratory for analysis, and reported immediately. Sputum specimen is obtained in signs of infected respiratory secretions the next time the patient is suctioned, or expectorates sputum. Skin should also be

inspected for indications of irritation, or infection such as redness, hardness, tenderness, drainage or foul smell and breakdown (Dennis-Rouse and Davidson, 2008, Serra, 2000). During stoma dressing, the wound under the tube flanges should be cleansed using cotton wool or cotton wool applicator moistened with 0.9% normal saline. The use of cheap cotton wool that fragments easily should be avoided to prevent particles from entering the stoma. Small amount of white soft paraffin can be applied as barrier film if the skin needs further protection (Higgins, 2009b, Serra, 2000). Serra (2000) suggests that use of cotton gauze or similar materials should be avoided as they tend to stick to the wound and can be inhaled. Higgins (2009b) highlighted that specific slim-line tracheostomy dressings are recommended. These are noted to usually have a 'T' shape cut into them. If not, the shape can be cut with sterile scissors. The dressing has foam and mat sides with the mat side placed against the skin.

- **Care of Tracheostomy Ties**

Ties or tapes for securing the tubes are recommended to be tied in a reef knot at each side of the neck. The rope is then drawn underneath the patient's neck with head flexed down towards the neck if possible, and fastened in a double knot. A single bow can get undone when it advertently gets caught on something. After fastening, check for indications of tension and comfort level of the patient by inserting the little finger between the ties and the neck. Ties should be changed daily (Serra, 2000, Walsh and Crumbie, 2007). Cotton ties are used for patients at risk of tube dislodgement (St. James's Hospital, 2013). Dennis-Rouse and Davidson (2008) advocates the use of velcro ties as they are more comfortable for patients, and have fewer tendencies for skin abrasion.

- **Inner Tube Care**

Cleaning and changing of the inner tube is done for the purpose of prevention of tube obstruction. The inner tube should be inspected regularly for early detection of blockage (Morris, Whitmer and McIntosh, 2013). To clean the tube, the inner cannula can be carefully removed and soaked in $^1/_2$ hydrogen peroxide, normal saline, mild detergent, or a weak solution of sodium bicarbonate for a maximum of two hours to loosen the crusts and

mucus. It is then cleansed with a small tube brush and rinsed under running water. Cleaning of the tube can be done as often as possible even hourly. Brushing of plastic tubes should be avoided as they can get damaged. Tubes should be stored dry. Silver tubes can be autoclaved. The outer cannula can be suctioned before reinsertion of the inner tube after cleaning. Care should be taken not to displace the outer tube. Ties should be checked to ensure they are securely tied. Re-usable plastic tubes can be cleansed and reused, only for the same patient (Serra, 2000, Walsh and Crumbie, 2007). Changing of the inner tube should be done at least twice a week. A clean tube should be inserted immediately an old one is removed (Higgins, 2009b).

- **Changing the Tracheostomy Tube**

Recommendations for changing of the tracheostomy tube are inconsistent (Morris, Whitmer and McIntosh, 2013. The first tube change should be performed by experienced medical or nursing staff. It takes 2-3 days for a tract to form and there is a possible danger of tube displacement or insertion into the pre-tracheal tissue. For this reason it is indicated two people should be present at the procedure. The tube is removed by one person while the other inserts the new tube immediately, remove the introducer, after which the tapes are securely tied (Stellenberg and Bruce, 2004, Serra, 2000, New South Wales Agency for Clinical Innovation, 2013).

- **Blocked Tubes**

Blocked tubes are usually caused by a large plug of mucus or a piece of crust attached to the end of the inner or outer tube. Patients may attempt to clear the obstruction by vigorous coughing at the initial stage. If however, suction and change of the inner tube fails in the removal, the outer tube must be changed immediately or the patient intubated orally. Good humidification, frequent inner tube suctioning, and change practices will prevent occurrence of blockages (Serra, 2000, Ministry of Health Nursing Clinical Practice Guideline, 2010).

- **Displaced Tubes**

This is when the tube comes completely and visibly out of the stoma, or is dislodged not out on the neck, but into the pre-tracheal tissues. This situation occurs more in patients with full neck, obese patients with large amount of fat in the neck, poorly tied tapes, or insufficient checking of tape tension in patients with subsiding swelling around the neck. In completely dislodged tube, the tracheostomy stoma can be kept open with the clean spare tube and tracheal dilator that is available for emergencies. The used tube can be reinserted if a clean tube is not available in an emergency. Tube displacement into the soft tissue may not be immediately apparent, if the patient has an airway that is sufficient to avoid obvious respiratory distress (Serra, 2000).

A patient with tracheostomy is not capable of speaking with a normal voice because, air passing through the larynx is inadequate. Where a patient can speak normally without the assistance of a speaking valve or occluding tube, it is a clinical indication that the tube has slipped into the soft tissues of the neck. The tube is checked for airflow to ascertain the possibility of tube displacement. In upper airway obstruction the patient will experience acute respiratory distress. In this case help must be sought immediately, the displaced tube is removed and the trachea is kept open by dilators until a fresh tube is inserted. If a tube has been out of the stoma for any length of time, it is necessary to insert a smaller tube. This is why bedside equipment should include various tube sizes. In cases where tracheostomy opening has started to close and tube insertion is difficult, a suction catheter can be inserted as a guide for the tube and to give passage of air. The tube can be threaded over the suction catheter which is not connected to a suction machine. If reinsertion of a new tracheostomy tube fails, securing airway via oral intubation is essential to prevent complication like hypoxia (Serra, 2000, Ministry of Health Nursing Clinical Practice Guideline, 2010). To prevent tube displacement, the tracheostomy tie should be secure and snug with a single finger fit under the tie. The tube should also be positioned neutrally at the midline. Checks for tube security should be done always and before movement of patient, to prevent displacement (Morris, Whitmer and McIntosh, 2013).

- **Tracheal Stenosis**

This is the narrowing of the trachea which can occur up to five years after the procedure. It is suspected to occur in patients who have increasing dyspnoea on exertion, cough, and retained secretion. The stenosed area can be removed with laser or resection, and end-to-end anastomoses is performed (Serra, 2000).

- **Decannulation**

Decannulation is the removal of the tube. Removal of the tube can take place from days to months after surgery, but never until the patient can breathe with the tubes occluded for 24 hours continuously. Occlusion is carried out gradually to determine patient's ability to breathe with the tracheostomy closed. This also helps the patient to become accustomed psychologically and physically, to breathing without a tube. Assessment for aspiration risk should be done before tube removal (Serra, 2000, Salmon and Herzberger, 2012).

- **Fluids and Nutrition**

Recommended fluid intake is a minimum of 3000ml to aid liquefaction of pulmonary secretions unless it is contraindicated in cases of cardiac insufficiency or oedema. Accurate intake and output records must be maintained. Oral food and fluids is not permitted. Patients are maintained on intravenous fluids, or are fed via nasogastric tube. In permanent tracheostomy, or the patient is not on a ventilator, oral fluids are gradually introduced. If tolerated soft diet is given and gradually increased to regular diet (Walsh and Crumbie, 2007).

- **Mouth Care**

Oral hygiene is maintained to increase patient comfort and to reduce risk of infection. The mouth is cleansed and rinsed every 2 hours until the patient can take normal meals. Regular mouth cleansing after each meal, and at bed times should be maintained (Walsh and Crumbie, 2007, New South Wales Agency for Clinical Innovation, 2013).

- **Communication**

Communication serves to meet patients' social and information needs. It is important to note that the patient is likely to be fearful of choking, and will be concerned about his inability to cough up secretions and communicate. If the nurse must leave the patient's bedside, he must be informed of how long she will be away. A call bell is placed at the patient's bedside so he can call when necessary. Patient must be informed of all process of care. It is also helpful to anticipate information patient may want, but is not able to ask. Pad and pencil should be kept within reach of the patient to aid communication of his needs and feelings. Hand signs can also be developed and relatives are encouraged to communicate with the patients. Watch out for patient's facial expressions, gestures, and key words, to determine what the patient is trying to communicate (Walsh and Crumbie, 2007, Doncaster and Bassetlaw, 2014).

2.3.4   Complications

- Surgical Emphysema

Too tight suturing of wound causes air to enter the neck tissues rather than leaking out around the tube. This is remedied effectively by simple release of any suture.

- Wound and Respiratory Tract Infection

Altered airway and poor techniques could contribute to potential infections. Measures to prevent infection include elevation of head of bed, oral care, and treatment of lung infections.

- Haemorrhage

Bleeding can be primary, secondary, or reactionary. Large haemorrhages can be fatal. If the tube is close to the innominate artery it may move in time with the heartbeat. Pulse should be taken to identify possible movement with the heartbeat. The insertion of a cuffed tracheostomy tube is useful in the control of bleeding and prevention of blood aspiration. Small amount of bleeding is expected after surgery and tube change. The surgeon should be contacted if bleeding is continuous (Serra, 2000; Stellenberg and Bruce, 2004; Morris, Whitmer and McIntosh, 2013).

2.5 Evidence-Based Practice (EBP)

According to Vincent, Hastings-Tolsma, Gephart and Alfonzo (2015) the concept of evidence-based practice (EBP) is not new, and has been gaining momentum in recent years. The Evidence-based Practice movement was founded by Archie Cochrane, a British epidemiologist. The motivation behind this movement is the belief that most of medical practice was based on intuition, experience, clinical skills, and guess work, rather than science (Melynk and Fineout-Overholt, 2011; Chitty, 2005). Originally proposed by Sackett and colleagues, EBP is a problem-solving approach to patient care that integrates the strongest research evidence, clinician expertise, and patient values/preferences (Vincent, Hastings-Tolsma, Gephart and Alfonzo, 2015; Winters and Echeverri, 2012).

EBP is defined as the simultaneous use of individual clinical expertise and the best available external clinical evidence from systematic research, to guide clinical decision making, while considering the patient's values (Larabee, 2009). The definition signifies that the clinician must take patient's condition, values and circumstances into account at clinical decision making. In evidence-based practice the clinician must also link evidence to other activities that promote the exercise of evidence-based patient choice. Evidence-based practice though key to improving patient outcomes, can be a challenge for busy nurse practitioners to implement (Larabee, 2009, Vincent, Hastings-Tolsma, Gephart and Alfonzo, 2015).

2.5.1 How Evidence-Based Practice Differs from Prior Practice

In the past clinical practice was based on, a high value for traditional authority and adherence to standard approaches. Answers were frequently sort from direct contact with local experts or, reference to writings of international experts. Healthcare managers tended to focus on cost and quality i.e "doing the right thing", leaving "doing what is right" to other forces or chance - a situation which can no longer continue. Every healthcare professional involved in decision making in recent times must have the skills to enable them make decisions about "doing the right things". Decision makers should be able to discriminate between good and bad systematic review, appraise studies on health service cost effectiveness, determine whether a randomized controlled trial in a specialty other their

own, is biased. These are management skills required in the 21st century decision maker. Evidence-based practice has become the desired standard within all health disciplines because the integration of best evidence into clinical practice is fundamental to optimizing patient outcomes (Profetto-McGrath, Negrin, Hugo and Smith, 2010).

2.6 Evidence-Based Nursing (EBN)

The term evidence based nursing emerged evolving from the initial work done in evidence-based medicine, and attends to what is important to nursing. Simply defined, evidence based nursing is the combination of individual clinical or professional expertise with the best available external evidence, to produce practice that is most likely to lead to a positive outcome for a client or a patient (The Joanna Briggs Institute, 2010). Evidence based nursing de-emphasizes intuition, unsystematic clinical experience and pathophysiologic rationale as sufficient for clinical decision making in nursing care, and stresses the examination of evidence from clinical research.

Clearly, nurses have enormous influence on the type and quality of care that is provided for patients, but only recently has the need for systematic use of scientifically defined evidence, received serious attention. Ciliska (2006) stated that, one of the earliest reviews to assess the effect of research based nursing practice on patient outcomes, identified 84 relevant studies and showed 'sizeable gains' in patients' behavioural, knowledge, physiological, and psychosocial outcomes compared with patients who received routine nursing care. The author also noted that the meaning of evidence–based nursing is broader than research utilization. The use of evidence–based practice in nursing solves problems encountered by nurses, and involves the following steps-

- Clear identification of issue or problem based on accurate analysis of current nursing knowledge and practice.
- Systematic search of literature for relevant research.
- Evaluation of research evidence using established criteria regarding scientific merit
- Choice of intervention and justification of selection with the most valid evidence.

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Evidence-based practice movement offers considerable assistance to nurses to improve research utilization in practice, through the strategy of development of condensed information that summarizes: the results of systematic review of evidence on a topic, that include the meta analysis or meta synthesis of research results (The Joanna Briggs Institute, 2010).

2.7 Evidence-Based Decision Making

Evidence based decision making is an advanced process of clinical decision making and patient care. According to Muir Gray (1999) the healthcare decision maker, who makes decisions about groups of patients or populations, will have to practice evidence-based decision making in the 21st century. Decisions will be based on systematic appraisal of the best available evidence. To accomplish this, the best available evidence must be found. Muir Gray (1999) identified the skills required of an evidence-based decision maker as follows:

- an ability to define criteria such as effectiveness, safety, and acceptability

- ability to find articles on the effectiveness, safety and acceptability of a new test or treatment

- ability to assess the quality of evidence

- ability to assess whether the results of research are generalizable to the whole population from which the sample was drawn

- ability to assess whether the results of the research are applicable to the local population.

According to The Joanna Briggs Institute (2010) systematic reviews provide the raw materials for establishing clinical guidelines, and assist in identifying gaps in existing research.

2.8 Clinical Practice Guidelines (CPG)

Watkins (2005) wrote that Institute of Medicine (1992) defined clinical practice guidelines (CPG) as systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. Shaban (2012) wrote that clinical guidelines outline operational information, procedures, and care guidelines with options, aimed at improving quality of care or standardizing care. Harrision, Dowswell and Wright (2002) also noted that clinical guidelines are essentially algorithmic formulations that guide users to courses of (diagnostic or therapeutic) action, dependent upon stated prior conditions though they do not necessarily claim to determine clinical action completely. Algorithmic formulations include clinical indicators presenting in patient conditions and research recommendation as guidelines. They are important components in the delivery of evidence-based health care practice. By incorporating guidelines into nursing practice, nurses anticipate minimizing risks to their patients, improving quality of care and increasing cost effectiveness. Clinical guidelines have been shown to benefit patient care, although they remain a challenge to locate. Obvious benefits include reduction in variation of care provided, facilitation and achievement of expected clinical outcomes, reduction in care delays and length of stay, maintaining or increasing patient and family satisfaction, and discouragement of practices that are not based on sufficient evidence (Watkins, 2005, Cherry and Jacob, 2005, Shaban, 2012).

2.8.1   Factors that Influence and Affect Use of Clinical Guidelines

- Organizational resources

- Individual characteristics of health care professionals

- Lack of communication between providers

- Lack of communication across shifts

- Perception of healthcare professionals about guidelines

- Implementation strategies

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- Beliefs of healthcare professionals of evidence-based practice

- Regulatory reporting activities

- Culture and leadership (Watkins, 2005)

2.9   Critical Thinking in Nursing Decision Making

The process of critical thinking guides scientific reasoning, the nursing process, problem solving and decision making. Critical thinking is a said to be a complex process that has many definitions. It is seen by some authors as a reflective and reasonable way of thinking, while some others see it as an attitude of inquiry, or describe it as a disciplined, self-directed thinking process (Jones, 2007). Paul and Elder (2009) defined critical thinking as the art of analyzing and evaluating thinking with a view to improving it. According to Khosravani, Manoochehri and Memarian (2005), Facione and Facione in (1996) defined critical thinking as a purposeful, self-regulatory judgement; an interactive, reflective reasoning process of making a judgement about what to believe or do.

Critical thinking is the cognitive engine that drives the processes of knowledge development and critical judgement in nursing. The skills and dispositional attributes of critical thinking are central to nursing, and demand openness to new evidence and willingness to reconsider judgments. The importance of critical thinking in nursing is so evident that, educational programmes are evaluated according to the development of skills related to this sort of thinking (Jones, 2007, Khosravani, Manoochehri and Memarian, 2005). In short, critical thinking is self-directed, self-disciplined, self-monitored and self-corrective thinking, requiring rigorous standards of excellence and mindful command of their use. It entails effective communication, problem solving abilities, and a commitment to overcoming native ego-centrism and socio-centrism (Paul and Elder, 2009).

2.10   Quality Clinical Decision Making in Nursing

Quality clinical decision making in nursing is the essence of quality nursing care delivery. Current interest in clinical decision making is attributed to various factors of contemporary trends and forces such as, current transformation of the health care delivery system,

increased focus on quality of care, increased awareness of the public of their right to accessible healthcare, and participation in clinical decision making. Other forces are decreased resources and budget restrictions, advanced roles such as decision maker, collaborator, and EBP. All of this is noted to suggest that transformation in the way nurses make decisions is needed (Arries and Nel, 2004). The authors wrote that Krejci (1999) and Moorhead and Huber (1997) opined that these changes dictate, nurses' clinical decision making of the 21st century must evolve beyond traditional task-oriented focus to encompass the emerging role orientation which require that, nurses move beyond well-defined organisational decision making boundaries.

Quality clinical decision making in nursing refers to the rational, interactive, deliberative, selective, cognitive-affective, problem solving activity that is followed by nurses in a specific context, during the care of an individual. Through series of transformations, nurses make diagnosis of health problems based on: comprehensive functional assessment, goal-directed choices between perceived alternative options, and implementation of these choices in accordance with pre-specified standards, that aim to promote the health of individuals, groups and communities (Arries and Nel, 2004). According to the authors this characteristic of nursing clinical decision making compare favourably with those of a system. It could be argued therefore that a system for quality clinical decision making in nursing should be based on systems-theoretical perspective.

2.11   Performance Improvement

Performance improvement is a continuous, on-going measurement and evaluation process with the intended goal being ''improvement in quality care''. The process of performance improvement includes monitoring, analyzing, improving and sustaining performance (Hudson, 2009). Performance on the other hand is the product of three underlying factors: ability, motivation, and environment (Hudson, 2009). A defect in any of the factors will impair performance. An effective means for increasing employee productivity is performance appraisal.

Understanding the causes of poor performance of healthcare providers is also very crucial to high quality healthcare delivery. To the extent that poor performance is caused by low competence, improving competence improves performance. Healthcare organizations need to assess individual and organizational performance periodically, to evaluate the efficacy of services provided. Assessment plays an important role in an organization's performance improvement initiatives. Results are used to identify gaps in knowledge and skills, guide managers in setting appropriate training or other remedial interventions, targeting individual or group providers (Kark, Burkhalter and Cooper, 2001).

2.11.1 The Role of Competency in Performance Improvement

Competency according to Hudson (2009) is the basis of effective performance improvement which assumes that, a predetermined level of excellence has been established as a guideline for practice i.e benchmarking. It is when this standard or established measure is "not" met that a performance improvement action is taken. Staff competency includes assessing and measuring staff knowledge, behaviours, understanding, and psychosocial skills. Knowledge, behaviours and skills can be determined by objective tests, essay tests, computer simulations, computer based questionnaires, case studies, actual observations, peer evaluation, and nursing audits (Hudson, 2009).

2.11.2 Role of Benchmarking in Performance Improvement

A benchmark is a standard against which we can measure performance, or a standard by which something can be measured or evaluated. Essentially benchmarking allows for the measurement or comparison of practices and services against other organizations best practices. It refers to processes and results that represent best practices and performance for similar activities, inside or outside an organization's industry. Benchmarks for clinical practice, help to cultivate a practice environment conducive to EBP and quality improvement (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010, Hudson, 2009).

2.11.3 Evaluating the Process of Performance Improvement

Effective ways of determining improvement in quality and performance are observation of behaviour, clinical competence, surveys, improved documentation, questionnaires, interview, data collection, and analysis of data (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010, Hudson, 2009). It is important to determine the extent of the clinical problem that requires improvement and acceptable, achievable, and realistic results, prior to performance improvement projects. Performance projects should be monitored closely until expected outcomes have been reached after which, it can be monitored annually. Nurse' managers and staff have the primary responsibility of monitoring and maintaining quality care in performance improvement process. Nurse mangers also have the key role of providing the necessary support and training for nurses, as well as using the necessary authority to make improvement changes (Hudson, 2009). Nursing sensitive outcomes are the best quality indicators for evaluating nursing practice. They unify nursing, and are the way of the future for claiming our professional contributions to patient care. Nursing-sensitive outcomes are defined as outcomes that are relevant, based on nurses scope and domain of practice, and for which there are empirical evidence linking nursing inputs and interventions to the outcomes (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010).

2.12 Quality Improvement

Quality improvement (QI) is a planned approach to transform organizations by evaluating and improving systems to achieve better outcomes (Larrabee, 2009). Several approaches have been used over the years to improve the quality of nursing care and there are three classic frameworks in literature from which nursing care can be evaluated: Structure, Process and Outcome. Each of these elements interacts with one another to contribute to quality of nursing care. An improvement in any of the elements is likely to produce a favourable change in the other two (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010).

- Structural Elements

This includes the physical setting, instrumentalities, and conditions by which care is rendered. This includes the nursing department's philosophy and objectives, the health agency building, organizational structure, financial resources, equipment, agency, licensure etc (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010).

- Process Elements

This includes steps in care activities: assessing, planning, implementing and evaluating, and all subsystems of nursing care such as health history, physical examination, making nursing diagnosis, determining patient care goals, constructing a nursing care plan, performing each prescribed task, measuring patient outcomes, and reporting patient's response to care/treatment (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010).

- Outcome Elements

These are net changes that occur as a result of health care or net result of health care (Stanhope and Lancaster, 2008). These changes include modifications of symptoms, signs, knowledge, attitudes, satisfaction, skill and compliance with treatment regimen.

The three frameworks – structure, process and outcome individually permit more than one approach to quality improvement. Structure can be examined from the standpoint of the total health agency or the nursing unit in which the patient receives care. Process can be examined from actions taken by the nurse or care received by the patient, while outcomes can be analyzed from the nurses' or the patient's and family's frame of reference. Quality improvement and EBP have been documented in literature as two of the most important strategies for improving clinical performance of healthcare systems. Engaging clinical nurses in the work of quality and performance improvement is essential to achieving excellence in clinical care (Albanese, Evans, Schantz, Bowen, Moffa, Piesieski and Polomano, 2010).

2.13 Nursing Documentation

The nursing profession has been concerned with patient data since Florence Nightingale. It has advanced with the introduction of the nursing process, the International Classification of Nursing Practice (ICNP), and the International Nursing Diagnosis Classification (NANDA), to increase the usability of nursing documentation (Wang, Hailey and Yu (2011). Quality nursing documentation promotes structured consistent and effective communication between caregivers. It facilitates continuity, individuality of care, and patient safety. According to Di Leonardi (2013), nursing documentation is a critical component in high quality patient care of safe and effective nursing practice, that is legally and ethically sound. It is one indicator especially helpful in the measure of nurses' responsibilities in practice areas (College of Registered Nurses of British Columbia, 2012).

Documentation according to College of Registered Nurses of British Columbia (2013) is any written or electronically generated information about a client that describe the care or service provided to that client. It is an accurate account of what occurred and when it occurred. Wang, Hailey and Yu (2011) wrote that Urquhart et al (2009) defined documentation as a communication tool for exchange of information stored in records between nurses and other caregivers. Documentation according to Daniels (2004) provides written records that reflect client care provided on the basis of assessment data and client's responses to interventions.

Nursing documentation therefore, is the record of nursing care that is planned and given to individual patients and clients by qualified nurses, or by other care givers, under the direction of a qualified nurse. It attempts to show what happens in the care process and provides information of what care decisions are based on, by presenting information about admission, nursing diagnoses, interventions, and evaluation of progress and care outcomes (Wang, Hailey and Yu, 2011). In health, records are kept as paper documents or electronic. Through the means of documentation nurses communicate observations, decisions, actions and outcome of these actions for clients in practice (College of Registered Nurses of British Columbia, 2013).

In their review of quality of nursing documentation, Wang, Hailey and Yu (2011), noted that despite the wide recognition of the importance of quality nursing documentation, and

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effort made to enhance it, there are inconsistencies in the definition of good nursing documentation. They observed that this is because of variations in nursing documentation practice based on, different local requirement, documentation systems, and terminologies across countries and settings.

2.13.1   Documentation Methods

There are many methods used for nursing documentation. Whichever method is used in a facility must reflect the complexity of care, must have an embodiment of accuracy, completeness, and evidence of professional practice with efficient and cost effective systems (Daniels, 2004). Methods used for nursing documentation include: focus charting, narrative charting, soap (soapier) charting, computerized documentation etc. Regardless of methods used, nurses are responsible and accountable. Very ill clients considered to be high risk or have complex health issues, require in-depth and frequent documentation (College of Registered Nurses of British Columbia, 2013).

Most documentation methods however, fall into one of two categories: documentation by inclusion and documentation by exception. **Documentation by inclusion** is done in on-going, regular basis and makes note of all assessment findings, nursing interventions and client outcomes. On the other hand **documentation by exception** makes notes of: negative findings and is completed when assessment findings, nursing interventions, or client outcomes vary from the established assessment norms, or standards of care existing within a particular agency. Documented baseline assessment must be discernable, with detailed descriptions including deficits. College of Registered Nurses of British Columbia (2013) noted that charting by exception according to is said to replace the long held belief of *"if it was not charted then it was not done"* with a new premise of *"all standards have been met with a normal or expected response unless documented otherwise".* Documentation by exception is only appropriate when assessment norms or standard of care are explicitly written and are available within the agency. This type of documentation is never acceptable for medication administration (College of Registered Nurses of British Columbia, 2013, Daniels, 2004).

- **Documentation Entries**

Entries must be:

- Accurate, valid, and complete
- Authenticated; that is, the information is truthful, the author is identified, and nothing has been added or inserted
- Dated and time-stamped by the persons who created the entry
- Legible/readable and
- Made using standardized terminology, including acronyms and symbols (Di Leonardi, 2013).

2.14   Empirical Studies

There is paucity of literature as regards nurses' decision making practices in tracheostomy care (Dennis-Rouse, 2008). However, there are several guidelines developed by professional bodies and healthcare institutions to support decision making processes of practitioners, integrate EBP into managing patients with tracheostomies, and ensure patient safety (Cooke, 2012, Doncaster and Bassetlaw Hospital, 2014, Liverpool Health Service, 2006, St. James's Hospital, Nursing, 2013, North West Regional Tracheostomy Care, 2010). EBP has become a desired standard within all health disciplines because the integration of best evidence into clinical practice, is fundamental to optimizing patient outcomes (Profetto-McGrath, Negrin, Hugo and Smith, 2010).

At Walter Reed Army Medical Centre (WRAMC), Georgia, Washington, the traditional outline of care guidelines was found inappropriate for evidence-based tracheostomy care (St. Clair, 2005). A survey of tracheostomy care decisions revealed inconsistencies in knowledge levels and variation in clinical practice, presenting threat to patient safety in form of: nosocomial infections, prolonged hospital stay, complications, and death. The Nursing Performance Improvement and Nursing Research Department entered into research collaboration with clinical experts to address these issues. A tracheostomy care and

suctioning algorithm was developed following the process of rigorous research to enable each health care professional exercise their clinical judgement in tracheostomy care decisions by evidence in 2003. Following pilot testing, staff members in selected units were trained in tracheostomy care and suctioning after which the algorithm was implemented and adapted (St. Clair, 2005).

Dennis-Rouse and Davidson (2008) reported that at a California nursing outcomes coalition pressure ulcer audit, a tracheostomy patient was identified with macerated skin around the stoma site and under the twill tape on the neck. This stimulated a closer monitoring of tracheostomized patients in a practice change project. PICO question of *"In hospitalized patients who require tracheostomy, what evidence drives nursing interventions aimed at prevention of complications?"* was set to evaluate the state of patients with tracheostomy. Reviewed literature include securing of tube, sutures and removal, type and choice of dressings, prevention of skin breakdown, frequency of care, role delineation and suctioning. Evidence gathered and evaluated revealed lack of high-level research to support one practice against another. To establish trends and values, views of national and local experts, current practice at local hospitals, data from local vendors of dressings, were surveyed. Physicians, staff and patients were also interviewed. The response of one of the national experts was that to his knowledge there are no studies to answer the PICO questions, and that most institutions have informal and formal policies developed to address tracheostomy care. He recommended further research. Responses from local experts revealed demonstration of wide variation of practices. The response of a wound and ostomy care nurse on tracheal occlusion showed there is no clear statement on who is responsible for tracheostomy care, which might cause error of omission as a result of shared responsibility. It was proposed that the nurse would have ultimate responsibility for tracheostomy care and suctioning - a minimum of once every 12 hours, necessitating further research into tracheostomy care practices and nursing care decisions (Dennis-Rouse and Davidson, 2008).

Amongst numerous factors required for effective decision making, knowledge has been identified as the foremost factor by several authors. Scholars have also recognized and identified that healthcare professionals utilize multiple choices of knowledge in clinical

decision making (Profetto-McGrath, Smith, Hugo, Taylor and El-Hajj, 2007). Gerdtz and Bucknall (2001) pointed out some authors have argued that, decision makers are frequently unable to articulate their underlying decision processes to others, and may be more interested in justifying their actions to researchers, than reporting what actually occurred in practice. It is therefore evident that, critical thinking skills be applied to nursing education to empower nurses with powerful judgement and skilful practice (Khosravani, Manoochehri and Memarian, 2005).

According to Thompson, Aitken, Doran and Dowding (2013), nurses' judgements and decisions have the potential to help healthcare systems allocate resources efficiently, promote health gain, patient benefit, and prevent harm. However, evidence from healthcare systems throughout the world suggests that judgements and decisions made by nurses could be improved upon, as around half of all adverse events have some kind of error at their core. For nursing to contribute to raising quality through improved judgements and decisions within health systems, there is a need to know more about decisions and judgements themselves. There is also need to know the interventions that are likely to improve judgement and decision processes and outcomes, and where best to target finite intellectual educational resources. Much of research evidence according to the authors have focused on nurses' decision making and judgement, playing only a minor role in the development of educational and technological efforts at decision improvement.

Twycross and Powls (2006) reported that consideration should be given to the complexity of decision making in the clinical environment and level of stress nurses experience, which may have detrimental effects on nurses' decision making ability. Study findings suggest participants in their research work used hypothetico-deductive model in decision making, and appeared to use backward reasoning strategies regardless of their level of expertise. Experienced and less experienced nurses were observed to collect similar additional information before care interventions, supporting the conjecture that they were functioning at non-expert level of decision making. No differences were observed in information collection of non-graduate and graduate   nurses, suggesting graduate status does not affect clinical decision making. The result of an exploratory study of clinical

decision making of nurses in five countries by Lauri, Salantera, Chalmers, Ekman, Kim, Kappeli and MacLeod (2001) revealed that participants employed different decision making models in different nursing situations. Participants mostly used both analytical and intuitive cognitive processes in decisions made. Intuitive oriented decision making dominated situations that required rapid response and prompt decision making. Professional education, practical experience, field of practice, and type of knowledge were reported to be significantly associated with decision-making models of participants, in the five countries.

Some studies have explored how nurses make decisions, however, there has been limited consideration to application of best evidence and decision making by nurses, in the context of their clinical work (Twycross and Powls, 2006, Hancock and Easen, 2006). Ciliska (2006) posit there is need for more current research aimed at understanding types of decisions nurses make, identifying information sources nurses use in clinical decision making, and assessment of nurses' understanding of EBP. The author reported Banning (2005) found that nurses had difficulty differentiating between EBP and the research process, and that EBP was equated with the research process. These areas were noted as particularly important as basis for intervention studies.

Ramezani-Badr, Nasrabadi, Yekta and Taleghani (2009) highlighted that critical care nurses' deal with patients with rapid changing conditions requiring important care decisions within limited time. Decision making in critical care is dynamic and unpredictable, and the most significant characteristic of critical care nurses is their ability to make different decisions, in complex situations. The findings of Hancock and Easen (2006) on the contrary, revealed a stark contrast to the espoused rhetoric view of critical care nurses' decision making. Much of nurses' decision making was observed to be "pragmatic led" rather than "clinically led".

Hancock and Easen (2006) also observed conformity to unit-based practice which, might be explained by consideration of distinction between "knowing that" and "knowing how". The authors argued that in nursing one must differentiate between "knowing how to do something" and "acting knowledge". The former is noted to be simply a method of doing something while the latter, was evident in their research findings. They reported that

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practical wisdom of ICU nurses' decision making was characterized by a complex combination of doing and thinking in the clinical situation, which cannot be separated into theoretical and practical components. Nurses' experienced clinical practice is seen as an inextricably interwoven complex pattern of events and thoughts. Research findings of Ramezani-Badr, Nasrabadi, Yekta and Taleghani (2009) revealed reasoning, intuition, pattern recognition, and hypothesis testing were decision strategies instituted by Iranian critical care nurses. The authors reported that participants in their study believed knowledge and experience, play an important role in their reasoning strategies.

Despite reports of good experience of some nurses in clinical work, many do not understand the rationale behind their clinical practice. Studies according to Hancock and Easen (2006) have revealed, nurses recognised certain changes in the state of a patient's clinical condition as dangers that call for interventions. They however failed to understand what conditions may have caused the patient to exhibit the changes, or why interventions were needed. According to the authors this report was arguably true for nurses, in their study. Competence in their study was majorly allocated in terms of compliance with unit-based practice, which is in contrast to the real definition of competence.

Thompson, Aitken, Doran and Dowding (2013) observed that there is a need to improve nurses' judgement and decisions to understand what happens when nurses vary in their decisions. The authors reported that study findings have highlighted that when given same information and undertaking same decisions, nurses will consistently make different judgement and decisions. The authors also observed that if sources of variations in nursing decision are not addressed, as volume of potential nursing interventions available increases, it is logical to argue that variability in nursing judgement and decisions will also increase. Shaban (2012) highlighted that some studies have focused primarily and exclusively, on accuracy or quality of judgement or the judgement process. The author reported that these studies have focused on judgement error, and many have failed for lack of understanding of the judgement process or the quality of good decision. Research findings according to Shaban (2012), suggest additional research, new approaches, rethinking of existing judgement, decision making, and ways in which they may be applied to professional work.

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Dowding and Thompson (2003) posit that evaluating decisions by the process by which they are made, has been suggested as an alternative approach to measuring of judgement and evaluating decisions.

Tracheostomy is a common procedure in critical care practice for multiple medical indications to aid breathing (Morris, Whitmer and McIntosh, 2013, North West Regional Tracheostomy Group, 2010). Nursing staff within diverse settings are expected to provide safe and effective care (Paul, 2010). Nurses must be able to readily identify tracheostomy patient needs, apply EBP to care, and prevent deterioration of patient conditions, which can result in re-admission into the ICU from ward settings (Docherty, 2002). It has been reported in literature however, that some healthcare professionals lack the relevant skills, knowledge and expertise to effectively manage tracheostomy patients (Paul, 2010, Parker, Shylan, Austin, Archer, Smith and Morison, 2008). Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) reported there is evidence practitioners are not adequately educated or experienced to care for patients with tracheostomy tubes on the wards. The authors went on to highlight that this research findings have serious legal implications, and also hamper the intent of comprehensive critical care which aims at prevention of readmission of patients to the ICU. Higgins (2009a) also reported evidence of lack of knowledge and skills in tracheostomy patient care outside specialist areas in literature. It is very vital nurses are knowledgeable in the proper care of patients with tracheostomy because inappropriate or inadequate care is associated with, increased morbidity and mortality (Dennis-Rouse and Davidson, 2008). Without specific strategies to address tracheostomy care, patients may receive sub-optimal care (Paul, 2010). The need for provision of more tracheostomy-related education as routine to health workers directly involved in the care of tracheostomy patients, including nurses has been emphasized (Casserly, Lang, Fenton and Walsh, 2007).

According to Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) and Paul, (2010), management of tracheostomy tubes is associated with several complications and risks, there is however very limited research in relation to the care and management of tracheostomized patients by nurses outside specialty areas. Research findings of Dennis-Rouse and Davidson (2008) revealed little research-based evidence related to tracheostomy

care. Brown (2014) reported previous studies on tracheostomy care, failed to address tracheostomy care practices carried out by nurses on daily basis. Day, Wainwright, and Wilson-Barnett (2001) observed that no previous researchers have investigated actual suctioning practices of general ward nurses. The observational study of Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) designed to explore nurses' knowledge and competence in performance of tracheal suctioning in acute and high dependency areas, found demonstration of poor knowledge amongst many nurses, which reflected in their practice. Suctioning practices were observed to be performed against research recommendations. The authors also reported that despite the potential hazards associated with tracheostomy suctioning, little empirical evidence exists on how well it is performed. Lack of high-level research to support one practice versus another was also reported. A widely accepted fact in literature is that suctioning should be performed only as indicated, and not as a routine intervention. Patient assessment should be done at intervals appropriate for the patient's general condition e.g half hourly on the ICU and not greater than 4-6hours on the wards (Nance-Floyd, 2011, Liverpool Health Service, 2006, St Clair, 2005, New South Wales Agency for Clinical Innovation, 2013). It was observed in the study of Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) and Brown (2014) that, many nurses fail to perform chest auscultation or pre-oxygenate patient prior to suctioning. According to Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) there is evidence to suggest hyper-inflation is rarely achieved in clinical practice. This evidence is supported by Brown (2014). Instillation of normal saline has become a widely practiced intervention not supported by research evidence. It is not recommended in practice. (Day, Farnell, Haynes, Wainwright and Wilson-Barnett, 2002a, Day, Farnell and Wilson-Barnett, 2002b, Doncaster and Bassetlaw Hospital, 2014, Nance-Floyd, 2011). Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) also reported that findings in one study revealed none of the nurses were seen to wash their hands before suctioning. This is supported by findings of Brown (2014) which reported modest, or even low levels adherence to hand hygiene practices. Research results have also shown that larger tube size when used for suctioning increase the risk of trauma from greater mucosal contact. Day, Farnell and Wilson-Barnett (2002b) reported that study findings identified all nurses in a study used

larger than recommended suction catheter size. Catheter rotation at withdrawal has not been associated with significant increase in secretion removal, but is reported as a common practice amongst nurses in literature (Docherty, 2002). Nurses within a study were reported to fail to suction within recommended duration (Day, Haynes, Wainwright and Wilson-Barnett, 2002a, Day, Farnell and Wilson-Barnett 2002b and Nance-Floyd, 2011). Study findings of Brown (2014) also supports Day, Haynes, Wainwright and Wilson-Barnett (2002a) and Day, Farnell and Wilson-Barnett (2002b), that nurses are generally unaware of recommended best suctioning practices. Docherty (2002) reported there is always the risk of blocked, displaced, complete removal of tube, or deterioration of patient condition. These are emergency situations for which the patient should be closely observed, and watched out for by the nurse. Good humidification, frequent suctioning, and adequate hydration of tracheostomy patients, however prevents tube blockages, ensuring tube patency.

According to Watkins (2005) clinical practice guidelines are systematically developed statements, to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances. Tong (2001) wrote that much of literature on the use of clinical guidelines comes from the field of medicine, and there is evidence that guideline based care can change nursing practice and patient outcomes. Interest in clinical guidelines as an instrument to implement new knowledge like clinical indicators and research findings has increased over the past decade. There use according to Forsner, Hansson, Brommels, Wistedt and Forsell (2010) may lead to improved quality of care by decreasing inappropriate variation in clinical practice, and ensuring recent advances in medical knowledge are disseminated rapidly to everyday practice. To improve quality of care, the Institute of Medicine recommends the use of clinical practice guidelines that synthesize the best available evidence and expert opinion (Colon-Emeric, Lekan, Utley-Smith, Ammarell, Bailey, Corazzini, Piven, and Anderson, 2007). According to Higuchi, Davies, Edwards, Ploeg and Virani (2011), in nursing, clinical guidelines also provide credible resources for evaluating and improving practice but that the changes required at the individual and system levels are frequently significant, requiring considerable time.

Wilkinson (2010) stated that the complexities of trying to change practice to reflect evidence are perhaps matched, only by the challenges of trying to demonstrate impacts and outcomes resulting from use of evidence in practice. Outcomes are increasingly been seen as the measure of successful evidence use. Reviews of clinicians engagement in quality improvement and use of evidence show that, over time there is much more emphasis on outcomes, particularly in relation to clinical guidelines. There are a large number of unknowns around, appropriate and effective evidence implementation strategies, complexities of practice contexts, the formats and acceptability of evidence, its fit to practice, and usability (Sigma Theta Tau International, 2010). The study findings of Harrison, Downswell and Wright (2002) however revealed nurses are generally supportive of clinical guidelines.

Findings of Forsner, Hansson, Brommels, Wistedt and Forsell (2010) suggest that the adoption of guidelines may be improved if local health professionals actively participate in an on-going implementation process, and identify efficient strategies to overcome barriers on an organizational and individual level. The researchers posit that getting evidence into practice and implementing clinical guidelines are dependent upon more than practitioners' motivation. They wrote that local factors like culture and leadership, evaluation, feedback on performance and facilitation, are likely to be equally influential. Cullen and Titler (2004) noted that facilitating an actual change in practice is perhaps the most difficult challenge facing nursing and organizations.

Research findings of Colon-Emeric, Lekan, Utley-Smith, Ammarell, Bailey, Corrzini et al (2007) on the other hand add to the understanding of why clinical guidelines and clinical protocols are not widely used in nursing homes. Staff from all the facilities under study reported use of policies and procedures to guide their care in common medical conditions. The guides were referred to as clinical protocols to distinguish them from administrative policies and procedures, and from clinical guidelines. The policies and procedures were created by the facility or nursing home to serve as document, and guide to care decisions. Identified barriers in the study include unfamiliarity with clinical guidelines, limited education of licensed practice nurse, belief that clinical guidelines are inconsistent with an

ideal individualized patient centred care and inferior to their professional experience, time to implement, staffing issues, limited facility resources, poor communication of clinical issues, and lack of computer access. Forsner, Hansson, Brommels, Wistedt and Forsell (2010) from their study findings classified identified barriers and facilitators of guidelines implementation in psychiatry into three major categories: organizational resources, healthcare professionals' individual characteristics, and perception of guidelines implementation strategies.

Thompson, Aitken, Doran and Dowding (2013) recognised that clinical guidelines a popular means of supporting nurses judgements and decisions, can be provided electronically most of which are not accessed in real-time in the process of delivery of care. The authors reported that research findings of Thompson et al (2001), Gabbay and le May (2004) and Rycroft-Malone et al (2009) revealed that key messages of clinical guidelines are often exchanged orally in social or professional networks, become internalised, and turned into received wisdom. Once internalised, messages from guidelines become part of the professional's own frame of reference. Such internalised information according to Thompson, Aitken, Doran and Dowding (2013) is particularly unreliable in judgements and decision making processes. The authors noted that nurses like all individuals, make use of heuristics or cognitive shortcuts to manage complexity and seemingly relevant information. However, such shortcuts generate predictable and well known bias as people rely on the easiest information to recall, regardless of the appropriateness of the information. The authors also reported that Tversky and Kahneman (1974) noted people reconstruct information in response to stimuli in the environment, and hindsight affects the retelling/recall of the very same situations that provide feedback and learning.

Research findings of Higuchi, Davies, Edwards, Ploeg and Virani (2011) also indicated documentation as implication for nursing care decisions. Standards of nursing practice and legal responsibilities were highlighted to require thorough documentation of nursing assessments, clinical judgements, and actions, given the complexity of nursing work. Professional standards according to College of Registered Nurses of British Columbia (2013) require nurses' documentation to be timely and accurate of, reports of relevant

observations which should include conclusions drawn to enable communication of care provided to other care providers. It is an account of what occurred, when it occurred. According to Collins (2014) pattern of nurses' documentation reflects level of concern about their patient, their clinical judgement, and may enhance quick recognition of deterioration in patient conditions. Wang, Hailey and Yu (2011) highlighted that content of nursing documentation contains evidence of care and is closely related with professional expertise.

Study findings have however, shown deficiencies in nursing documentation at different levels of content in the nursing process, a framework for nursing practice. Flaws in documentation highlighted include deficiency in psychological and sociological aspects of care, insufficient documentation of nursing steps, and lack of specific data in relation to a particular clinical issue. Attention to the accuracy of nursing documentation in comparison with reality of practice is advocated (Wang, Hailey and YU 2011). Findings of Higuchi, Davies, Edwards, Ploeg and Virani (2011) suggest the use of electronic health records will enhance improvements in documentation of nursing care activities. The study of Lee (2006) found that nurses used to narrative form of charting may not adjust to electronic documentation in the representation of complexities of care, thus compromising data quality in the revelation of care efforts.

Colins (2014) noted that compliance with nursing documentation requirements accounts for a great deal of nurses' time. She observed that optional information is documented into records by nurses in some care situations. Paul (2010) reported occasional accurate documentation of assessment findings of tracheostomy patient's respiratory status, psychological state, colour, consistency, amount of secretions, and care activities on ward settings. Findings in literature have also highlighted practices of poor documentation of tracheostomy care and management on the wards amongst nurses, which according to Paul (2010) may lead to fragmented care.

Implementing EBP is a complex but valued process that requires support for nurses to make it a reality in care delivery. Programmes that support nurse practitioners through the EBP process according to Cullen and Titler (2004), are needed for use in a variety of settings internationally. Education was observed as necessary but insufficient. Other programmes

like internship for staff nurses are needed, to aid integration of science-based practice change into care delivery.

2.15   Summary of Literature Review

This chapter has reviewed concisely, relevant literature, concepts, theories, and framework, that give direction to the study. Review was made on decision making, clinical decision making in nursing, tracheostomy care, evidence-based clinical practice, evidence-based nursing, clinical guidelines, critical thinking in nursing decisions, judgement and decisions, quality clinical decision making in nursing, performance improvement, quality improvement, nursing documentation and empirical studies. A conceptual model for the study was also developed.

In summary, literature review revealed that decision making is one of the most frequent activities performed by professional nurses. Decision strategies is noted to inform nurses ability to make relevant observations, gather patient information and evaluate information in order to recognize health problems. This process enables decisions that result in the delivery of appropriate care. Literature however exist that many established nursing practices not underpinned by sound evidence have been reported. Practices based on tradition or established ritual have also been observed to be widespread amongst a variety of nurses and practice settings.

Interest in the development of clinical guidelines as an instrument for implementing new knowledge and research findings into practice is on the increase. Guidelines are important components in the delivery of evidence-based health care practice, which may lead to improved quality of care by decreasing inappropriate variation in clinical practice. Quality clinical decision making is identified as the essence of quality nursing care delivery. Nurses have the primary responsibility of monitoring and maintaining quality of care provided. Quality improvement and evidence-based practice were documented as two of the most important strategies for improving clinical performance. Decision making in critical care settings is noted to be dynamic and often unpredictable. Critical care nurses are required to develop ability to make decisions in diverse situations as we have in the care of

tracheostomy patients. Ineffective clinical decisions in critical care units may have serious consequences on patient outcomes.

Evidence-based practice, a growing focus on professional care that is effective, compassionate, and meets the needs of patients, has become the desired standard within all health disciplines. The ultimate goal of nursing is to deliver to patients the best available care. This goes hand in hand with the use of clinical guideline indicators and available research evidence in the provision of care. Although the management of tracheostomy is associated with several complications and risks, there is very limited research in relation to the care and management of tracheostomized patients by nurses. Authors have also observed that no previous investigation of actual suctioning practices of general ward nurses have been done. Study findings have identified that current endotracheal suctioning practices within cardiac intensive care were not based on current recommended practice. Literature posit previous studies fail to address daily tracheostomy care practices of nurses.

It has also been observed that though several studies have explored how nurses make decisions, there has been limited consideration about application of best evidence and decision making by nurses in the context of their clinical work. Literature highlighted practices of poor documentation of tracheostomy care and management on the wards amongst nurses, which may lead to fragmented care. Demonstration of poor knowledge level of tracheostomy care amongst nurses, which reflect in practice of care decisions against many research recommendations were suggested. Literature review show an urgent need for practice change, use of clinical guideline indicators, and focused practice-based education in tracheostomy care, to improve nurses' performance of EB care decisions.

2.16   Conceptual Model

The developed conceptual model for the study reflects the structure, process and outcome of the health care setting as it applies to nurses' use of clinical guideline indicators in EB tacheostomy care decisions. It is designed for the purpose of describing and explaining the quasi experimental study. Applied model and theories are Donabedian Triad Model of Change, Bandura's Social Cognitive Theory, Orlando's Theory of Nursing Process

Discipline, and Abdellah Faye's Theory of Patient–Centered Approaches. Specific inter-relationship among concepts in the organizational structure of the work environment: nurses' knowledge and skill of EB tracheostomyy care, decision making, documentation, and outcomes of care following an educational intervention programme on use of clinical guideline indicators in EB decision making, are represented.

2.16.1   Donabedian Triad Model of Change (1980)

This model gives an insight into understanding the structure, process, and outcome of health care as applicable to nursing care activities in EB decision making in tracheostomy care. Avedis Donabedian states that the most complete, credible and useful information can be got only by studying structure, process and outcome together. The model describes structure, process, and outcome of delivered service as quality elements that are interlinked. Structure and process elements are made up of indirect measures that influence outcome which is a direct element of measure. The partitioning of the elements makes it possible to specifically determine causal relationship between the several indicators to report malfunctioning at an early stage. Structure element is made up of all tools and resources in the healthcare institution. The indicators are characteristics of the administrative organization, nurses' qualification, nurses' knowledge of EB tracheostomy care, and skill of EB decision making. Others are use of clinical guideline indicators in decision making, working experience, tracheostomy patients, facilities etc. Process indicators are care decisions and nursing activities that take place in the care environment. Outcome indicator is the effect of the educational intervention on nurses' compliance and adherence to use of clinical guideline indicators in EB tracheostomy care decisions, documentation, care outcomes, and professional development (Postema, 2005, Stanhope and Lancaster, 2008).

2.16.2 Social Cognitive Theory (Bandura, 1977)

The theory explained human behaviour using a three-way reciprocal theory in which personal factors (one's cognitive process), behaviour and environmental influences continually interact in a process of reciprocal determinism or reciprocal causality in learning. Bandura (1977) stated that reinforcement contributes to learning, but that reinforcement along with an individual's expectations of the consequences of behaviour, determines an individuals' behaviour. Reinforcement can be accomplished in 3 ways (1) direct (2) vicarious or (3) self-management. Direct reinforcement is supplied directly to the person. Other constructs applicable to learning situations are behavioural capability, expectations, self-efficacy, and emotional coping responses. Behavioural capability refers to the knowledge and skills necessary to do a behaviour which influences actions. If an

individual is able to perform specific behaviours, he must first know what the behaviour is and how to perform it. Clear instructions and/or training is therefore, needed to achieve this. Expectations refer to the ability of humans to think and to expect certain results in certain situations. Expectancies are values people place on an expected outcome. The more highly valued the expected outcome, the more the person is likely to perform the needed behaviour to yield that outcome. Self-efficacy according to Bandura is the single most important aspect of sense of self that determines one's effort to change behaviour. This is the self-confidence in one's ability to successfully perform a specific type of action. A person can increase self-efficacy by personal mastery of a task, and must be able to deal with any sources of anxiety surrounding that behaviour in order to learn (i.e emotional coping responses) (Campbell, 2001).

2.16.3 Theory of Nursing Process Discipline (Ida Jean Orlando, 1972)

The nursing process discipline theory is based on the process by which any individual act. When it is used between a nurse and a patient, it is to meet the patient's immediate need for help. Steps of care activities in nursing decision making involve assessing, planning, implementing and evaluating, and all subsystems of nursing care such as health history, physical examination, making nursing diagnosis, determining patient care goals, constructing a nursing care plan, performing each prescribed task, measuring patient outcomes, and reporting patient's response to care/treatment. Improvement in the patient's behaviour indicates resolution of the need which is the desired result. The theory shows an understanding of how professional and job responsibilities affect each other. This understanding allows each nurse to effectively fulfil her professional function for the patient within the organizational setting (George, 2002).

2.16.4 Abdellah Faye's Theory of Patient–Centered Approaches (1960)

The theory states that nursing is the use of problem-solving approaches with key nursing problems related to the health needs of people. The theoretical statement maintains problem-solving as the vehicle for nursing problems, as the patient moves towards health (the

outcome), meaning patient's problems determine nursing care. The theory indicates that current nursing research needs are to focus on EB research and identify clinical practice guidelines that identify indicators that measure quality of care. It should also identify methods or instruments that monitor the extent to which, actions of health practitioners conform to practice guidelines, medical review criteria or standards of quality, and point out policy implications of the research (George, 2002).

Application to Study

The model is used to illustrate this study by using the structure, process, and outcome elements to demonstrate the clinical setting in the health institution. It is implied that structure elements or indicators reflect the ICU, ENT and Neurological units in which core care processes for tracheostomy conditions take place. Nurses' decision making practices are indirectly influenced by their qualifications, knowledge and skill of decision making, use of clinical guideline indicators in EB care, and organizational policies for tracheostomy care. Process indicators reflect care activities in form of EB nursing decisions as they relate to standards of care, and expectations of health providers in the management of tracheostomy patients. The dynamic relationship between the cognitive processes in the nurse, her behaviour, and the care environment shape the clinical decision making behaviour of the nurse in the care of tracheostomy patients. Knowledge and skill of the nurse of tracheostomy care decisions, when reinforced through direct instructions on use of clinical guideline indicators and EB recommendations will influence change in decision making practices. The value placed by the nursing profession on autonomy enables the nurse to yield to learning to perform the new skill. Nurses are able to develop the self-confidence to successfully perform EB decisions in tracheostomy care, and increase their mastery of the skill. In learning nurses are also able to respond positively and deal with any source of anxiety surrounding the development of the skill of use of clinical guideline indicators in EB decision making.

The tracheostomy patient require nursing care that is creative, responsive, holistic, and individualized, based on sound scientific knowledge. Care activities in nursing decision making should be based on presenting evidence in individual patient conditions rather than

the work setting and routine. The nurse is enabled by training to perform and document care decisions in terms of objectively observable clinical indicators in tracheostomy care. Problem solving in decision making practices is focused on measurement of outcome of nurses' use of clinical guideline indicators in performance of EB tracheostomy care decisions. Monitoring extent to which nurses conform to use of clinical guideline indicators in EB decision making has implication for performance improvement, expert clinical judgement, improved documentation practices, improved clinical outcomes, patient safety, and professional development.

2.17   Hypotheses

1. There is no significant difference in nurses' knowledge of evidence-based tracheostomy care in the intervention and control groups pre and post intervention.

2. There is no significant difference in nurses' knowledge of decision making in the intervention and control groups pre and post intervention.

3. There is no significant difference in nurses' knowledge of use of clinical guidelines in decision making in the intervention and control groups pre and post intervention.

4. There is no significant difference between nurses' performance level in use of clinical guideline indicators in EB tracheostomy care decision practices before and after training in the intervention and control groups

5. There is no significant difference in the performance level of documentation practices of clinical guideline indicators utilized in EB tracheostomy care decisions before and after training in the intervention and control groups.

CHAPTER THREE

METHODOLOGY

The steps and strategies utilized for data gathering and analysis are presented in this chapter. Presentation includes study design and setting, sampling procedure, instrument development and validation, and how data was collected and analysed.

3.1   Study Design

The study is Quasi-experimental Design utilizing the three (3) Federal Teaching Hospitals in South-West Nigeria. This design facilitates the search for knowledge and examination of causality in situations in which complete control is not possible (Burns and Grove, 2003, Ary, Jacobs, Sorensen and Razavieh, 2010). The design included intervention and control groups

3.2   Study Setting

The study setting comprised three (3) Federal Teaching Hospitals in South-West Nigeria purposively selected into intervention and control groups. The three (3) Federal Teaching Hospitals in south-west Nigeria are:

(1) Lagos University Teaching Hospital (LUTH), Idi Araba, Lagos State.

(2) University College Hospital, Ibadan (UCH), Oyo State.

(3) Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Osun State.

The hospitals have similar characteristics in that they are centres of clinical excellence funded by the Federal Government. Continuous scientific evaluation through research is carried out in these hospitals in medical, nursing and other health related sciences to improve quality of care. All the hospitals have Specialist Ear, Nose, and Throat (ENT) Surgeons (Otorhinolaryngologists) as consultants in their employment. They carry out tracheostomy surgical procedure on patients with airway problems requiring such treatment, admit patients, and also run consultant ENT Out-patient Clinics. A preliminary survey

before onset of the study settings suggested about 48 tracheostomy patients are admitted yearly, with an average of two to four patients on admission monthly in the hospitals.

For the purpose of this study, settings have been designated as "A", "B" and "C". University College Hospital, Ibadan, Oyo State (Setting 'A') was selected purposively as the intervention study setting, while Lagos University Teaching Hospital, Idi Araba, Lagos State (Setting 'B') and Obafemi Awolowo Teaching Hospital Complex, Ile-Ife, Osun State (Setting 'C') were selected as control. LUTH and OAUTHC were purposively grouped into control due to the limited number of nurses on the nominal roll in the hospitals. The selection also allowed for more study participants in the control group.

The selected units/wards for the study were Intensive Care Unit (ICU), Ear, Nose and Throat (ENT) Specialty and Neurological Wards where tracheostomy patients are nursed in both experimental and control settings.

3.3   Target Population

The target population were professional nurses caring for tracheostomized patients in south-west, Nigeria.

3.3.1   Study Population

The study population comprised all cadre of nurses currently working in the selected units who were available, accessible, and eligible to be recruited, and also completed participation in all the three (3) stages of the study

3.4   Sample Size

At baseline, total population of 121 nurses' of the different nursing cadre were listed on the nominal roll of the control and intervention settings (66 in the control and 55 in the intervention). A total of 94 nurses were accessible at baseline. The actual sample size of eligible, available and accessible participants who completed the three (3) phases of the study with analysed data, was a total sample of 67 nurses (32 and 35 nurses in the intervention and control groups respectively) (Gliner, Morgan and Leech, 2009). Actual

participant's response rate was 71.3% (67/94). Characteristics of participants were similar to nurses excluded without bias. The specialized units where the participants worked, and attributes of participants were also representative of the target population (Gliner, Morgan and Leech, 2009).

The actual sample size flow of accessible, available and willing participants of 94 nurses (56 nurses in the control and 38 in the intervention setting) from 121 total population at baseline (phase/stage I) data collection is as follows: A total of 10 and 17 nurses were excluded from the study in the control and intervention settings respectively. Reasons for exclusion were decline in participation, job schedule, administrative duties, retirement, transfers, study and maternity leave. Thus restricting recruitment, access to structured observation, and hindrance of progression of some participants to phase/stage II of the study.

In phase/stage II, only 32 nurses in the intervention group participated in the training progamme. Six (6) nurses were excluded for reasons of busy night shift, off duty, study, annual and maternity leave. The control group of 50 available nurses did not have any training intervention. Pre and post knowledge tests was administered to both groups. Six (6) nurses in the control group were also excluded from knowledge tests due to transfer to other units.

At post intervention 15 nurses in the ICU of setting 'C' of the control group were excluded from the entire study after participation in phases/stages I and II. Exclusion was due to limitation by insufficient functional ventilators on the unit delaying tracheostomy patient admission and, death and transfer of eventual admissions. This limitations restricted structured observation of nurses by researcher and research assistants in phase/stage III of the study in the setting. No patient with tracheostomy was admitted in the unit thereafter for over 12 weeks necessitating close of the study.

According to Lenth (2001) practical constraints override importance of sample when a researcher does not have a choice in sample size. Gliner, Morgan and Leech (2009) also noted that in such cases, firstly, representation of the sample is a more important consideration than sample size. Secondly, the interest is in identification of key factors that

may influence the dependent variable or help to predict it. Also, evaluation of population external validity is most important. This however, does not depend on internal validity, and must be judged separately.

The small sample size in this study is strengthened by population external validity representative of: (i) the target population of all cadre of nurses working in the specialized units, (ii) an accessible population of nurses in the specialized area of interest, (iii) total sample design of population of interest, (iv) actual participants that completed the three phases of the study with, (v) a response rate of 71.3% (67/94). Strength in ecological external validity of the study lies in equality of participants in the intervention and control groups, based on internal validity of intact attributes of all cadre of nurses working in the selected specialized units. The research method of repeated observation of nurses' practice of use of clinical guideline indicators in decision making is representative of natural conditions that enable real-time outcomes of the study in the natural setting and its applicability (Gliner, Morgan and Leech, 2009). To ensure more widely applicable results, scope of study was broadened to include broader demographics of participants responses to knowledge tests, decision making practices, and proportions of observed assessment and care decisions, pre and post intervention (Lenth, 2001).

3.5 Sampling Method

Purposive sampling of all available and accessible nurses was adopted for the study due to limited number of nurses (121) in the selected specialized units. All cadre of nurses working in the units were recruited. The researcher believes these nurses realistically represent the target population.

Inclusion Criteria: availability and willingness of participants to participate in all the three phases of the study.

Exclusion Criteria: nurses involved in ward administrative duties, different types leave, decline, retirement, transfer, and non-completion of all the three (3) study phases.

3.6   Instrument Development

Triangulation approach was adopted in the development of instruments for data collection. Triangulation is the use of multiple methods to address a research problem to draw conclusions about what constitutes the truth (Polit, Beck and Hungler, 2001, Ary, Jacobs, Sorensen and Razavieh, 2010). The research instruments consisted of two (2) observational checklists, structured questionnaire, and an educational guide from which a training manual was developed. The instruments were developed from literature review and a validated Tracheostomy Care and Suctioning Algorithm (Appendix VII). The Algorithm, made up of clinical guidelines was developed at Walter Reed Army Medical Centre (WRAMC), Washington DC in 2003 (St. Clair, 2005). The guidelines delineates specific clinical indicators and decisions in tracheostomy care supported by research evidence at each point of nursing care. The instrument was modified to make it culture friendly, and easy to comprehend for structured observation and training of nurses, in the use of clinical guideline indicators in evidence-based tracheostomy care decisions.

3.6.1   Developed Instruments for Data Collection

1. Instruments for Assessment of Nurses' Decision Making at Baseline and Post Intervention

Two (2) instruments were developed with the ultimate purpose of generating data, at baseline assessment of nurses' performance of use of clinical guideline indicators in EB decision making practices, and at Post Intervention in Phase/Stage III. The developed instruments are as follows:

(a) Structured Checklist for Observation of Nurses' Use of Clinical Guideline Indicators in Evidence-based Decision Making Practices

This instrument (Appendix II) was formulated from literature to capture what nurses do at decision making, as opposed to information that will be given at pre-test and post-test, as an account of practice in the study units. The instrument is a structured checklist designed to examine realities of nursing care practices performed in clinical decisions, covering the use of clinical guideline indicators in tracheostomy suctioning, airway maintenance, stoma dressing, and tie change. It is made up of 31 identified process indicators and a section for

observation of 10 care activities as outcome indicators in Phases I and III respectively. Included in the instrument were clinical questions to determine patient status, and ensure objectivity of structured observations and collected data. The purpose of this tool was to measure evidence of meeting care standards relevant to EBP guidelines. **Process Indicators** were criteria that measured actions that specify standard of care, while **Outcome Indicators** were criteria that measured desired consequences of meeting standard of care (Larrabee, 2009).

Recommended EBP suctioning assessment and care practices set as process indicators and observed in this study were limited to clinical guideline indicators in: chest auscultation, oxygen saturation level, tracheal secretions, respiratory pattern and rate, application of suction pressure at introduction of suction tube into the tracheostomy tube, tube rotation, suction passes, suction duration, and sodium bicarbonate or normal saline instillation practices. Airway maintenance process indicators was limited to clinical guideline indicators in physical assessment and care in evidence of crusts, reduced secretions and free air low, application of humidified oxygen, administration of oral/naso-gastric feeds and intravenous fluids. Stoma dressing clinical guideline indicators was also limited to assessment and care for soils and dressing change, signs of infection and breakdown at dressing removal, pressure of tracheostomy flange on stoma, removal and replacement of inner cannula, EB dressing technique, use of normal saline for cleansing, and documentation of dressing change. Tie change practices was limited to clinical guideline indicators for assessment and care of cleanliness and security, measurement of 1-finger width for safety and patient comfort, change and securing of tracheostomy tie.

(b) Structured Checklist for Observation of Nurses' Documentation Practices

The structured checklist (Appendix III) was also divided into four sections to cover the specific areas under study. It contained 21 identified process indicators, and a section for data collection of 10 observations as outcome indicators, in Phases I and III of the study respectively. The instrument was designed to elicit information on participants' practice of use of clinical guideline indicators in documentation of assessment and care activities, and

also measure evidence of meeting care standards relevant to evidence-based practices (Larrabee, 2009).

2. Structured Questionnaire for Knowledge Assessment at Intervention

A Structured Questionnaire (Appendix IV) was developed as a pre and post self-report instrument for assessment of: nurses' knowledge of EB practices in tracheostomy care decisions before and after intervention, in the intervention and control groups. The instrument was developed from literature search of current research evidence of tracheostomy care recommendations.

The questionnaire is divided into four (4) sections. Section A contains seven (7) items designed to collect demographic data of participants. Section B is made up of 25 questions in the multiple choice format to assess nurses' knowledge of clinical guideline indicators and recommendations in EB tracheostomy care. Section C contains 13 questions. Eight (8) questions on nurses' knowledge of decision making and EB decision making, and five (5) questions on clinical guidelines, in multiple choice and true or false format. Section D assumed an open-ended scenario to elicit nurses' self-report of their practices in EB decisions for tracheostomy suctioning, airway maintenance for patency, stoma dressing, and tie changes.

Intervention Package

(a) Educational Programme Guide

This Educational Guide (Appendix V), modified following identified gaps in nurses' practice of decision making at baseline assessment, was developed from literature review and the tracheostomy care and suctioning algorithm (St. Clair, 2005). The guide, made up of five (5) modules covering the study objectives, was designed to facilitate the development of a training manual. Identified gaps enabled emphasis on nursing assessment, care practices, and supporting rationale for decisions on the training manual to enhance nurses' use of clinical guideline indicators in EB tracheostomy care decisions.

(b) Training Manual for Evidence-based Decision Making in Tracheostomy Care for Nurses

The training manual was developed exclusively for the intervention group. The developed training manual (Appendix VI) was made up of five (5) modules. The manual covered the study objectives and delineates specific clinical decisions in major areas of tracheostomy care. It was hoped the training manual will aid the development of nurses' knowledge and skill in the exercise of use of clinical guideline indicators in tracheostomy care decisions, supported by research evidence. It was also hoped that the manual would facilitate nurses' adherence to use clinical guideline indicators and empirical recommendations in the practice of EB decision making in tracheostomy care. The training manual highlighted and gave explanations on available research evidence and recommendations for assessment, care, and documentation practices in EB tracheostomy suctioning, airway maintenance, stoma dressing, and tie change decisions.

3.7   Validity of Instruments

The developed instruments were assessed by the supervisor and appraised by senior intensive care practitioner in the Peri-Operative School for face validity, clarity and adequacy. Suggestions and observations of need to include clinical questions to aid objective data collection were used to modify the developed instruments accordingly.

3.8   Reliability of Instruments

The developed research instruments (checklists for observation of nurses' use of clinical guideline indicators in care decisions and documentation practices, and structured questionnaire) were pilot tested at the University of Benin Teaching Hospital, South-South, Nigeria to establish their consistency between 17th December, 2012 and 30th January, 2013.

Test-Retest of the developed questionnaire was conducted between an interval of $2^{1}/_{2}$weeks for a group of n= 40 willing participants from the Intensive Care and ENT Units to establish consistency of the developed instruments. Results of Cronbach's Alpha Coefficient level for time 1 was 0.8 and 0.83 for time 2 respectively.

Inter-Observer Reliability of the developed structured checklists for observation of nurses' EB decision making and documentation of care activities was done using a nurse educator as a second observer. Inter-observer reliability was done to determine consistency of observable non-directive behaviours of participants: in the practice of use of clinical guideline indicators and EB recommendations in tracheostomy care decisions, and documentation of care indicators. Six (6) participants in the ENT unit consented to observation of their decision making practices following explanation of the research purpose. A total of six (6) observational episodes of decision making were recorded from all shifts for each participant simultaneously by both observers for 1week. This process was used because participants had random day-off, and day and night shift duties. Observations also noted time intervals between care decisions on all shifts. There were three (3) tracheostomy patients on admission on the ENT ward. No tracheostomy patient was on admission on the ICU at the time of reliability test.

The data gathering process was non-directive, done immediately following observation of nurses' use of clinical indicators in evidence-based decision making for: suctioning, airway maintenance, stoma dressing, and tie change. It provided a record of decision making activities in the areas of context under study. Data entry was context specific providing "the moment" record of events. The real focus of this process of data collection is to allow the data "speak" the realities of nursing decision making processes. Field notes were completed soon after observations. Kappa measurements for chance agreements were calculated using Stata for statistical analysis. Percentage agreements for the observational checklist ranged from 83% to100% with Kappa measures from 0.75 to 1.0. Results for chart review and documentation were percentage agreement 83.33% to 100% with Kappa measurements from 0.76 to 1.0. Both results indicate a good level of agreement between both observers.

3.9   Ethical Considerations

Ethical approval was sought and granted, by the Institutional Review Committee (IRC) of the University of Benin Teaching Hospital, used for pilot testing of the developed instruments. The Head of Nursing Services Department was met and purpose of reliability testing of research instruments for the study was explained. Access to the ENT ward and the

ICU was granted. Introduction to nursing officers in-charge of the wards/units was made before commencement of instrument testing.

Permission to conduct the study was also sought and obtained from the IRC of the three (3) Federal Teaching Hospitals (UCH, Ibadan, Oyo State, LUTH, Lagos State and OAUTHC, Ile-Ife, Osun State). Administrative permission was also sought from Management of the hospitals for access into the selected units/wards for the study, and granted. Due to delay in the data collection process following strike actions locally, and at federal levels in the three hospitals, extension of ethical approval was sought and obtained at the end of 1st and 2nd year respectively, to enable completion of the study. The Head of the Nursing Services Department and Nursing Officers in-charge of the selected units were also met in the hospitals. Permission was obtained to facilitate access into the ICU, ENT and Neurological units. The researcher and assistants were identified to participants without any pretence. The objective of the study to collect and document data on tracheostomy care decision making activities was fully explained. The nature, roles and benefits of the intervention were made known, and their consent to participate in the study was sought. Participants were also informed participation is entirely voluntary. Confidentiality and anonymity was emphasized. They were informed they are free to withdraw from the study at any time and will not be penalized. Field notes were taken openly to reinforce data that was being collected.

To conduct the intervention training programme, the researcher and assistant were introduced to the Co-ordinator of the Continuing Education Unit by the Head of Nursing Services Department of the intervention study setting (UCH, Ibadan). Permission was sought for arrangement of study days, use of the seminar room, projector and generator. Charge nurses in the selected units were also met with for arrangement of participants in small groups to prevent disruption of clinical activities in the units, guided by the duty roster. According to Day et al (2001) teaching small groups has been associated with greater knowledge retention. Participants were adequately informed of their study days. Nurses off duty were contacted on phone to get their consent to attend.

3.10 Procedure for Data Collection

The process for data collection for phases I, II and III of this Quasi-experimental study covered the period from 6th June 2013 to 24th June 2015. The proposed duration for data collection was 12 weeks in each study location. The immediate limitation however, was incessant strikes of different health workers internally in the three hospitals, locally and at federal levels at different times in the study settings, between year 2013 and 2015. Adverse effect of the incessant strikes led to delayed process of data collection, as health care services were epileptic and uncertain in the hospitals. Consequently, limiting the number of available nurses for the three phases of the study and tracheostomy patient admissions. At post intervention, tracheostomy patient admission in study setting 'C' was also hindered by non-availability of sufficient functional ventilators on the ICU. Collected data was analysed from 67 accessible and available participants who concluded all three phases of the study.

Three registered nurses per unit were recruited as research assistants for this study. They were carefully trained to be able to collect data as observers and reduce bias. To enable real time data collection, researcher and assistants ran two shifts: 8am to 6pm and 6pm to 8am daily in the selected units of each study setting, to ensure objective data collection without any break.

3.10.1 Phase/Stage I: Baseline Assessment

This phase lasted 14days, 13days, and 10days respectively on the ICU, Neurological and ENT wards in the intervention study setting 'A'. In control setting 'B' data collection took 13days, 12days, and 15days on the study units respectively. In control setting 'C' data collection lasted 12days and 14days on the ICU and ENT/Neurological ward. Data collection could not be done concurrently in both intervention and control study settings due to tracheostomy patients not being on hospital admission at the same time in the study settings, nor within study units. The tracheostomy patient admission situation was probably due to the strike actions.

To remain ethical, participants were fully informed of purpose of study without any pretence i.e overt involvement of researcher (Munhull, 2011). The objective of the study to collect and document data on tracheostomy care decision making activities was fully explained.

Collection of data involved structured observation of nurses' practice of use of clinical guideline indicators in the EB decision making and documentation by participant observation. Participant observation is an observational research method in which the researcher becomes an insider in the events being observed so that, he or she can experience events in the same way as participants (Ary, Jacobs, Sorensen and Razavieh, 2010). Structured observation on the other hand, is the collection of data that specify behaviours or events selected for observation, conducted in participants' natural environment (Ary, Jacobs, Sorensen and Razavieh, 2010). The technique of 'observer as participant' was used for structured observation. This process is one in which the researcher interacts with participants enough to establish rapport, but do not become involved in the behaviour, or activities of the study group (Ary, Jacobs, Sorensen and Razavieh, 2010).

To reduce bias the researcher and assistants managed the study by critical self-reflection of their knowledge and skill in clinical decision making and tracheostomy care. To reduce observer effect i.e impact of the observer on participants being studied, the researcher and assistants being aware of limitations and problems encountered in observational research process, developed a relaxed but not intense relationship with participants. This was achieved by a friendly approach and jotting of field notes in the presence of participants from the onset of data collection. Only descriptive notes of care activities, work environment, and patient clinical presentation were taken to enable understanding of nurses' decision making and documentation activities. Interjection of participants in non-directive data collection process was controlled by exclusion of the first five (5) observations. Some participants called on the researcher and assistants to observe them carry out tracheostomy care activities at the onset of study. Interjection was observed to influence participants natural behaviour, constituting a major threat to credibility of findings. Observations were not representative of what would have naturally occurred, which is the focus of this study (Roller and Lavrakas, 2015). The researcher and assistants participated in care activities where necessary while ensuring, such involvement did not influence participants in specific areas being observed, and building a more relaxed relationship and rapport with the nurses. This process allowed for establishment of trust within the study group, and prevented

restriction of the researcher to information that may be distorted by protective facades by the group.

Data from structured observation were collected with the developed checklists (Appendix II and III), designed to capture and record specific nursing behaviours observed in natural occurrence of nurses' use of clinical indicators, in EB tracheostomy care decisions and documentation. The researcher and assistants watched out for instances of occurrence of non-directive behaviours, that may or may not be manifested by the participants 4hourly on the wards. Observation in the intensive care unit ranged from ¼ hourly to 4hourly because of the frequency in the care needs of critically ill patients. This way, occurrence and frequency of specified EB decision making practices of participants were identified and recorded, whether or not care decisions were taken when patients were evidently in need of tracheostomy care.

Overall, data were collected on nurses' EB decision making processes on a total of 10 procedures each on: tracheostomy suctioning, airway maintenance, stoma dressing, and tie change per participant. Observed procedures were labelled P1-P10. However, the first five (5) observations were excluded from analysis due to interjection in non-directive data collection process. Only the last five (5) observations were used for practice analysis due to alteration in nurses' natural behaviour which changed the observed event. Change in nurses' behaviour could be due to attention gained from observation (Ary, Jacobs, Sorensen and Razavieh, 2010). Rapport with nurses was maintained throughout data collection to reduce the distance between the researcher, and quieten their anxiety about being observed and described.

The number of observations collected and analyzed was adjudged by the researcher as adequate to achieve study objectives. According to Friedman, Furberg and DeMets (2010), the amount of data collected is dependent on the nature of the study, purpose of data use, and must include relevant baseline data that should measure study participants before start of intervention. This was achieved in the five structured observations analyzed. Each observation was recorded as separate entity and assessed as such (Hunyibo, Fawole, Sotiloye, and Otolorin, 2008). The goal of this approach is to examine the true realities of

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nurses' experiences and behaviour at clinical decision making in EB tracheostomy care (Polit, Beck and Hungler, 2001, Ary, Jacobs, Sorensen and Razavieh, 2010). According to Roller and Lavrakas (2015) one of the credibility component of an ethnographic study is founded on data gathering and is associated with, how well the researcher's observation have actually addressed the construct of interest. It was also observed that at 10 observations (including 5 initial observations discarded), a point of saturation was reached as no new information was obtained from participant's decision making process.

Review of patient charts for documentation of care rendered by each participant was done shortly after observations (immediately after to within 10 minutes of care). Review examined the documentation of care activities and evidence of clinical indicators for decisions made. Same number of charts was reviewed for each participant observed (Mangione-Smith, Elliot, McDonald and McGlynn, 2002). This enabled the researcher have insight to activities of participants that are concealed at observation. To ensure complete entry of process and outcome indicators on checklist, patient charts and nurses' documentation were scrutinized two to three times. Observed gaps at baseline assessment was used to modify the training guide and development of the training manual.

Situational variables like changes in the care environment by emergencies, new admissions, meal times, and movement of patients to and fro theatre or X-ray department was controlled by carrying out observations only when the clinical floor was constant. Observations were with-held at such instances. Extraneous variables like tiredness, un-well feelings of participants etc. were controlled by repeated observation of nurses' decision making activities. Furthermore, chances of bias was reduced by describing observations made from mental notes, field notes and jottings immediately or soon after observation. Participants were assigned numbers for data entry and protection (Burgess, 2008, Munhall, 2011).

Pre test was conducted in the intervention and control study settings to determine nurses' theoretical knowledge of EB tracheostomy care. Knowledge test was conducted in the two (2) control settings by the research assistants on morning, afternoon, night, and call duty

shifts. Questionnaires (Appendix IV) were self-administered after clarification for 30 minutes and retrieved from participants immediately after completion to prevent contamination in both study groups.

3.10.2   Phase/Stage II: Intervention

This phase involved conduction of Training Programme and Post-Test at the intervention study setting 'A'. The Intervention Programme is hoped to promote nurses' knowledge of use of clinical guideline indicators and recommended research evidence in tracheostomy care decisions. The 50 available participants in the control group did not have any training intervention but had only post intervention test given as in pre-test.

In the intervention group, 32 nurses participated in the training programme. Six (6) eligible nurses who could not attend for reasons of busy night shift, off duty, and sick leave were excluded from the study. Pre-test with the developed structured Questionnaire (Appendix IV) was self-administered preceding the Educational Programme. Clarification of test items was done before commencement to aid understanding. Pre-test lasted 30 minutes. Allotted time was adequate as participants finished within record time. Completed questionnaires were collected immediately by the researcher and assistant. Intervention was an Educational Programme titled "Training Programme on Evidence-based Decision Making in Tracheostomy Care for Nurses' with emphasis on use of clinical guidelines indicators in assessment, care, and documentation practices in EB decision making. The programme was developed from the training guide (modified after baseline assessment). Training was implemented for four (4) days: 9th to 11th June, 2014 and 13th June 2014 on the intervention group. There was a one day break in-between as the scheduled nurses were off duty, to resume work from 13th June, 2014, on the three (3) study units. Two training sessions were taken daily (9am-1pm and 1pm to 5pm) to include all participants. Effort was made in the

development of the time table to ensure participants in the first session will go off duty as the second session is in progress to reduce influence of responses. Consideration was also given to nurses off duty and on night shift. Their consent to participate was obtained. Training manuals were not taken out of the hall by participants after each session to further reduce influence of responses. An attendance register was duly signed by participants for each session to ensure commitment. All participants complied.

Training package was made up of five (5) modules as follows:

- **Module I:** Concept of Decision Making, Clinical Decision Making, Evidence-based Decision Making and Clinical Guidelines

- **Module II:** Brief Review of The Trachea, Tracheostomy, and Determination of Nursing Care Needs by Evidence of Clinical Guideline Indicators

- **Module III:** Evidence-based Decision Making for Tracheostomy Suctioning

- **Module IV:** Evidence-based Decision Making for Tracheostomy Dressing

- **Module V:** Evidence-based Decision Making for Tracheostomy Tie Change and Airway Maintenance.

The use of clinical guideline indicators and EB recommendations in decision making in specific aspects of tracheostomy care were highlighted in each module, to expose nurses to knowledge and use of clinical indicators within clinical guidelines in care decisions, and easy comprehension. Teaching duration for each module was: Module I – 20minutes, Modules II and III – 35minutes each, Modules IV and V – 30minutes respectively. Teaching was re-enforced with power point presentation, video clip of evidence-based tracheostomy care, model of the clinical guideline for EB tracheostomy care and suctioning, disposable tracheostomy care pack, and ambu-bag. Other teaching aids for reinforcement were tracheal dilator, different sizes of thumb-controlled suction catheters, tracheostomy tubes with inner cannula, velcro and twill tapes, protective goggles, plastic apron, face mask, gloves etc to aid understanding of participants and achievement of training objectives. Training session was concluded with 25minutes Question and Answer Session.

Post-Test was given to participants at the end of each session with the same self-report structured questionnaire administered at pre-test to evaluate the programme. Completed questionnaires were collected immediately at the end of each session to prevent influence of responses of participants yet to undertake training.

3.10.3 Phase/Stage III: Post Intervention Data Collection

Post intervention data collection was carried out 3months after the training programme in the three (3) study settings, with the developed structured checklists utilized in Phase I for both intervention and control groups. According to Higuchi, Davies, Edwards, Ploeg and Virani (2011) follow-up period for short-term evaluation of guideline implementation of Registered Nurses Association of Ontario has generally been six months. Choice of 3 months in this study was to enable data collection from same nurses that were trained, as they may go on various kinds of leave, and can be transferred to other wards/units due to administrative protocols. Data collection took 14days, 18days, and 12days on the ICU, Neurological and ENT wards in study setting 'A' (intervention group). Collection of data in control setting 'B' lasted 22days, 9days, and 16days on the ICU, Neurological and ENT wards. In control setting 'C' data was collected for 18 hours on the ICU and 12days on the ENT/Neurological ward. Collectively post intervention data collection lasted a total period of 103days and 18hours in the three study settings.

Structured observational episodes of selected nursing decision making events in the use of clinical guideline indicators were recorded for non-directive: tracheostomy suctioning, airway maintenance, stoma dressing, and tie change in patient care by participants, as in phase I of the study. Observations were done as tracheostomy care needs were required by patients ¼ hourly to 4hourly, during morning, afternoon, night and call shifts. To ensure sufficient data were collected, nursing decision events were observed for each participant. The first five (5) observations were discarded to control for Hawthorne Effect following interjection of observations by participants. Hawthorne Effect is response of change in behaviour of participants because they are being observed (Ary, Jacobs, Sorensen and Razavieh, 2010). The last five (5) observations were analysed for effectiveness of the training on nurses' performance of use of clinical guideline indicators in EB tracheostomy

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care decisions. As in Phase I, at 10 observation a point of saturation was noted in nurses decision making processes and no new behaviours were observed.

Copies of the training manual was distributed to all participants after conclusion of the programme to prevent contamination of responses to the Questionnaire.

3.11   Procedure for Data Analysis

Data collected at baseline and 18 hours post intervention from the ICU in control setting 'C' were excluded from analysis as all the 15 participants could not be accessed at the concluding part of the study. Delay in tracheostomy patients admission due to insufficient functional ventilators in the unit, death, and transfer of eventual admissions, resulted in inadequate number of collected data post intervention. There was no tracheostomy patient admission into the unit for over 12 weeks necessitating close of the study, and subsequent exclusion of participants from the whole study. The study was terminated on 24th June, 2015 as the academic research work was being unduly protracted. Data collection for the entire study was unduly delayed by several strike actions of different health workers in the hospitals at different times. A total of 67 participants concluded the Quasi-experimental study.

After editing, collected data from 67 participants at pre and post-intervention in the intervention and control groups were analyzed with SPSS software version 20. Data collection instruments were self-administered structured knowledge questionnaire, and structured observational checklists to examine nurses' performance level of use of clinical guideline indicators and documentation in EB tracheostomy care decisions. Knowledge test items covered clinical guideline indicators and recommendations in EB tracheostomy care, decision making, EB decision making, clinical guidelines, and open-ended questions on nurses' self-report of decision making practices in EB tracheostomy care. Structured observation of nurses' decision making covered tracheostomy suctioning, airway maintenance, stoma dressing, and tie change by participant observation.

Demographic data were summarized using descriptive statistics of mean scores, standard deviation, proportions, and percentages, presented in frequencies and tables. Test of nurses'

level of theoretical knowledge and clinical competence in performance of EB tracheostomy care decisions was evaluated on the basis of an attainment of: an average score ≥60% of test items and observed practices of use of clinical guideline indicators in EB decisions and documentation, in tracheostomy care. The grade of ≥60%, indicates demonstration of a reasonably acceptable level of achievement of fundamental theoretical knowledge and clinical competence applicable in professional context (Queensland University of Technology, 2013). Similarly, Abdullah, Mohammed and Ismail (2014) employed 75% score in their study for measure of satisfactory level of knowledge and practice of nurses' in administration of medications via naso-gastric, among critically ill patients. Data were summarized using descriptive statistics of proportions and percentages, presented in frequencies and tables. Set hypotheses were tested with Chi-square test, Mann-Whitney U and Wilcoxon non-parametric tests to determine level of significance between variables at 5% level of significance and 95% confidence interval.

3.11.1 Analysis of Study Objectives and Hypothses

Objective 1: To assess nurses' knowledge level of clinical guideline indicators and recommendations in EB tracheostomy care pre and post intervention. Twenty-five test items (Questions 8-32) measuring knowledge of clinical guideline indicators and recommendations in EB tracheostomy care was of the multiple choice format of which one out of four options (a-d) is the correct answer. Questions also include true or false format. Question number 22 measured nurses' knowledge of complications of tracheostomy suctioning. Responses to the 13 correct options were scored as one (1) mark to each correct option and zero (0) to non-responses. Scores were part of the total 37 score of test items in the knowledge test. Scoring of test items is as follows: One (1) mark to correct options and zero (0) to other responses. Theoretical knowledge level of nurses was evaluated on the basis of an attainment of an average score of ≥60% (≥22 marks) of correct test items. In this respect, nurses who scored below 60% (<22 marks) of correct test items were rated to have poor knowledge of EB tracheostomy care, while, scores of 60% and above were rated as good knowledge. Proportion of nurses' responses to knowledge test items was summarized and displayed in percentages. Nurses' knowledge level was further examined within demographic variables to identify variations. Proportion of nurses' responses to test items

on knowledge of clinical guideline indicators and recommendations in EB tracheostomy suctioning, airway maintenance, stoma dressing and tie changes at pre and post-tests, were further explored and displayed in percentages. Statistical significance was tested with Chi-square at p=0.05.

Objective 2: To assess nurses' knowledge level of decision making pre and post intervention. Questions 33-40 evaluated nurses' theoretical knowledge of decision making before and after intervention. Likewise, the scoring of eight (8) multiple choice test items to measure nurses' knowledge level of decision making was done. Poor theoretical knowledge level assumed scores below 60%, while scores ≥60% (≤5marks) were taken for a demonstration of good theoretical knowledge level of decision making. Nurses' responses to test items were further explored. Correct and incorrect responses were determined in percentages. Analysis was also done within specialty, work experience in the specialty, designation, professional qualification, and years of professional experience between intervention and control groups. Relationship between nurses' knowledge level and demographic variables was computed. Results were cross tabulated with selected socio-demographic data to determine attainment of an acceptable achievement level in professional context. Relationship within variables was statistically tested using Chi-square at p=0.05 level of significance.

Objective 3: To determine nurses' knowledge level of use of clinical guidelines in decision making pre and post intervention. Questions 41-45 assumed multiple choice and True/False/No Idea format. Correct responses were computed as 1mark, while incorrect and no idea responses were rated as zero (0). Poor knowledge level of use of clinical guidelines assumed score below 3 marks, while scores above 3 marks (≥60%) were categorised as good knowledge level of use of clinical guidelines in decision making. Proportion of correct and incorrect responses of participants on test items were further explored in percentages. Chi-square was used to test relationship of nurses' knowledge of clinical guidelines use in decision making processes within demographic variables at significance level of p=0.05.

Objective 4: To examine nurses' self-report of EB practices in tracheostomy care decisions in suctioning, airway maintenance, dressing and tie changes pre and post intervention. Question 46 made up of open ended questions explored nurses' reported practices of EB decisions in the four (4) study areas pre and post-intervention. Responses were content analyzed and re-grouped into themes: (i) Decision making steps and application of clinical guideline indicators relevant to EB practices, (ii) Best practices, and (iii) Non-EB practices. Results were displayed on tables using frequencies and percentages to determine and compare nurses' reported practices pre and post intervention between study groups.

Objective 5: To examine nurses' performance level in the use of clinical guideline indicators in EB tracheostomy care decisions pre and post-intervention. A checklist was used to capture realities of what nurses' do at decision making. The checklist for observation of nurses' decision making practices is made up of process and outcome indicators of EB assessment and care activities for: tracheostomy suctioning, airway maintenance, stoma dressing, and tie change. Process indicators measured nursing actions of use of clinical guideline indicators that specify standard of care. Outcome indicators on the other hand, measured the desired consequences of meeting care standards in use of clinical guideline indicators in EB tracheostomy care decisions by means of pre-determined scores. Five (5) observations labelled P1-P5 were analysed, to determine realities of nurses' performance level of consistency and adherence to use of clinical guideline indicators in observed non-directive behaviour in decision making. Score weighting of outcome indicators constitute: **2** (Yes Outcome Indicator met), **1** (Outcome Indicator Not Met), and **0** (Not Applicable). Scores were re-coded as: **"Yes"** (adherence to use of clinical guideline indicators) **"1"** score, **"No"** (non-adherence to use of clinical guideline indicators) **"0"** score and **"Not Applicable"** as **"missing"** score to enable computation of actual scores for each nurse, and also serve as the numerator for performance grading. The denominator was determined by computation of total number of process indicators as applicable in EB assessment and care decision practices observed in each participant. Respective scores were computed as percentages by dividing actual scores by total number of applicable practice observations multiplied by 100.

$$\frac{Outcome\ Indicator\ Score}{Process\ Indicator\ Score} \text{ X 100}$$

This approach to measurement according to Larrabee (2009) produces more precise data than an indication that ask whether or not the practitioner performs care as should be performed. Score of $\geq 60\%$ was determined as Good Performance Level of competence in use of EB clinical guideline indicators, while, score $< 60\%$ was graded as Low Performance Level. Further insight into nurses' practices of competence and adherence to use of clinical guideline indicators in EB tracheostomy suctioning, airway maintenance, dressing, and tie change decisions was explored as observed practices and displayed in proportions and percentages. Performance level was also further explored within socio-demographic variables and displayed in frequencies and percentages.

Determination of composite overall competence score of nurses' performance level in use of clinical guideline indicators for EB tracheostomy care decisions and documentation was done by, computation of mean of the percentages of scores of five (5) observations at pre and post intervention for tracheostomy suctioning, airway maintenance, stoma dressing, and tie change. Percentage for each composite score for use of clinical indicators was recoded as: scores ≥ 60 Good Performance Level, and scores $< 60\%$ as Poor Performance Level in EB tracheotomy assessment and care decisions.

Objective 6: To determine nurses' performance level of documentation of clinical guideline indicators utilized in EB tracheostomy care decisions pre and post intervention. Observational checklist of process and outcome indicators was utilized to elicit information of nurses' documentation practices of clinical guideline indicators, used in EB tracheostomy assessment and care decisions. Competence and consistency of non-directive behaviour of participants in documentation practices from collected data, were analysed for five (5) observations each for individual nurses in: tracheostomy suctioning, airway maintenance, stoma dressing and tie change. Performance level of clinical competence in nurses' performance of use of clinical guideline indicators in EB assessment and care decisions, and documentation practices for: tracheostomy suctioning, airway maintenance, stoma dressing, and tie change was also determined within socio-demographic variables and displayed in

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frequencies and percentages. Performance level of documentation practices was determined as stated for Objective 5.

H$_0$ 1: There is no significant difference in the Pre and Post intervention nurses' knowledge of evidence-based tracheostomy care in the intervention and control groups.

Nurses' knowledge level was categorized into poor and good levels at pre and post intervention. Statistical significance of differences in pre and post knowledge was tested using chi-square at p=0.05. In addition, Independent t-test was conducted to compare mean differences of knowledge scores between study groups, pre and post intervention. Paired Sample t-test was used to test pre-post mean knowledge score of intervention and control group at significance level of p=0.05.

H$_0$ 2: There is no significant difference in the Pre and Post intervention nurses' knowledge of decision making in EB tracheostomy care in the intervention and control groups.

Similarly, chi-square was used to test for significant differences in pre and post knowledge test score, paired sample t-test for pre-post test mean score differences of intervention and control groups, and independent sample t-test for difference in mean scores at pre and post intervention in both study groups, all at 0.05 level of significance.

H$_0$ 3: There is no significant difference in the Pre and Post intervention nurses' knowledge of use of clinical guidelines in EB decision making in the intervention and control groups.

Chi-square was also used to test for significant differences in pre and post knowledge score, paired sample t-test for difference in pre-post mean scores, and independent sample t-test for pre and post test mean score differences of intervention and control groups, all at 0.05 level of significance.

H$_0$ 4: There is no significant difference between nurses' performance level of use of clinical guideline indicators in EB tracheostomy care decisions before and after training in the intervention and control groups.

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Non-parametric tests were used to test for statistical significance of educational intervention on performance level due to skewed data obtained from observation of nurses' practices of EB tracheostomy assessment and care decisions. Composite score of five (5) observations of participants for assessment and care decisions was determined to enable test for level of significance. Mann-Whitney U test was also done for test of significance in pre and post median scores in nurses' performance level between intervention and control groups. Wilcoxon test was used to test for differences in median of performance scores pre-post intervention for both study groups. Both tests were done at p=0.05 level of significance.

H_0 5: There is no significant difference in the performance level of documentation practices of clinical guideline indicators utilized in EB tracheostomy care decisions before and after training in the intervention and control groups.

Likewise Mann-Whitney U and Wilcoxon tests were used to test for significant mean differences in performance of documentation practices pre and post, and pre-post intervention in both study groups at p=0.05 level of significance.

CHAPTER FOUR

RESULTS

Analysed results of collected data by means of questionnaire and participant observation from 67 nurses pre and post intervention are presented and discussed in this chapter.

4.1 Socio-demographic Distribution of Nurses

Tables 4.1 and 4.1.1 show the socio demographic distribution of nurses and collapsed demographic categories of participants determined for statistical analysis of collected data. Table 4.1 shows highest number of nurses 29(43.3%) were aged between 26-35 years. The mean age was 38.6 ± 7.4 years in both intervention and control groups. Only 1(1.5%) male nurse participated in the study. Twenty-six (38.8%), 22(32.8%) and 19(28.4%) nurses work on the ENT, ICU and Neurological units respectively in both groups. Majority of the participants 14(20.9%), 18(26.9%) and 12(65.7%) were in the Nursing Officer I and II and Senior Nursing Officer cadre. A greater proportion of participants 36(53.7%) were RN/RM holders. One (1.5%), 4(6.0%) and 2(3.0%) nurses have diplomas in Critical Care, Intensive Care and ENT Nursing in the intervention and control groups. Bachelors and Master's Degree holders in Nursing were 16(23.9%) and 2(3.0%) respectively. Others hold Diplomas, Bachelors, and Master's degrees in other disciplines. Majority of the participants 59(88.1%) have work experience of 1-10years in all the specialties (units). Majority of the participants 18(26.9%) have professional practice experience of 6-10 years. Among the demographic variables, nurses' designation and years of professional experience showed a statistically significant p value of 0.030 and 0.017 respectively.

Table 4.1.1 shows the collapsed categories of demographic distribution of participants determined to enable statistical analysis of data in categories with less than 5 participants in a cell as a result of the small sample size. Nurses' period of work in the specialty showed a statistically significant p value of 0.004.

Table 4.1: Socio-demographic distribution of nurses

Variable	Intervention Group n=32 %	Control Group n=35 %	Total N=67 %	X^2	P value
Age					
Mean (SD)	37.3 (5.5)	39.7 (8.7)	38.6 (7.4)		
Age Group (years)					
26-35	15 (46.9)	14 (40.0)	29 (43.3)		
36-45	15 (46.9)	11 (31.4)	26 (38.8)		
46-55	2 (6.2)	10 (28.6)	12 (17.9)	5.86	0.053
Sex					
Male	0 (0.0)	1 (2.9)	1 (1.5)		
Female	32 (100)	34 (97.1)	66 (98.5)	0.93	0.335
Specialty					
ENT	12 (37.5)	14 (40.0)	26 (38.8)		
ICU	9 (28.1)	13 (37.1)	22 (32.8)		
NEUROLOGICAL	11 (34.4)	8 (22.9)	19 (28.4)	1.22	0.543
Designation					
NO II	4 (12.5)	10 (28.6)	14 (20.9)		
NO I	6 (18.8)	12 (34.3)	18 (26.9)		
SNO	10 (31.2)	2 (5.7)	12 (17.9)		
PNO	6 (18.8)	2 (5.7)	8 (11.9)		
ACNO	2 (6.2)	3 (8.6)	5 (7.5)		
CNO	4 (12.5)	6 (17.1)	10 (14.9)	12.39	0.030*
Highest Professional/Academic Qualification					
RN/RM	20 (62.5)	16 (45.7)	36 (53.7)		
Diploma Critical Care	0 (0.0)	1 (2.9)	1 (1.5)		
Diploma Intensive Care	1 (3.1)	3 (8.6)	4 (6.0)		
Diploma ENT Nursing	2 (6.2)	0 (0.0)	2 (3.0)		
D iploma Other Disciplines	0 (0.0)	2 (5.7)	2 (3.0)		
B.Sc Nursing	6 (18.8)	10 (28.6)	16 (23.9)		
Bachelors Other Disciplines	2 (6.2)	1 (2.9)	3 (4.5)		
M.Sc Nursing	1 (3.1)	1 (2.9)	2 (3.0)		
Masters Other Discipline	0 (0.0)	1 (2.9)	1 (1.5)	9.66	0.471
Period of Working Experience in the Specialty (Units) (years)					
<1	4 (12.5)	1 (2.9)	5 (7.5)		
1-10	28 (87.5)	31 (88.6)	59 (88.1)		
11-20	0 (0.0)	1 (2.9)	1 (1.5)		
>20	0 (0.0)	2 (5.7)	2 (3.0)	4.83	0.185
Years of Professional Experience					
1-5	1 (3.1)	6 (17.1)	7 (10.4)		
6-10	8 (25.0)	10 (28.6)	18 (26.9)		
11-15	13 (40.6)	4 (11.4)	17 (25.4)		
16-20	5 (15.6)	4 (11.4)	9 (13.4)		
>20	5 (15.6)	11 (31.4)	16 (23.9)		
				10.245	0.017*

*significant p values

Table 4.1.1: Collapsed socio-demographic categories of nurses for statistical analysis

Variable	Intervention Group n=32 %	Control Group n=35 %	Total N=67 %	X^2	p value
Age (years)					
26-35	18 (56.2)	24 (68.6)	42 (62.7)		
>35	14 (43.8)	11 (31.4)	25 (37.3)	1.085	0.298
Designation					
Nursing Officers I, II, Senior Nursing Officer	20 (62.5)	24 (68.6)	44 (65.7)		
Principal, Assistant, Chief Nursing Officer	12 (37.5)	11 (31.4)	23 (34.3)	0.273	0.601
Highest Professional/Academic Qualification					
Diploma RN/RM/Critical Care/Intensive Care/ENT Nursing/ Other Disciplines	23(71.9)	20(65.7)	45(67.2)		
Degree Nursing/Other Disciplines	9(28.1)	13(37.1)	22(32.)	0.616	0.432
Period of Working Experience in the Specialty (Units) (years)					
≤ 5	29(90.6)	21(60.0)	50(74.6)		
> 5	3(9.4)	14(40.0)	17(25.4)	8.280	0.004*
Years of Professional Experience					
1-10	9(28.1)	16(45.7)	25(37.3)		
>10	23(71.9)	19(54.3)	42(62.7)	2.211	0.137

*significant p values

4.2   Research Objectives

Objective 1: To assess nurses' knowledge level of clinical guideline indicators and recommendations in EB tracheostomy care pre and post intervention. Table 4.2 displayed results of nurses' knowledge level of clinical guideline indicators and recommendations in EB tracheostomy care in intervention and control groups pre and post intervention. Table 4.3 shows the demographic distribution of nurses knowledge level of EB tracheostomy care in the study groups. Table 4.4 display results of relationship between nurses' collapsed socio-demographic categories and knowledge level of EB tracheostomy care to provide further insight, and determine statistical significance in the intervention and control groups. The set objective was addressed with questions 8-32 on the structured questionnaire.

4.2: Nurses' knowledge level of clinical guideline indicators and recommendations in evidence-based tracheostomy care in the intervention and control groups pre and post intervention

As presented on Table 4.2, amongst 67 nurses assessed on knowledge of clinical guideline indicators and EB recommendations in tracheostomy care pre and post intervention, all nurses 32(100%) in the intervention group displayed good knowledge post intervention. At pre intervention only 34.4% of nurses displayed good knowledge, while 65.6% displayed poor knowledge in the intervention group.

In the control group 51.4% of the 35 nurses displayed good knowledge at pre intervention, while 60.0% displayed good knowledge post intervention.

Table 4.2: Nurses' knowledge level of clinical guideline indicators and recommendations in evidence-based tracheostomy care in the intervention and control groups pre and post intervention

| Knowledge Level | Pre Intervention Test | | | Post Intervention Test | | |
	Intervention n %	Control n %	Total n %	Intervention n %	Control n %	Total n %
Poor	21 (65.6)	17 (48.6)	38 (56.7)	0(0.00)	14(40.0)	14(20.9)
Good	11 (34.4)	18 (51.4)	29 (43.3)	32(100.0)	21(60.0)	53(79.1)
Total	32 (100)	35 (100)	67 (100)	32(100.0)	35(100)	67(100)

* ≤ 60% Poor Knowledge   ≥ 60% Good Knowledge

4.3: Demographic distribution of nurses' knowledge level of clinical guideline indicators and recommendations in evidence-based tracheostomy care in the intervention and control groups pre and post intervention

Analysis was done to give a deeper insight into distribution of nurses' knowledge level of clinical indicators and recommendations in EB tracheostomy care within their ages, specialty, period of working experience in the specialties, designation, professional/academic qualification, and years of professional experience at pre and post-test in both intervention and control groups.

At pre-test good knowledge distribution of nurses spanned across: 26-35 years age category 6(54.5%) in intervention group, ICU 11(64.7%) in the control group, designation category PNO 3(27.3%) in intervention and 6(33.3%) in the control group respectively. Good knowledge level was also distributed within 1-10 years working experience in the specialty 10(55.6%) nurses in intervention group and 16(88.9%) control, RN/RM qualification 6(54.5%) nurses in intervention, 10(55.6%) control, and 11-15 years of professional experience category 6(54.5%) nurses in intervention and 4(22.2%) in the control group respectively. Poor knowledge was highly distributed in all demographic variables.

Post test result revealed all nurses in the intervention group 32(100%) had good knowledge level of clinical guideline indicators and recommendations in EB tracheostomy care. In the control group good knowledge level was highly distributed amongst 26-35 years age category 10(47.6%), ICU 10(47.6%), 1-10 years work experience in specialty 19(90.0%), NO I cadre 8(38.1%), RN/RM qualification 9(42.9%), and years of professional working experience 6(28.6%). Poor knowledge distribution was highly spread amongst nurses in 36-45years age category, ENT specialty, 1-10 years working experience in the specialty, NO I cadre, RN/RM qualification, and >20years professional work experience.

Table 4.3: **Demographic distribution of nurses' knowledge level of clinical guideline indicators and recommendations in evidence-based tracheostomy care in the study groups pre and post intervention**

| | PRE INTERVENTION KNOWLEDGE | | | | | | | | POST INTERVENTION KNOWLEDGE | | | | | | | |
| | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | |
SOCIO-DEMOGRAPHIC VARIABLES	POOR n=21 %	GOOD n=11 %	X^2	P	POOR n=17 %	GOOD n=18 %	X^2	P	POOR n=0 %	GOOD n=32 %	X^2	P	POOR n=14 %	GOOD n=21 %	X^2	P
AGE																
26-35 YEARS	9(42.9)	6(54.5)	0.822	0.663	7(41.2)	7(38.9)	0.463	0.793	0(0.0)	15(46.9)	0.000		4(28.6)	10(47.6)	1.732	0.421
36-45 YEARS	11(52.4)	4(36.4)			6(35.3)	5(27.8)			0(0.0)	15(46.9)			6(42.9)	5(23.8)		
46-55 YEARS	1(4.8)	1(9.1)			4(23.5)	6(33.3)			0(0.0)	2(6.2)			4(28.6)	6(28.6)		
SPECIALTY																
ENT	7(33.3)	5(45.5)	10.205	0.006	11(64.7)	3(16.7)	10.782	0.005	0(0.0)	12(37.5)	0.000		7(50.0)	7(33.3)	2.468	0.291
ICU	3(14.3)	6(54.5)			2(11.8)	11(61.1)			0(0.0)	9(28.1)			3(21.4)	10(47.6)		
NEUROLOGY	11(52.4)	0(0.0)			4(23.5)	4(22.2)			0(0.0)	11(34.4)			4(28.6)	4(19.0)		
PERIOD OF WORKING EXPERIENCE IN SPECIALTY(UNIT)																
<1YEAR	3(14.3)	1(9.1	0.178	0.673	1(5.9)	0(0.0)	2.005	0.571	0(0.0)	4(12.5)	0.000		1(7.1)	0(0.0)	2.272	0.518
1-10 YEARS	18(85.7)	10(90.9)			15(88.2)	16(88.9)			0(0.0)	28(87.5)			12(85.7)	19(90.5)		
11-20 YEARS	0(0.0)	0(0.0)			0(0.0)	1(5.6)			0(0.0)	0(0.0)			0(0.0)	1(4.8)		
>20 YEARS	0(0.0)	0(0.0)			1(5.9)	1(5.6)			0(0.0)	0(0.0)			1(7.1)	1(4.8)		
DESIGNATION																
NO II	2(9.5)	2(18.2)	2.373	0.795	4(23.5)	6(33.3)	6.377	0.271	0(0.0)	4(12.5)	0.000		3(21.4)	7(33.3)	5.417	0.367
NO I	4(19.0)	2(18.2)			7(41.2)	5(27.8)			0(0.0)	6(18.8)			4(28.6)	8(38.1)		
SNO	8(38.1)	2(18.2)			0(0.0)	2(11.1)			0(0.0)	10(31.2)			1(7.1)	1(4.8)		
PNO	3(14.3)	3(27.3)			1(5.9)	1(5.6)			0(0.0)	6(18.8)			1(7.1)	1(4.8)		
ACNO	1(4.8)	1(9.1)			3(17.6)	0(0.0)			0(0.0)	2(6.2)			3(21.4)	0(0.0)		
CNO	3(14.3)	1(9.1)			2(11.8)	4(22.2)			0(0.0)	4(12.5)			2(14.3)	4(19.0)		
HIGHEST PROFESSIONAL/ACADEMIC QUALIFICATION																
RN/RM	14(66.6)	6(54.5)	6.732	0.346	6(35.3)	10(55.6)	6.377	0.605	0(0.0)	20(62.5)	0.000		7(50.0)	9(42.9)	6.510	0.590
ENT NURSING	2(9.5)	0(0.0)			0(0.0)	0(0.0)			0(0.0)	2(6.2)			0(0.0)	0(0.0)		
INTENSIVE CARE	0(0.0)	1(9.1)			1(5.9)	2(11.1)			0(0.0)	1(3.1)			0(0.0)	3(14.3)		
CRITICAL CARE	0(0.0)	0(0.0)			1(5.9)	0(0.0)			0(0.0)	0(0.0)			1(7.1)	0(0.0)		
DIP. MANAGEMENT	0(0.0)	0(0.0)			1(5.9)	1(5.6)			0(0.0)	0(0.0)			1(7.1)	1(7.1)		
B.Sc NURSING	3(14.3)	3(27.3)			6(35.3)	4(22.2)			0(0.0)	6(18.8)			4(28.6)	6(28.6)		
B.Ed H. EDUCATION	1(4.8)	0(0.0)			0(0.0)	1(5.6)			0(0.0)	1(3.1)			0(0.0)	1(4.8)		
B.Sc PSYCHOLOGY	0(0.0)	1(9.1)			0(0.0)	0(0.0)			0(0.0)	1(3.1)			0(0.0)	0(0.0)		
M.Sc NURSING	1(4.8)	0(0.0)			1(5.9)	0(0.0)			0(0.0)	1(3.1)			1(7.1)	0(0.0)		
MASTERS SOCIALWORK	0(0.0)	0(0.0)			1(5.9)	0(0.0)			0(0.0)	0(0.0)			0(0.0)	1(4.8)		
YEARS OF PROFESSIONAL EXPERIENCE																
<1-5 YEARS	0(0.0)	1(9.1)	4.938	0.294	3(17.6)	3(16.7)	5.667	0.225	0(0.0)	1(3.1)	0.000		2(14.3)	4(19.0)	1.831	0.767
6-10 YEARS	7(33.3)	1(9.1)			7(41.2)	3(16.7)			0(0.0)	8(25.0)			4(28.6)	6(28.6)		
11-15 YEARS	7(33.3)	6(54.5)			0(0.0)	4(22.2)			0(0.0)	13(40.6)			1(7.1)	3(14.3)		
16-20 YEARS	4(19.0)	1(9.1)			2(11.8)	2(11.1)			0(0.0)	5(15.6)			1(7.1)	3(14.3)		
>20 YEARS	3(14.3)	2(18.2)			5(29.4)	6(33.3)			0(0.0)	5(15.6)			6(42.9)	5(23.8)		

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4.4: Relationship between nurses' collapsed socio-demographic categories and knowledge level of evidence-based tracheostomy care in intervention and control groups pre and post intervention

Table 4.4 shows the relationship of the collapsed categories of nurses' socio-demographic variables (Table 4.1.1) with knowledge of EB tracheostomy care in intervention and control groups, at pre and post intervention tests.

At pre intervention good knowledge level of nurses was highest amongst collapsed demographic variables as follows: 26-35 years age category 7(63.6%), 9(81.8%) in ≤ 5 years work experience in specialty, 6(54.5%) in NOI/NOII/SNO designation, 4(36.4%) degree educational qualification, and >10 years professional experience in the intervention group. Significance of 0.009 was found with nurses' period of work experience in the specialty and knowledge.

In the control, good knowledge level was highly distributed amongst nurses with >5 years work period in the specialty 11(61.1%) and diploma holders 13(72.2%) different from intervention group.

At post test all nurses in the intervention group 32(100%) had good knowledge. All collapsed demographic variables were significant with nurses' knowledge p=0.000. In the control group good knowledge level was highest amongst same collapsed demographic categories as in pre intervention. None of the collapsed demographic variables was found statistically significant.

Table 4.4: Relationship between nurses' collapsed socio-demographic categories and knowledge level of evidence-based tracheostomy care in the intervention and control groups pre and post intervention

| | PRE INTERVENTION KNOWLEDGE | | | | | | | | POST INTERVENTION KNOWLEDGE | | | | | | | |
| | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | |
VARIABLES	POOR n=21 %	GOOD n=11 %	X^2	P	POOR n=17 %	GOOD n=18 %	X^2	P	POOR n=0 %	GOOD n=32 %	X^2	P	POOR n=14 %	GOOD n=21 %	X^2	P
AGE																
26-35 YEARS	11(52.4)	7(63.6)	0.372	0.542	11(64.7)	13(72.2)	0.299	0.632	0(0.0)	18(56.2)		0.000	8(57.1)	16(76.2)	1.414	0.234
>35 YEARS	10(47.6)	4(36.4)			6(35.3	5(27.8)			0(0.0)	14(43.8)			6(42.9)	5(23.8)		
PERIOD OF WORKING EXPERIENCE IN SPECIALTY																
≤5 YEARS	20(95.2)	9(81.8)	1.530	0.216	14(82.4)	7(38.9)	6.882	0.009	0(0.0)	29(90.6)		0.000	10(71.4)	11(52.4)	1.270	0.260
>5 YEARS	1(4.8)	2(18.2)			3(17.6)	11(61.1)			0(0.0)	3(9.4)			4(28.6)	10(47.6)		
DESIGNATION																
NOI/NOII/SNO	14(66.7)	6(54.5)	0.453	0.501	11(64.7)	13(72.2)	0.229	0.632	0(0.0)	20(62.5)		0.000	8(57.1)	16(76.2)	1.414	0.234
PNO/ACNO/CNO	7(33.3)	5(45.5)			6(35.3)	5(27.8)			0(0.0)	12(37.5)			6(42.9)	5(23.8)		
HIGHEST PROFESSIONAL/ACADEMIC QUALIFICATION																
DIPLOMA	16(76.2)	2(18.2)	0.563	0.362	9(52.9)	13(72.2)	1.392	0.238	0(0.0)	23(71.9)		0.000	9(64.3)	13(61.9)	0.020	0.886
DEGREE	5(23.8)	4(36.4)			8(47.1)	5(27.8)			0(0.0)	9(28.1)			5(35.7)	8(38.1)		
YEARS OF PROFESSIONAL EXPERIENCE																
1-10 YEARS	7(33.3)	2(18.2)	0.820	0.365	10(58.8)	6(33.3)	2.289	0.130	0(0.0)	9(28.1)		0.000	6(42.9)	10(47.6)	0.077	0.782
>10 YEARS	14(66.7)	9(81.8)			7(41.2)	12(66.7)			0(0.0)	23(71.9)			8(57.1)	11(52.4)		

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Objective 2: To assess nurses' knowledge level of decision making pre and post intervention. Table 4.5 present result of nurses' pre and post intervention knowledge level of decision making. Table 4.6 further examined demographic distribution of nurses' knowledge level of decision making in the study groups pre and post intervention. The relationship between collapsed socio-demographic variables of nurses and knowledge level of decision making was done to provide further insight and determine statistical significance, displayed on table 4.7. Data was analyzed using test items 33-40 on the structured questionnaire.

4.5 Nurses' knowledge level of decision making in the intervention and control groups pre and post intervention

Pre intervention test results showed 8(25.0%) and 10(28.6%) nurses had poor knowledge of decision making in the intervention and control groups respectively. An overall total of 49(73.1%) nurses had good knowledge of decision making collectively in both groups of which majority 25 (71.4%) were in the control group.

Post intervention test results reveal a marked improvement in nurses' knowledge level of decision making in both intervention and control groups. Sixty-two (92.5%) nurses in both intervention and control had good knowledge post intervention. Only 3(9.4%) and 2(5.7%) nurses had poor knowledge in the intervention and control groups respectively.

Table 4.5: Nurses' knowledge level of decision making in the intervention and control groups at pre and post intervention

Knowledge Level	Pre Intervention Test			Post Intervention Test		
	Intervention n %	Control n %	Total n %	Intervention n %	Control n %	Total n %
Poor	8 (25.0)	10 (28.6)	18 (26.9)	3 (9.4)	2 (5.7)	5 (7.5)
Good	24 (75.0)	25 (71.4)	49 (73.1)	29 (90.6)	33 (94.3)	62 (92.5)
Total	32 (100)	35 (100)	67 (100)	32 (100)	35 (100)	67 (100)

4.6: Demographic distribution of nurses' knowledge level of decision making in the intervention control groups pre and post intervention

Pre intervention result showed that in the intervention group good knowledge level was highly distributed amongst nurses in 26-35 years age category 13(54.2%), ENT specialty 9(37.5%), 1-10 work experience in specialty 22(91.7%), NOI and PNO cadre 5(20.8%) respectively, RN/RM qualification 13(54.2%), and 11-15 years professional experience 9(37.5%). Poor knowledge was distributed highest amongst 36-45 years age category 5(62.5%), ENT and Neurology specialty 3(37.5%) respectively, 1-10 years work experience in the specialty 6(75.0%), SNO designation 4(50.0%), RN/RM designation 7(87.5%), and 11-15 years professional work experience 4(50.0%).

In the control group, <1-5 years professional work experience category 7(28.0%) had good knowledge different from the categories intervention group. Poor knowledge was distributed highly amongst 46-55 years age category 4(40.0%), ENT 4(40.0%), 1-10 years work experience in the specialty 9(90.0%), NOI and CNO designation 3(30.0%), RN and BSc Nursing qualifications 3(30.0) respectively and >20 years professional experience 5(30.0%).

At post intervention findings revealed significant increase in number of nurses with good knowledge level across all demographic categories: 26-35 years and 36-45 years age group 14(48.3%), ENT and Neurology specialty 10(34.5%) respectively, 1-10 years work experience in the specialty 27(93.1%), SNO designation 8(27.6%), RN/RM qualification 17(58.6%), and 11-15 years professional experience 12(41.4%).

In the control, different from intervention group, there was high knowledge level found amongst ICU nurses 12(36.4%), NOI designation 12 (36.4%), and 6-10 years professional experience 10(30.3%).

Poor knowledge level was minimally distributed amongst nurses in both study groups.

Table 4.6: Demographic distribution of nurses' knowledge level of decision making in the intervention and control groups pre and post intervention

| | Pre Intervention Knowledge Level | | | | | | | | Post Intervention Knowledge Level | | | | | | | |
| | Intervention Group n=32 | | | | Control Group n=35 | | | | Intervention Group n=32 | | | | Control Group n=35 | | | |
SOCIO-DEMOGRAPHIC VARIABLES	POOR n=8 %	GOOD n=24 %	X^2	P	POOR n=10 %	GOOD n=25 %	X^2	P	POOR n=3 %	GOOD n=29 %	X^2	P	POOR n=2 %	GOOD n=33 %	X^2	P
AGE																
26-35 YEARS	2(25.0)	13(54.2)	2.311	0.315	3(30.0)	11(44.0)	0.999	0.607	1(33.3)	14(48.3)	4.414	0.126	0(0.0)	14(42.4)	5.303	0.071
36-45 YEARS	5(62.5)	10(41.7)			3(30.0)	8(32.0)			1(33.3)	14(48.3)			0(0.0)	11(33.3)		
46-55 YEARS	1(12.5)	1(4.2)			4(40.0)	6(24.0)			1(33.3)	1(3.4)			2(100)	8(24.2)		
SPECIALTY																
ENT	3(37.5)	9(37.5)	0.067	0.967	4(40.0)	10(40.0)	0.505	0.777	2(66.7)	10(34.5)	1.683	0.431	0(0.0)	14(42.4)	1.627	0.443
ICU	2(25.0)	7(29.2)			3(30.0)	10(40.0)			0(0.0)	9(31.0)			1(50.0)	12(36.4)		
NEUROLOGY	3(37.5)	8(33.3)			3(30.0)	5(20.0)			1(33.3)	10(34.5)			1(50.0)	7(21.2)		
WORKING EXPERIENCE IN SPECIALTY																
<1YEAR	2(25.0)	2(8.3)	7.524	0.224	0(0.0)	1(4.0)	1.253	0.740	2(66.7)	2(6.9)	8.880	0.003	0(0.0)	1(3.0)	7.758	0.051
1-10 YEARS	6(75.0)	22(91.7)			9(90.0)	22(88.0)			1(33.3)	27(93.1)			1(50.0)	30(90.9)		
11-20 YEARS	0(0.0)	0(0.0)			0(0.0)	1(4.0)			0(0.0)	0(0.0)			0(0.0)	1(3.0)		
>20 YEARS	0(0.0)	0(0.0)			1(10.0)	1(4.0)			0(0.0)	0(0.0)			1(50.0)	1(3.0)		
DESIGNATION																
NO II	1(12.5)	3(12.5)	3.644	0.602	2(20.0)	8(32.0)	5.518	0.356	1(33.3)	3(10.3)	4.340	0.502	0(0.0)	10(30.3)	10.253	0.068
NO I	1(12.5)	5(20.8)			3(30.0)	9(36.0)			0(0.0)	6(20.7)			0(0.0)	12(36.4)		
SNO	4(50.0)	4(25.0)			0(0.0)	2(8.0)			2(66.7)	8(27.6)			0(0.0)	2(6.1)		
PNO	1(12.5)	5(20.8)			0(0.0)	2(8.0)			0(0.0)	6(20.7)			0(0.0)	2(6.1)		
ACNO	1(12.5)	1(4.2)			2(20.0)	1(4.0)			0(0.0)	2(6.9)			0(0.0)	3(9.1)		
CNO	0(0.0)	4(16.7)			3(30.0)	3(12.0)			0(0.0)	4(13.8)			2(100)	4(12.1)		
HIGHEST PROFESSIONAL/ACADEMIC QUALIFICATION																
RN/RM	7(87.5)	13(54.2)	7.733	0.258	3(30.0)	13(52.0)	7.866	0.447	3(100)	17(58.6)	1.986	0.921	1(50.0)	15(45.5)	8.319	0.403
ENT NURSING	0(0.0)	2(8.3)			0(0.0)	0(0.0)			0(0.0)	2(6.9)			0(0.0)	0(0.0)		
INTENSIVE CARE	0(0.0)	1(4.2)			1(10.0)	2(8.2)			0(0.0)	1(3.4)			0(0.0)	3(9.1)		
CRITICAL CARE	0(0.0)	0(0.0)			0(0.0)	1(4.0)			0(0.0)	0(0.0)			0(0.0)	1(3.0)		
DIP. MANAGEMENT	0(0.0)	0(0.0)			1(10.0)	1(4.0)			0(0.0)	0(0.0)			1(50.0)	1(3.0)		
B.Sc NURSING	0(.0)	6(25.0)			3(30.0)	7(28.0)			0(0.0)	6(20.7)			0(0.0)	10(30.3)		
B.Ed H. EDUCATION	1(12.5)	0(0.0)			0(0.0)	1(4.0)			0(0.0)	1(3.4)			0(0.0)	1(3.0)		
B.Sc PSYCHOLOGY	0(0.0)	1(4.2)			0(0.0)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	0(0.0)		
M.Sc NURSING	0(0.0)	1(4.2)			1(10.0)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	1(3.0)		
MASTERS SOCIALWORK	0(0.0)	0(0.0)			1(10.0)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	1(3.0)		
YEARS OF PROFESSIONAL EXPERIENCE																
<1-5 YEARS	0(0.0)	1(4.2)	0.697	0.952	1(10.0)	5(20.0)	3.588	0.465	0(0. 0)	1(3.4)	1.420	0.841	0(0.0)	6(18.2)	4.628	0.328
6-10 YEARS	2(25.0)	6(25.0)			3(30.0)	7(28.0)			1(33.3)	7(24.1)			0(0.0)	10(30.3)		
11-15 YEARS	4(50.0)	9(37.5)			0(0.0)	4(16.0)			1(33.3)	12(41.4)			0(0.0)	4(12.1)		
16-20 YEARS	1(12.5)	4(16.7)			1(10.0)	3(12.0)			0(0. 0)	5(17.2)			0(0.0)	4(12.1)		
>20 YEARS	1(12.5)	4(16.7)			5(50.0)	6(24.0)			1(33.3)	4(13.8)			2(100.0)	9(27.3)		

4.7: Relationship between nurses' collapsed socio-demographic categories and knowledge level of decision making in intervention and control groups pre and post intervention

Analysis of result revealed a trend of good knowledge level of decision making in both intervention and control groups within all collapsed socio-demographic variables at pre-test. However, none of the variables was found significant.

Post intervention test analysis revealed an increase in number of nurses with good knowledge of decision making in the intervention group showing an improvement in nurses' knowledge. Good knowledge amongst nurses in the control group was also noted to be sustained. There was a statistical significance of $p=0.031 <$ than 0.05 at 95% confidence interval between nurses' designation and knowledge of decision making in the control group (Table 4.7).

Table 4.7: Relationship between nurses' collapsed socio-demographic categories and knowledge level of decision making and in intervention and control groups pre and post intervention

	PRE INTERVENTION KNOWLEDGE								POST INTERVENTION KNOWLEDGE							
	INTERVENTION GROUP n=32				CONTROL GROUP n=35				INTERVENTION GROUP n=32				CONTROL GROUP n=35			
CHARACTERISTIC VARIABLES	POOR n=8 %	GOOD n=24%	X^2	P	POOR n=10 %	GOOD n=25 %	X^2	P	POOR n=3 %	GOOD n=29 %	X^2	P	POOR n=2%	GOOD n=33%	X^2	P
AGE																
26-35 YEARS	4(50.0)	14(58.3)	0.169	0.681	7(70.0)	17(68.0)	0.13	0.908	2(66.7)	16(55.2)	0.146	0.702	2(100)	22(66.7)	0.972	0.324
>35 YEARS	4(50.0)	10(41.7)			3(32.0)	8(32.0)			1(33.3)	13(44.8)			0(0.0)	11(33.3)		
PERIOD OF WORKING EXPERIENCE IN SPECIALTY																
≤5 YEAARS	8(100)	21(87.5)	1.103	0.294	6(60.0)	15(16.0)	0.000	1.000	3(100)	26(87.7)	0.342	0.558	1(50.0)	20(60.6)	0.088	0.766
>5 YEARS	0(0.0)	3(12.5)			4(40.0)	4(20.0)			0(0.0)	3(10.3)			1(50.0)	13(39.4)		
DESIGNATION																
NOI/NOII/SNO	6(75.0)	14(58.3)	0.711	0.399	5(50.0)	19(76.0)	2.241	0.134	3(100)	17(58.6)	1.986	0.159	0(0.0)	24(72.7)	4.628	0.031
PNO/ACNO/CNO	2(25.0)	10(41.7)			5(50.0)	6(24.0)			0(0.0)	12(41.4)			2(100)	9(27.3)		
HIGHEST PROFESSIONAL/ACADEMIC QUALIFICATION																
DIPLOMA	7(87.5)	16(66.7)	1.288	0.256	5(50.0)	17(68.0)	0.991	0.319	3(100)	20(69.0)	1.295	0.225	2(100)	20(60.6)	1.253	0.714
DEGREE	1(12.5)	8(33.3)			5(50.0)	8(32.0)			0(0.0)	9(31.0)			0(0.0)	13(39.4)		
YEARS OF PROFESSIONAL EXPERIENCE																
1-10 YEARS	2(25.0)	7(29.2)	0.052	0.820	4(40.0)	12(48.0)	0.184	0.668	1(33.3)	8(27.6)	0.044	0.833	0(0.0)	16(48.5)	1.786	0.181
>10 YEARS	6(75.0)	17(70.8)			6(60.0)	13(52.0)			2(66.7)	21(72.4)			2(100)	17(51.5)		

Objective 3: To determine nurses' knowledge level of use of clinical guidelines in decision making pre and post intervention. Tables 4.8 displays nurses' pre and post intervention knowledge level of use of clinical guidelines in decision making. Table 4.9 further examined demographic distribution of nurses' knowledge of use of clinical guideline in decision making in the study groups pre and post intervention. The relationship between nurses' collapsed socio-demographics categories and knowledge level of use of clinical guidelines in decision making was also analyzed to determine statistical significance, and displayed on Table 4.10. Questions 41-45 on the structured questionnaire measured this objective.

4.8 Nurses' knowledge level of use of clinical guidelines in decision making pre and post intervention in intervention and control groups

Pre intervention test result shows 75.0% (24) and 82.9% (29) of nurses had good knowledge level of use of clinical guideline in decision making in the intervention and control groups respectively. Only 14(20.9%) nurses of the total participants had poor knowledge.

Post intervention test results indicated a reduction in the total number of nurses with poor knowledge 12(17.9%). A total of 55(82.1%) nurses had good knowledge in the intervention and control groups.

Table 4.8: Nurses' knowledge level of use of clinical guidelines in decision making in the intervention and control groups pre and post intervention

Knowledge Level	Pre Intervention Test			Post Intervention Test		
	Intervention n %	Control n %	Total n %	Intervention n %	Control n %	Total n %
Poor	8 (25.0)	6 (17.1)	14 (20.9)	3 (9.4)	9 (25.7)	12 (17.9)
Good	24 (75.0)	29 (82.9)	53 (79.1)	29 (90.6)	26 (74.3)	55 (82.1)
Total	32 (100)	35 (100)	67 (100)	32 (100)	35 (100)	67 (100)

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4.9 Demographic distribution of nurses' knowledge level of use of clinical guidelines in decision making in the study groups pre and post intervention

Pre intervention findings of analyzed data in the intervention group revealed that good knowledge level was minimally distributed amongst nurses in 46-55 years age bracket 2(8.3%), 7(29.2%) nurses in ICU specialty, 3(12.5%) with < 1 year work experience in the specialty, 2(8.3%) in ACNO designation, 1(4.2%) ENT and Intensive Care Nursing, BSc Psychology and MSc Nursing qualification respectively, and 1(4.2%) nurse in 1-5 years professional work experience category. Distribution of poor knowledge was minimal in all demographic variables.

In the control group, good knowledge was distributed amongst all demographic variables. The highest number of nurses with good knowledge was found amongst 27(93.1%) and 15(51.7%) nurses in the 1-10 years work experience in the specialty and RN/RM qualification respectively. Total number of nurses (6) with poor knowledge in the study group were minimally distributed within all demographic variables.

Post intervention results showed that the intervention group had more nurses (29) with good knowledge than the control (26), better than pre intervention result. Significantly high number of nurses with good knowledge were in the 26-35 years age group 14(48.3%), ENT specialty 10(34.5%), RN/RM qualification 17(58.6%,) and 11(37.9%) in years of professional work experience demographic categories. Poor knowledge was minimally distributed within demographics.

The control group had significantly high knowledge level amongst nurses in the ICU specialty 11(42.3%), 1-10 years work experience in the specialty 24(92.3%) and RN/RM qualification12(46.2%). Poor knowledge level were highest in work experience in specialty 7(77.8%) and 26-35 years age bracket 5(55.6%) categories (Table 4.9).

Table 4.9: Demographic distribution of nurses' knowledge level of use of clinical guidelines in decision making in the intervention and control groups pre and post intervention

| | PRE INTERVENTION KNOWLEDGE | | | | | | | | POST INTERVENTION KNOWLEDGE | | | | | | | |
| | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | |
SOCIO-DEMOGRAPHIC VARIABLES	POOR n=8 %	GOOD n=24 %	X^2	P	POOR n=6 %	GOOD n=29 %	X^2	P	POOR n=3 %	GOOD n=29 %	X^2	P	POOR n=9 %	GOOD n=26 %	X^2	P
AGE																
26-35 YEARS	4(50.0)	11(45.8)	0.711	0.701	2(33.3)	12(41.4)	0.146	0.929	1(33.3)	14(48.3)	0.613	0.736	5(55.6)	9(34.6)	2.040	0.361
36-45 YEARS	4(50.0)	11(45.8)			2(33.3)	9(31.0)			2(66.7)	13(44.8)			3(33.3)	8(30.8)		
46-55 YEARS	0(0.0)	2(8.3)			2(33.3)	8(27.6)			0(0.0)	2(6.9)			1(11.1)	9(34.6)		
SPECIALTY																
ENT	3(37.5)	9(37.5)	0.067	0.967	3(50.0)	11(37.9)	2.158	0.340	2(66.7)	10(34.5)	1.683	0.431	4(44.4)	10(38.5)	1.368	0.505
ICU	2(25.0)	7(29.2)			3(50.0)	10(34.5)			0(0.0)	9(31.0)			2(22.2)	11(42.3)		
NEUROLOGY	3(37.3)	8(33.3)			0(0.0)	8(27.6)			1(33.3)	10(34.5)			3(33.3)	5(19.2)		
PERIOD OF WORKING EXPERIENCE IN SPECIALTY																
<1YEAR	1(12.5)	3(12.5)	0.000	1.000	0(0.0)	1(3.4)	6.953	0.073	1(33.3)	3(10.3)	1.314	0.252	1(11.1)	0(0.0)	4.012	0.260
1-10 YEARS	7(87.5)	21(87.5)			4(66.7)	27(93.1)			2(66.7)	26(89.7)			7(77.8)	24(92.3)		
11-20 YEARS	0(0.0)	0(0.0)			1(16.7)	0(0.0)			0(0.0)	0(0.0)			0(0.0)	1(3.8)		
>20 YEARS	0(0.0)	0(0.0)			1(16.7)	1(3.4)			0(0.0)	0(0.0)			1(11.1)	1(3.8)		
DESIGNATION																
NO II	1(12.5)	3(12.5)	4.089	0.537	0(0.0)	10(34.5)			1(33.3)	3(10.3)	4.340	0.502	2(22.2)	8(30.8)	6.556	0.256
NO I	2(25.0)	4(16.7)			2(33.3)	10(34.5)	11.533	0.042	0(0.0)	6(20.7)			4(44.6)	8(30.8)		
SNO	4(50.0)	6(25.0)			1(16.7)	1(3.4)			2(66.7)	8(27.6)			0(0.0)	2(7.7)		
PNO	0(0.0)	6(25.0)			1(16.7)	1(3.4)			0(0.0)	6(20.7)			1(11.1)	1(3.8)		
ACNO	0(0.0)	2(8.3)			2(33.3)	1(3.4)			0(0.0)	2(6.9)			2(22.2)	1(3.8)		
CNO	1(12.5)	3(12.5)			0(0.0)	6(20.7)			0(0.0)	4(12.5)			0(0.0)	6(23.1)		
HIGHEST PROFESSIONAL/ACADEMIC QUALIFICATION																
RN/RM	6(75.0)	14(58.3)	6.933	0.327	1(16.7)	15(51.7)	13.615	0.092	3(100)	17(58.6)	1.986	0.921	4(44.4)	12(46.2)	8.301	0.405
ENT NURSING	1(12.5)	1(4.2)			0(0.0)	0(0.0)			0(0.0)	2(6.9)			0(0.0)	0(0.0)		
INTENSIVE CARE	0(0.0)	1(4.2)			1(16.7)	2(6.9)			0(0.0)	1(3.4)			0(0.0)	3(11.5)		
CRITICAL CARE	0(0.0)	0(0.0)			1(16.7)	0(0.0)			0(0.0)	0(0.0)			1(11.1)	0(0.0)		
DIP. MANAGEMENT	0(0.0)	0(0.0)			0(0.0)	2(6.9)			0(0.0)	0(0.0)			0(0.0)	2(7.7)		
B.Sc NURSING	0(0.0)	6(25.0)			2(33.3)	8(27.6)			0(0.0)	6(20.7)			3(33.3)	7(26.9)		
B.Ed H. EDUCATION	1(12.5)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	1(3.4)			0(0.0)	1(3.8)		
B.Sc PSYCHOLOGY	0(0.0)	1(4.2)			0(0.0)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	0(0.0)		
M.Sc NURSING	0(0.0)	1(4.2)			1(16.7)	0(0.0)			0(0.0)	1(3.4)			1(11.1)	0(0.0)		
MASTERS SOCIALWORK	0(0.0)	0(0.0)			0(0.0)	1(3.4)			0(0.0)	0(0.0)			0(0.0)	1(3.8)		
YEARS OF PROFESSIONAL EXPERIENCE																
1-5 YEARS	0(0.0)	1(4.2)	2.964	0.564	0(0.0)	6(20.7)	4.823	0.305	0(0.0)	1(3.4)	1.782	0.776	1(11.1)	5(19.2)	5.057	0.281
6-10 YEARS	3(37.5)	5(20.8)			1(16.7)	9(31.0)			1(33.3)	7(24.1)			5(55.6)	5(19.2)		
11-15 YEARS	4(50.0)	9(37.5)			2(33.3)	2(6.9)			2(66.7)	11(37.9)			0(0.0)	4(15.4)		
16-20 YEARS	0(0.0)	5(20.8)			1(16.7)	3(10.3)			0(0.0)	5(17.2)			1(11.1)	3(11.5)		
>20 YEARS	1(12.5)	4(16.7)			2(33.3)	9(31.0)			0(0.0)	5(17.2)			2(22.2)	9(34.6)		

4.10 Relationship between nurses' collapsed socio-demographic variables and knowledge of use of clinical guidelines in decision making in the intervention and control groups pre and post intervention

Data analysis of pre intervention test results revealed a good percentage of nurses in both study groups had good knowledge level of the use of clinical guidelines in decision making across demographic variables. Only 8(25.0%) and 6(17.1%) nurses had poor knowledge in the intervention and control groups respectively. No significance was found amongst the demographic variables with nurses' knowledge of use clinical guidelines in nursing decision making p>0.05..

At post intervention test the number of nurses with poor knowledge increased from 6(17.1%) at pre-test to 9(25.7%) in the control group, while a drop from 8(25.0%) to 3(9.4%) with poor knowledge was observed in the intervention group. No statistical significance was found between nurses' knowledge of clinical guidelines and all demographic variables at post-test p>0.05 (Table 4.10).

Table 4.10: Relationship between nurses' collapsed socio-demographic categories and knowledge level of use clinical guidelines in decision making in intervention and control groups pre and post intervention

| | PRE INTERVENTION KNOWLEDGE | | | | | | | | POST INTERVENTION KNOWLEDGE | | | | | | | |
| | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | | INTERVENTION GROUP n=32 | | | | CONTROL GROUP n=35 | | | |
CHARACTERISTIC VARIABLES	POOR n=8 %	GOOD n=24 %	X^2	P	POOR n=6 %	GOOD n=29 %	X^2	P	POOR n=3 %	GOOD n=29 %	X^2	P	POOR n=9 %	GOOD n=26 %	X^2	P
AGE																
26-35 YEARS	4(50.0)	14(58.3)	0.169	0.681	4(66.7)	20(69.0)	0.12	0.912	1(33.3)	17(58.6)	0.701	0.401	6(66.7)	18(69.2)	0.020	0.886
>35 YEARS	4(50.0)	10(41.7)			2(33.3)	9(31.0)			2(66.7)	12(41.4)			3(33.3)	8(30.8)		
WORKING EXPERIENCE IN SPECIALTY																
≤5 YEARS	8(100.0)	21(87.5)	1.103	0.294	2(33.3)	19(65.5)	2.146	0.143	3(100.0)	26(87.7)	0.342	0.558	6(66.7)	15(57.7)	0.224	0.638
>5 YEARS	0(0.0)	3(12.5)			4(66.7)	10(34.5)			0(0.0)	3(10.3)			3(33.3)	11(42.3)		
DESIGNATION																
NOI/NOII/SNO	7(87.5)	13(54.2)	1.600	0.206	3(50.0)	21(72.4)	1.159	0.282	3(100.0)	17(58.6)	1.986	0.159	6(66.7)	18(69.2)	0.020	0.886
PNO/ACNO/CNO	1(12.5)	11(45.8)			3(50.0)	8(27.6)			0(0.0)	12(41.4)			3(33.3)	8(30.8)		
HIGHEST PROFESSIONAL QUALIFICATION																
DIPLOMA	7(87.5)	16(66.7)	1.288	0.256	3(50.0)	19(65.5)	0.513	0.474	3(100.0)	20(69.0)	1.295	0.255	5(55.6)	17(65.4)	0.277	0.443
DEGREE	1(12.5)	8(33.3)			3(50.0)	10(34.3)			0(0.0)	9(31.0)			4(44.4)	9(34.6)		
YEARS OF PROFESSIONAL EXPERIENCE																
1-10 YEARS	3(37.5)	6(25.0)	0.464	0.496	1(16.7)	15(51.7)	2.462	0.117	1(33.3)	8(27.6)	0.044	0.833	6(66.7)	10(38.5)	2.143	0.143
>10 YEARS	5(62.5)	18(75.0)			5(83.3)	14(48.3)			2(66.7)	21(72.4)			3(33.3)	16(61.5)		

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Objective 4: To examine nurses' self-report of evidence-based practices in tracheostomy care decisions for suctioning, airway maintenance, stoma dressing and tie change pre and post intervention. Nurses' self-report at pre and post-tests were content analysed into themes of (i) decision making steps required in EB tracheostomy care, (ii) report relevant to best practices, and (iii) non-evidence-based report. Analysis provided insight into knowledge and decision making practices as reported by nurses in tracheostomy suctioning, airway maintenance, dressing and tie change. Post-test analysis involved examination of differences in reported EB decision making processes after exposure to training. Comparison of self report information in the themes were drawn between the study groups pre and post intervention and presented as summaries (4.1a-d, 4.2, and 4.3 respectively).

Summary 4.1: Nurses' self-report of evidence-based decision making practices in tracheostomy suctioning, airway maintenance, dressing and tie change practices.

Outline of nurses' reported information drawn into themes on EB decision making practices in tracheostomy suctioning, airway maintenance, dressing and tie changes decisions are presented as summaries of comparison of EB tracheostomy care practices between intervention and control groups pre and post intervention in 4.1a-d, 4.2, and 4.3.

Summary 4.1a: Comparison of nurses' self-report of evidence-based decision making steps in tracheostomy suctioning practices pre and post intervention between study groups

Analysis of reported assessment practices for clinical indicators prior to tracheostomy suctioning pre intervention revealed only 1(3.1%) nurse reported chest auscultation for pulmonary assessment of breathe sound to determine patient's need for suctioning in the intervention group. Assessment of oxygen saturation was reported by 4 (12.5%) and 11(31.4%) nurses in the intervention and control groups respectively. Other clinical indicators reported were respiratory rate by 4(12.5%) nurses in intervention

and 5(14.3%) in the control group , and consistency, colour, rate, and odour of tracheal secretions by22(62.9%) and 11(34.4%) in the control and intervention groups respectively. At post intervention, analysis showed some improvement in the report of EB assessment for clinical indicators required to determine suctioning need in the intervention group. Fourteen (43.8%) nurses reported auscultation as an important clinical guideline pre-requisite to suctioning in the intervention group. No report (0.0%) was recorded in the control group as in pre-test. Nurses' report of clinical indicators dropped to 5(14.3%), 0(0.0%), 5(14.3%), and 5(14.3%) in the control group for assessment practices of oxygen saturation, respiratory rate and pattern and consistency, colour, rate, and odour of secretion respectively in contrast to responses at pre-intervention test.

Analysis of selection of care strategies pre intervention test revealed all nurses in the intervention and control groups failed to report EB considerations required prior to tracheostomy suctioning decisions. Post intervention test results showed 4(12.5%) and 6(17.1%) nurses in the intervention group identified the need to determine evidence of patient's inability to clear secretions into the tube by cough-like mechanism in the intervention and control group respectively. Only 1(3.1%) nurse in the intervention group identified the need to determine clinical indication of patient's ability to clear secretions into the tube to determine suctioning need.

Analysis of implementation of EB care decisions steps at pre intervention revealed only 3(9.4%) nurses in the intervention group reported suction pressure should be applied only when catheter is within the tracheostomy tube, and continuously at withdrawal. Amongst the group only 1(3.1%) nurse reported suction duration should not exceed 10-15 seconds per session. At post intervention, increase in knowledge of clinical guideline indicators and recommendations was observed in the intervention group. Nineteen (59.4%) nurses reported the correct suction pressure required at suctioning. Four (12.5%), 1(3.1%), and 6(18.8%) nurses reported recommendations of none rotation of suction catheter, suction limit of 3 passes per session, and duration of 10-15second at suctioning in the intervention group respectively. In the control group

4(11.4%) nurses reported none application of suction pressure at insertion until catheter is in situ within the tube and at withdrawal during suctioning procedure. Two (5.7%) nurses also identified suction duration limit of 10-15 seconds.

For evaluation/reassessment step the highest number of nurses that reported clinical indicators of monitoring of breathe sounds, saturation level, vital signs, and patient status after suctioning at pre-test 10(31.5%), were in the intervention group. Same indicators were reported by 6(17.1%) nurses in the control group at post test.

Report of documentation practices was poor in both study groups. At pre intervention, only 1(3.1%) nurse reported documentation of clinical indicators from assessment findings post suctioning, in the intervention group. Post intervention analysis revealed 8(25.0%) nurses in the intervention, and 3(8.6%) in the control group respectively reported documentation of indicators from assessment findings and suction event, with time and date of care activity after suctioning procedure.

Summary 4.1b: Comparison of nurses' self-report of evidence-based decision making practices in airway maintenance pre and post intervention between study groups

Examination of assessment practices reported by nurses at pre intervention revealed nil report 0(0.0%) of EB assessment practices for clinical guideline indicators necessary for maintenance of airway in tracheostomy care decisions, in both intervention and control groups. Only 1(2.9%) nurse reported the need for assessment of clinical guideline indicator of the tube for free airflow to determine evidence of breathing difficulty or distress in the control group. Nurses' report at post intervention of assessment of clinical guideline indicators improved slightly in the intervention group in comparison with pre-test results. However, only 3(9.4%), 5(15.6%), 5(15.6%), and 2(6.3%) nurses identified assessment for clinical guideline indicators of thin not copious secretions, thick and reduced secretion with dried crusts, and free airflow in the intervention group respectively. In the control only 2(5.7%) nurses mentioned assessment for evidence of thick and dry secretions, while 7(20.0%)

mentioned the need for assessment for clinical indicator of free airflow to determine evidence of breathing difficulty or distress in the control group. Nurses' report at post intervention of assessment of clinical guideline indicators improved slightly in the intervention group in comparison with pre-test results. However, only 3(9.4%), 5(15.6%), 5(15.6%), and 2(6.3%) nurses identified assessment for clinical guideline indicators of thin not copious secretions, thick and reduced secretion with dried crusts, and free airflow in the intervention group respectively. In the control only 2(5.7%) nurses mentioned assessment for evidence of thick and dry secretions, while 7(20.0%) mentioned the need for assessment for clinical indicator of free airflow to determine evidence of breathing difficulty in patient care decisions. Two (6.3%) nurses reported the need for assessment of clinical indicators of last time of tracheostomy suctioning and administration of humidification on the patient, in the intervention group.

Analysis of nurses' report for selection of care strategies pre intervention revealed only 4(12.5%) nurses, and 1(2.9%) nurse reported administration of oxygen in clinical evidence of thick and dry secretions in the intervention and control groups respectively. Post intervention analysis revealed a high percentage of nurses 68.0% (22), and 50.0%(16) in the intervention group reported decisions for administration of humidified oxygen to liquefy secretions, and encouragement of hydration (oral/intravenous fluid maintenance) respectively in evidence of thick and dry secretions. Only 4(11.4%) nurses in the control group reported care decision for oxygen administration in clinical evidence of thick and dry secretion in the tracheostomy tube.

Examination of nurses' report of implementation of care decisions at pre intervention show that in the intrvention group only 6(18.8%) and 4(11.4%) nurses in the control group reported the need to suction patient as determined by evidence of clinical indicators. Also 6(18.8%) nurses in the intervention, and 12(34.3%) in the control reported recommendation of removal and replacement of the inner tracheostomy tube with a clean spare tube, before proceeding to clean the dirty one. Post intervention analysis of nurses' report of care implementation revealed 50% of nurses in the

intervention group reported suctioning of the tracheostomy tube for maintenance of airway patency. Eight (25.0%) and 11(31.4%) nurses in the intervention and control groups respectively reported recommendation of removal and replacement of tracheostomy tube with a clean one before cleaning of the dirty tube in the care process.

Highest number of nurses' report for evaluation of patient conditions after care 4(12.5%) was at post-test for monitoring of patient status to ensure airway maintenance only in the intervention group.

Nurses' report of documentation practices was poor. None of the nurses reported documentation of assessment findings nor care activities in both groups pre intervention. Post intervention results revealed only 2(6.3%) in the intervention group reported documentation of both assessment findings and care activities rendered respectively. Only 1(2.9%) nurse in the control group reported documentation of care activities after procedure in the control group.

Summary 4.1c Comparison of nurses' self-report of evidence-based decision making practices in tracheostomy stoma dressing pre and post intervention between study groups

Pre intervention results revealed the highest number of nurses 20(57.1%) who reported assessment of clinical guideline indicator for soils before decision for tracheostomy stoma dressing change were in the control group. Eleven (34.4%) nurses in intervention group also reported the need for assessment of old dressing for evidence of soils prior to dressing decisions. In both groups, 11(34.4%) nurses in intervention and 11(31.4%) in the control reported assessment need of stoma site after removal of soiled dressing, for clinical guideline indicators of infection, swelling, discolouration, and pain. Only 1(2.9%) nurse reported assessment of the inner cannula for clinical indicator of crusts and secretions in the control group. Post intervention results revealed 19(59.4%) and 17(48.6%) nurses in intervention and control groups respectively, reported assessment of the stoma site for soils to determine clinical

indication for dressing change decision. Assessment of the stoma for clinical indicators of infection and swelling, to guide decision for dressing after exposure of stoma, was reported by 14(43.8%) and 11(31.4%) nurses, in the intervention and control groups respectively. Only 2(6.3%), 4(12.5%) and 5(15.6%) nurses reported the need for assessment of clinical guideline indicators for: pressure of tracheostomy flange on the stoma, signs of encrustations and secretion in the inner cannula, and checking of patients' clinical record for last time of dressing change in the intervention group respectively.

Nurses' report for decision of selection of care strategies at pre intervention revealed only 4(12.5%) and 5(14.3%) nurses reported evidence of dirty dressing as a clinical indicator for decision of dressing change in the intervention and control groups respectively. Only 1(2.9%) nurse reported evidence for secretions and encrustations in the inner cannula as a clinical indicator for removal, replacement, and cleaning of the dirty inner tube thereafter in the control group. At post intervention examination of results revealed 23(17.9%) and 11(31.4%) nurses in the intervention and control group respectively reported evidence of dirty dressing as a clinical guideline prerequisite for dressing change decisions. Only 1(3.1%) nurse in the intervention group reported, care decision of obtaining wound swab for laboratory test in the evidence of signs of stoma infection. Fifteen (46.9%), 4(12.5%) and 2(6.3%) nurses in the intervention group reported EB care decisions for: tracheostomy dressing change in evidence of stoma dressing that is not wet nor dirty, but has been changed previously for over 4-6hours, nothing to be done to stoma dressing when clean and stoma was dressed less than 4-6hours previous. Decision for removal, replacement, and washing of dirty inner tube following evidence of secretions and encrustations in the tube was also reported, respectively.

Self expressed report of care implementation decisions at pre intervention revealed 4(12.5%) nurses and 1(2.9%) nurse in the intervention and control groups respectively reported the use of recommended 2-person technique in tracheostomy dressing decision to prevent tube dislodgement. Only 4(12.5%) nurses reported EB

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recommendation of cleaning the stoma with normal saline. Post intervention results revealed only 3(9.4%) nurses reported the use of EB recommendation of 2-person technique in the performance of tracheostomy dressing in the intervention group. Twelve (37.5%) nurses reported the use of EB guideline technique of upper and lower half cleaning of the stoma, while 11(34.4%) reported the use of recommended normal saline for tracheostomy dressing decision, in the intervention group. In the control group, only 3(8.6%) nurses reported the use of recommended normal saline for stoma cleansing.

Only 1(3.1%) nurse reported monitoring of patient status in evaluation of tracheostomy care decisions in the intervention group at pre and post-test respectively.

At pre intervention, only 1(3.1%) nurse in the intervention group reported documentation of dressing change to be done following care decisions. Post intervention results show 8(25.0%) and 1(2.9%) nurses in the intervention and control groups respectively, reported documentation of clinical indicators of assessment findings after care decisions. Nine (28.1%) and 3(8.6%) in the intervention and control groups reported documentation of care activities with date and time after the procedure, respectively.

Summary 4.1d: Comparison of nurses' self-report of evidence-based decision making practices in tracheostomy tie change pre and post intervention between study groups

Pre intervention analysis shows 2(6.3%) and 12(34.3%) nurses reported tracheostomy tie assessment for clinical guideline indicators of cleanliness, wetness, stains, and crust prior to decision making, in the intervention and control groups respectively. Assessment of tracheostomy tie security at both sides of the neck was reported by 6(18.8%) and 20(57.1%) nurses in both groups respectively to determine EB decision for tie change. Post intervention results revealed 11(34.4%) and 8(22.9%) nurses reported assessment for evidence of cleanliness, wetness, stains etc as pre-requisite for tracheostomy tie change decisions, in the intervention and control groups respectively.

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Other practices reported was assessment for evidence of tie security by 8(25.0%) nurses in the intervention group, and 12(34.3%) nurses in the control. One (3.1%) nurse in the intervention group also reported the need to assess and ensure tracheostomy tie is drawn below the patient's neck to prevent dislodgement of the tube.

Pre intervention analysis revealed only 3(9.4%) and 2(5.7%) nurses reported evidence of dirty tie as a clinical indicator for tie change decisions in both intervention and control groups respectively. Only 1(3.1%) nurse in the intervention reported the decision not to change the tracheostomy tie, when it is evidently clean. Two (5.7%) nurses in the control reported decision to secure tie when there is evidence of insecurely tied tapes. Post intervention results revealed 18(56.3%) and 9(25.7%) nurses reported performance of tracheostomy tie change decision in evidence of dirty tie in intervention and control groups respectively. Only 1(3.1%) and 1(2.9%) of nurses in the intervention and control groups respectively, reported decision to secure tracheostomy tie in the evidence of the tie not being drawn beneath the neck.

Analysis of nurses report on care implementation step show that only 4(12.5%) of the nurses in the intervention group reported the use of recommended 2-person technique in tie changes pre intervention. Three (9.4%) other nurses in the intervention group also reported EBP recommendation of one nurse holding the tracheostomy tube down, while the other performs the tie change. Eight (25.0%) and 2(5.7%) nurses in the intervention and control group respectively, reported measurement of tension and patient comfort level, by inserting 1-finger between the neck and tie in care decisions. Post intervention analysis revealed 13(40.6%) nurses reported EBP recommendation of use of 2-person technique for tie changes in the intervention group. Two (6.3%) other nurses also reported the recommendation of one nurse to hold down tube, while tie change is performed by the other, in the intervention group. Twenty-four (75.0%) and 4(11.4%) nurses reported recommendation of ascertaining tension and patient comfort level by 1-finger width measure between neck and tie in care decisions, in both intervention and control groups respectively.

Findings of report on evaluation revealed only 1(3.1%) nurse in the intervention group reported decision to re-tie tape in evidence of < or > 1-finger width measure between patient's neck and tracheostomy tie pre intervention. At post intervention results show only 1(3.1%) nurse in the intervention group reported the need to do nothing to the tie in the evidence of 1-finger width measure, while 2(6.3%) nurses in same group reported the need for decision of tape re-tie in evidence of < or > 1-finger width breathe between neck and tie.

Pre intervention test results revealed no report 0(0.0%) for documentation decisions in both study groups. Post intervention analysis revealed only 2(6.3%) nurses in the intervention group reported documentation of clinical guideline indicators in assessment findings. Two 6.3%) and 1(2.9%) in the intervention and control groups reported documentation of tie change decision activities with date and time in patient notes respectively.

Summary 4.2: Nurses' self-report responses relevant to best practice standards in evidence-based tracheostomy decision making in the intervention and control groups

At pre-test Summary 4.2 show nurses' report of some core practices relevant to practice standards worthy of mention in both study groups. Highest self-report were recorded for explanation of procedure to patients and upright positioning of patient 27(84.4%), aseptic practices 21(65.6%), availability of bedside equipment 8(25.0%) and, ensuring tube security and patency at suctioning 15(46.9%) nurses in the intervention group respectively. Responses were generally low amongst nurses in the control group.

Post-test results revealed highest response rate for same practices as in the pre-test in both study groups. Non instillation of normal saline in suctioning practices was reported by only 1(3.1%) of nurses in the intervention group. Also only 1(3.1%) of nurses in the intervention reported non-instillation of normal saline, or sodium bicarbonate for maintenance of airway patency. Report of best practice measures were

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noted to have improved in the intervention group above the control. and, ensuring tube security and patency at suctioning 15(46.9%) nurses in the intervention group respectively. Responses were generally low amongst nurses in the control group.

Summary 4.3: Nurses' self-report of non-evidence-based responses in tracheostomy care decision making in the intervention and control groups

Pre-test result analysis revealed self-report responses of practices that are not based on research evidence in both study groups. Two (6.3%) nurses in the intervention group mentioned introduction of catheter gently, suction quickly to prevent hypoxia in the intervention group. Highest report amongst 5(15.6%) of nurses was recorded for instillation of normal saline for tracheostomy suctioning in the intervention group, instillation of normal saline for airway maintenance was reported by 22(68.8%) and 14(40.0%) nurses in the intervention and control groups respectively. Daily routine stoma dressing was reported by 6(17.1%) nurses in the control group while 1(3.1%) and 2(5.7%) of nurses reported weekly tie changes in the intervention and control groups respectively.

Post-test results revealed only 2(6.3%) nurses reported suction limit of 8-10 seconds and 5 seconds respectively in the intervention group. Instillation of normal saline for maintenance of the airway was reported by 1(3.1%) and 15(42. 9%) of the nurses in the intervention and control groups respectively

Objective 5: To examine nurses' performance level in the use of clinical guideline indicators in evidence-based tracheostomy care decisions pre and post intervention in the intervention and control groups. The objective was set to determine nurses' performance level of EB tracheostomy assessment and care decisions, and examine nurses' practice and adherence to use of clinical guideline indicators in tracheostomy suctioning, airway maintenance, dressing and tie change decisions. Tables 4.18 display the results of nurses' overall performance level of EB tracheostomy suctioning. 4.19a-b display proportion of observed practices of nurses' adherence to use of clinical guideline indicators in non-directive EB assessment and care decisions in tracheostomy suctioning, pre and post intervention. Table 4.20a-d further explored nurses' performance level of tracheostomy suctioning decisions within demographic variables, pre and post intervention. Tables 4.21 and 4.22a-b display results of nurses' overall performance level of EB tracheostomy airway maintenance decisions, and proportion of observed nurses' adherence practices to use of clinical guideline indicators in decision making pre and post intervention. Further analysis of nurses' performance level of EB airway maintenance decisions within demographic variables pre and post intervention is displayed on Tables 4.23a-d. Results of nurses' performance level of EB tracheostomy dressing decisions and proportion of observed adherence practices are displayed on Tables 4.24 and 4.25a-b. Further exploration of nurses' performance of EB tracheostomy dressing decisions within demographic variables pre and post intervention are shown on Tables 4.26a-d. Analysis of overall nurses' performance level in tracheostomy tie change decisions, and observed proportion of adherence practices are demonstrated on Tables 4.27 and 4.28a-b. Analysed results of explored performance level of nurses' EB decision making within socio-demographics pre and post intervention are displayed on Tables 4.29a-29d.

Table 4.18: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy suctioning decisions pre and post intervention in the intervention and control groups

Table 4.18 shows the result of nurses' overall performance level in the use of clinical guideline indicators in EB tracheostomy suctioning decisions within study groups, pre and post intervention. Evidence-based assessment and care decisions observed in five (5) suctioning sessions per participant was assessed for nurses' performance level of competence in practice of EB decision making.

Data analysis revealed overall, only 3(9.4%) nurses displayed good performance level of EB assessment practices in suctioning decisions after training in the intervention group. This is observed to be lower than pre intervention overall result of 8(25.0%) nurses with good performance level. An increase in poor performance level of nurses assessment practices in the control group from 19(54.3%) pre intervention to 24(68.6%) was also observed. Results of EB care decisions at post intervention revealed an improvement in the number of nurses with good performance level in both intervention and control groups. Nurses with good performance level increased from 4(12.5%) to 5(15.6%) in the intervention group, and 5(14.3%) to 12(34.3%) in the control group.

Table 4.18: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy suctioning decisions pre and post intervention in the intervention and control groups

NURSES' USE OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY SUCTIONING DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35			POST INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	24(75.6)	8(25.0)	32(100.0)	19(54.3)	16(45.7)	35(100.0)	29(90.6)	3(9.4)	32(100.0)	24(68.6)	11(31.4)	35(100.0)
CARE DECISIONS	28(87.5)	4(12.5)	32(100.0)	30(85.7)	5(14.3)	35(100.0)	27(84.4)	5(15.6)	32(100.0)	23(65.7)	12(34.3)	35(100.0)

Table 4.19a: Proportion of observed nurses' practice of use of clinical guidelines indicators in evidence-based tracheostomy suctioning decisions pre intervention in intervention and control groups

Pre intervention observation results revealed only 13(40.6%), 13(40.6%), 9(28.1%), 11(34.4%) and 9(28.1%) nurses performed tracheostomy suctioning in the five (5) sessions in the intervention group. In the control group 20(57.1%), 20(57.1%), 19(54.3%, 19(54.3%) and 18(51.4%) nurses performed tracheostomy suctioning in the five (5) observations. Results indicate a greater number of nurses in the intervention group failed to carry out tracheostomy suctioning.

Observed EB Suctioning Assessment Decisions

Result show that only 1(3.1%) nurse in the intervention group performed chest auscultation to determine clinical indication for suctioning decision at P3 and P5 respectively. More nurses 2(5.7%) performed auscultation assessment in four (4) out of five (5) observations in the control group than in the intervention. EB assessment for oxygen saturation levels was observed amongst ICU nurses in both study groups in all observations. The highest number of assessment practices of use of clinical indicators of increased secretions, noisy respiration and increased respiration to determine suctioning decision was observed amongst nurses in the control group in all five (5) observations.

Analysis of *Observed EB Suctioning Care Decisions* amongst nurses revealed EB recommendation of suction pressure was applied at suctioning by majority of nurses 10(28.6%) in the control group at P2. Majority of nurses failed to practice EB recommendation of none-tube rotation in both study groups. The highest number of nurses 9(25.7%) observed to practice non-tube rotation at suctioning were in the control group. The highest number of observed tube rotation 10(28.6%) was recorded amongst 19(54.3) nurses in the control that performed suctioning at P3. Practice of ≤ 3 passes of the suction catheter was observed amongst nurses in both groups. The highest number of ≤ 3 suction passes amongst nurses in the intervention group

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4(12.5%) was observed in P4 out of 11(34.4%) nurses that carried out suctioning. The highest number of nurses that practiced non adherence to EB recommendations of 10-15 seconds duration at suctioning were 5(14.3%) in the control group at P1. Results show non-adherence to EB recommendations in decision making practices amongst majority of nurses in both study groups.

Table 4.19a

Table 4.19b: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy suctioning decisions post intervention in intervention and control groups

Post intervention results showed that majority of nurses failed to carry out tracheostomy suctioning in all five observations in the intervention and control groups. The highest number of nurses that performed suctioning were 10(37.5%) at P1 in the intervention group and 13(37.1%) nurses at P3 in the control.

Observed EB Suctioning Assessment Decisions

Observation of nurses' practice of use of clinical guideline indicators revealed chest auscultation prior to tracheostomy suctioning decisions was observed highest in the control group at P2 by 2(5.7%) nurses amongst 11(31.4%) nurses that performed suctioning. Nurses that failed to determine oxygen saturation before suctioning decisions in all five observations are in the minority. Majority of nurses failed to assess for increased secretions in both study groups. Six (18.8%) participants out of 28(87.5%) that failed to assess for increased secretions performed suctioning in the intervention group at P5. The highest number of nurses 26(81.2%) at P2 and 29(90.6%) at P5 failed to assess for noisy respiration in the intervention group, out of which 8(25.0%) and 6(18.8%) nurses performed tracheostomy suctioning at both observations respectively.

Observed EB Suctioning Care Decisions

Nurses that were observed to apply EB recommendation of suction pressure were in the minority in all 5 observations. Majority of nurses in the control group 10(28.6%) at P3 and 11(31.4%) at P4 practiced tube rotation at suctioning. The highest number of nurses in the intervention group that did not adhere to none tube rotation were 6(18.8%) at P1. Nurses that did not adhere to evidence-based recommendations of ≤ 3 suction passes and 10-15 seconds suction duration limit were in the minority in the intervention and control group.

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Table 4.19b

Table 4.20a: Nurses' performance level of evidence-based assessment decisions in tracheostomy suctioning practices within demographic variables pre intervention in intervention and control group

Pre-intervention observations revealed majority of nurses had poor performance level of use of clinical guideline indicators in EB assessment decisions of tracheostomy suctioning practices in the intervention group in the five observations. Nurses in the control group had good performance level in majority of the observations. Results showed nurses on the ICU performed EB assessment decisions better than nurses in the ENT and Neurological Units in the intervention and control group. Within years of working experience in the specialty the highest number of nurses with good knowledge have worked for 1-10 years in both intervention and control groups. Majority of nurses in the NOI cadre in the control group demonstrated good performance level. All four (4) nurses in the CNO cadre in the intervention had poor performance level in all five observations. Good performance level was highly distributed amongst all cadre of nursing designation in the control group. Majority of nurses with good performance level were RN/RM qualified nurses in both study groups. All three (3) Intensive Care Certificated nurses had good performance level in the control in all five observations. Good performance of EB suctioning assessment decisions was distributed within all categories of professional work experience in both study groups.

Table 4.20a

Table 4.20b: Nurses' performance level of evidence-based care decisions in tracheostomy suctioning practices within demographic variables pre intervention in intervention and control group

Analysis revealed all nurses with good performance level of evidence-based care decisions in tracheostomy suctioning 3(100.0%), 1(100.0%), 4(100.0%), 5(100.0%) and 3(100.0%) in all five observations worked on the ICU of the intervention group. All nurses on the ENT and Neurological unit displayed poor performance level. In the control, good performance level though poor overall was distributed amongst nurses in the three specialties at PI-P4. Majority of nurses in all the categories of work experience in the specialties displayed poor suctioning care practices in the intervention and control group. Nurses with poor performance level of evidence-based suctioning care decisions were in the majority within all designations in the intervention and control groups. Nurses with display of good performance were in the minority in all cadre of qualification in the in the intervention group. The highest number of nurses with good performance level 6(60.0%) in the control group was recorded at P3 amongst BSc Nursing holders. The highest number of nurses with good performance level 5(62.5%) have had 6-10 years working experience in the control group.

Table 4.20b

Table 4.20c: Nurses' performance level of evidence-based assessment decisions in tracheostomy suctioning practices within demographic variables post intervention in intervention and control group

At post intervention nurses in the ICU maintained good level of performance of assessment practices in both study groups in all five observations. Only 1(16.7%) nurse in the intervention group with <1year work period in the specialty displayed good performance level amongst that category of nurses. The highest number of nurses 10(100.0%) at P1with good performance level of assessment practices have worked in the specialty for 1-10 years in the intervention group. In the control the only nurse with 11-20 years period of work in the specialty demonstrated good performance level of assessment practices in the control group in all five observations. Nurses in the NO I cadre showed good performance level in all five observations in the intervention group. Similarly, NO I and NO II officers in the control group recorded good performance level in all five observations. All nurses in the CNO in the intervention group displayed poor performance in all five observations as in pre intervention. RN/RM nurses who are in the majority maintained their lead as the qualification category with highest number of participants with good performance level. Specialist nurses in ENT performed poorly in all five observations in the intervention group. On the contrary, nurses with Intensive Care and Critical care qualifications demonstrated good performance in suctioning decisions assessment in all 5 and 3 observations respectively in the control. Nurses with good performance level were in the minority amongst BSc Nursing degree holders in both study groups. The highest number of nurses 5(50.0%) with good performance level post intervention have had professional work experience of 11-15 years in the intervention group. In the control 3 nurses within 16-20 years professional work experience category demonstrated good performance level in evidence-based tracheostomy suctioning assessment decisions in each of the five observations post intervention.

Table 4.20c

Table 4.20d: Nurses' performance level of evidence-based care decisions in tracheostomy suctioning practices within demographic variables post intervention in intervention and control groups

Post intervention results revealed nurses in the ICU maintained their lead in the demonstration of good performance level in the intervention and control groups in EB tracheostomy suctioning care decisions. Nurses in the ENT units in both study groups demonstrated poor performance level in tracheostomy care decisions. The highest number of nurses in the Neurological unit 3(27.3%) at PI and 3(33.3%) at P3 demonstrated good performance level in the intervention group. Only 1(7.1%) nurse in the Neurological unit displayed good performance level in the control group at P3. Within categories of work experience in the specialty the highest number of nurses with good performance level of care practices 9(100.0%) and 5(100.0%) was observed at P3 and P5 amongst nurses with 1-10 years work experience in the intervention group. In the control, all nurses in the <1year category of work experience in the specialty demonstrated poor level of performance in all 5 observations. The only nurse in the 11-20 years category displayed good performance level of EB tracheostomy suctioning care practices.

In designation category, the highest number of good performance level was recorded amongst nurses in the NO I cadre 4(57.1%) in P4 of the intervention group. Highest poor performance level was noted amongst SNO's 10(40.0%) and 10(37.0%) at P4 and P5. All nurses in the PNO cadre demonstrated poor performance level at P2. In the control, nurses in the NO I cadre 9(42.9%) were observed at P3 to have the highest poor performance level. Highest performance of good level was noted amongst the CNO cadre in P3. Within qualification majority of RN/RM nurses demonstrated good performance level in the control. All 3 Intensive care certificated nurses demonstrated good performance level at P1 and P4. BSc degree holders had good performance at the in all 5 observations. The only B.Ed degree holder had good performance level in all 5 observations. The intervention group also recorded highest good performance level amongst nurses in the RN/RM category. All ENT qualified nurses demonstrated poor

performance level. BSc degree holders were also noted to demonstrate good performance level at P1, P3 and P4. Within professional work experience category, nurses with 11-15 years working experience 5(62.5%) and 4(44.4%) displayed good performance level at P1 and P3 respectively in the intervention group. Highest Poor performance level was noted amongst participants with 16-20 years professional experience at P1, P3 and P5. The control group recorded the highest number of observed participants 9(42.9%) with poor performance amongst nurses with 6-10 years professional experience at P3. Good performance level of EB care practices in tracheostomy suctioning decisions was also observed amongst nurses with >20years working experience 5(35.7%) and 6(42.9%) at P1 and P3 respectively post intervention.

Table 4.20d

Table 4.21: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy airway maintenance decisions pre and post intervention in the intervention and control groups

As displayed on Table 4.22 pre intervention results revealed only 2(6.2%) and 5(14.3%) nurses had good performance level in the practice of use of clinical guideline indicators for EB assessment decisions for tracheostomy airway maintenance in both intervention and control groups respectively. At post intervention, performance level of clinical competence expected of professionals did not show any marked improvement as an increase in poor performance level of assessment practices was demonstrated in both study groups. Results of use of evidence in airway maintenance care decisions revealed good performance level by 21(65.6%) and 29(82.9%) of nurses in the intervention and control group respectively at pre intervention. On the contrary, post intervention data analysis revealed only 1(3.1%) nurse in intervention group displayed overall good performance level in assessment decisions after training. Only 3(8.6%) nurses demonstrated good performance level in assessment decisions in the control. Good performance of EB tracheostomy care decisions was displayed amongst 18(56.2%) nurses in the intervention group and 14(40.0%) nurses in the control.

Table 4.21: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy airway maintenance decisions pre and post intervention in the intervention and control groups

USE OF CLINICAL GUIDELINES INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY AIRWAY MAINTENANCE DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35			POST INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	30(93.8)	2(6.2)	32(100.0)	30(85.7)	5(14.3)	35(100.0)	31(96.9)	1(3.1)	32(100.0)	32(91.4)	3(8.6)	35(100.0)
CARE DECISIONS	11(34.4)	21(65.6)	35(100.0)	6(17.1)	29(82.9)	35(100.0)	14(43.8)	18(56.2)	35(100.0)	21(60.0)	14(40.0)	35(100.0)

Table 4.22a: Proportion of observed nurses' practice of use of clinical guidelines in evidence-based tracheostomy airway maintenance decisions pre intervention in intervention and control groups

Observed Assessment Decisions

Table 4.22a revealed that at pre intervention, generality of nurses failed to assess the tracheostomy tube for evidence of dried crusts in all five observations. All 32(100.0%) nurses in the intervention group failed to assess for dried crusts at P3. Only 5 nurses (14.3%) in the control group at P3, and 5(15.6%) nurses at P4 in the intervention group assessed for evidence of dried crusts. Assessment for free airflow was observed amongst minority of nurses in the five observations. The highest number of nurses 8(22.9%) in the control, assessed for free airflow at P4. All 32(100.0%) nurses in the intervention group failed to carry out this assessment practice at P3.

Observed Care Decisions

Application of oxygen for patients was not applicable in majority of patients that were nursed as they were on continuous oxygen therapy for all five observations. However, no decision to apply oxygen on patients who require such care decision to loosen secretions was observed in all five observations in both study groups. The highest number of nurses 7(21.9%) at P1 in the intervention group, and 6(17.1%) respectively at P1 and P5 in the control were observed to encourage oral fluid intake in patients on oral feeds. Patients on intravenous infusion and naso-gastric tube feeding were in the majority. The highest number of nurses that failed to encourage oral fluid intake to loosen secretions in evidence-based care decisions was observed amongst nurses in the intervention group 3(9.4%) at P1, 5(15.6%) at P2, 8(25.0%) at P3, 6(18.8%) at P4 and 7(21.9%) at P5. The number of nurses that practiced normal saline instillation to loosen secretions was observed most frequently amongst nurses in the intervention group. The highest number of normal saline instillation practices observed was 8(25.0%) at P4, a practice that is not acceptable in tracheostomy patient care.

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Table 4.22a

Table 4.22b: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy airway maintenance decisions post intervention in intervention and control groups

Observed Assessment Decisions

Assessment practices of evidence-based airway maintenance decisions for crusts and free airflow in the tracheostomy tube amongst nurses was observed to be poor in both study groups. Only 6(18.8%), 3(9.4%), 4(12.5%), 3(9.4%) and 1(3.1%) nurses in the intervention were observed to assess for dried crusts. Assessment for free airflow was highest amongst nurses in the control group 6(17.1%) at P1. The least assessment 1(3.1%) was observed at P5 in the intervention group.

Observed Care Decisions

Majority of patients were also on oxygen therapy, intravenous infusion and naso-gastric tube feeding at post intervention. Decisions taken for oral fluid intake in patient care was impressive as majority of patients on oral feeds were encouraged to take fluids to loose secretions in all 5 observations. Care decisions for normal saline instillation to loosen secretions was observed at P2 1(3.1%) nurse in the intervention group, and 1(2.9%) nurse each at P2, P4 and P5, and 2(5.7) nurses at P3 in the control group.

Table 4.22b

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Table 4.23a: Nurses' performance level of evidence-based assessment decisions in tracheostomy airway maintenance practices within demographic variables pre intervention in intervention and control group

Table 4.23a displays pre intervention result of nurses' performance level of assessment practices in evidence-based airway maintenance decisions. Majority of nurses in all the 3 study units had poor performance level of assessment practices in all five observations in the intervention group. Highest number of nurses with good performance level of assessment decisions were 2(40.0%), 2(50.0%) and 2(40.0%) was noted at P1, P2 and P5 respectively amongst nurses on the ICU in the intervention group. All nurses on the ENT unit 14(48.3) demonstrated poor performance level of evidence-based assessment practices in airway maintenance in the control group at P1. The highest number of nurses with good performance level was recorded on the ICU. Within the period of work in the specialty variable all 4 nurses with <1yr experience had poor performance level. Good performance level was observed at P1 (100.0%) and P5 (100.0%) amongst nurses with 1-10years period of working in the specialty in the intervention group. In the control majority of the nurses with good performance in assessment practices 6(100.0%), 6 (85.7%) and 7(100.0%) have worked for 1-10years in the specialties. Only 1(16.7%) nurse with >20years of working period in the specialty demonstrated good performance level.

The highest number of nurses with poor performance level in the intervention group 10(31.2%) and 10(32.3%) were in the SNO cadre while, in the control poor performance level was observed amongst NO II nurses at P1, P2 and P3. All PNO's were also observed to have poor performance level all round. Good performance level was recorded amongst NO II nurses in all five observations. RN/RM qualified nurses recorded the highest number of nurses with good level of assessment practice at P1. Only 1(20.0%) nurse with ENT qualification demonstrated good performance level. In the control the highest number of nurses 3(42.9%) with good performance level was observed amongst BSc degree nurses at P5. In the control, majority of the nurses had poor performance level in all 5 observations. Two(40.0%) nurses at P1 and 2(50.0%)

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at P2 with 11-15 years professional experience demonstrated good performance level in evidence-based air way maintenance assessment decisions in the intervention group.

Table 4.23a

Table 4.23b: Nurses' performance level of evidence-based care decisions in tracheostomy airway maintenance practices within demographic variables pre intervention in intervention and control group

Results on Table 4.23b revealed all 9 nurses on the ICU pre intervention demonstrated good performance level of evidence-based care decisions in tracheostomy airway maintenance in four observational sessions in the intervention and control groups. All nurses 8(27.6%) in the Neurological unit in the control group also demonstrated good performance level in evidence-based care decisions. All nurses with <1year working period in the specialty in the intervention group demonstrated poor performance level in airway care decisions, while all nurses in the same category in the control had good level of performance in all five observations. Nurses in the 1-10 years working period in both study groups demonstrated good performance level of evidence-based decision making in airway maintenance decisions.

Within designation good and poor performance level of evidence-based airway maintenance decision was distributed amongst all cadre of nurses in both study groups. Within qualification variable poor performance level was observed amongst RN/RM qualified nurses and BSc degree holders in the intervention and control group. Nurses with 11-15 years professional work experience in the intervention group and nurses with <1-5 years and 6-10 years professional experience in the control group demonstrated poor performance level in evidence-based care decision in airway maintenance practices.

Table 4.23b

Table 4.23c: Nurses' performance level of evidence-based assessment decisions in tracheostomy airway maintenance practices within demographic variables post intervention in intervention and control group

Post intervention results revealed same trend of poor performance of evidence-based assessment decisions in the ICU, ENT and Neurological wards respectively in both study groups. Highest number of good performance level was observed amongst nurses with 1-10 years working experience in both study groups. Poor performance level was observed amongst all nurses with <1 year experience in the intervention group. All nurses in the NO II and CNO cadre were also observed to demonstrate poor performance level in assessment decisions in the intervention group. All RN/RM holders 20(66.7%) demonstrated poor performance level at P3 in the intervention group. In the control, nurses in the same RN/RM qualification category 16(49.1%) at P4, and 16(51.6%) at P5 also demonstrated poor performance level of assessment decisions in airway maintenance practices. Within professional work experience variable, all nurses in the 11-15 years category 13(4.9) demonstrated poor performance level in the intervention group at P2, P4 and P5. In the control group, the highest number of nurses with record of good performance level of EB assessment decisions 3(50.0), were in the >20 years professional working experience category.

Table 4.23c

Table 4.23d: Nurses' performance level of evidence-based care decisions in tracheostomy airway maintenance practices within demographic variables post intervention in intervention and control group

Results displayed on Table 4.23d show that at post intervention, all nurses on the ICU in the intervention group and 12 nurses on the ICU in the control group, demonstrated good performance level of evidence-based care decisions in airway maintenance practices in all five observations. All nurses on the ENT unit recorded poor performance level at P5 in the intervention group. Majority of nurses in the Neurological unit in the intervention and control groups demonstrated poor evidence-based decision making performance level in airway maintenance care practices. Good performance level was distributed amongst nurses in the 2 categories of period of working experience in the specialty in the intervention group. All nurses with >20years working experience in the specialty also recorded good performance level in the control. Highest number of nurses with poor performance level amongst the SNO cadre in the intervention group was observed at P4 8(44.4%), and P5 (42.1%) respectively. Highest number of nurses with poor performance was also observed amongst nurses in NO I cadre in all observations in the control group. Highest number of poor performance level was also observed amongst BSc nurses at P4 5(27.8%) and at P5 5(26.3%). In the control all nurses with B.Ed degree, Intensive Care and Critical Care qualifications demonstrated good performance level, while on the other hand, nurses with Masters degree in Nursing and Social Work demonstrated poor performance level of evidence-based care decisions in airway maintenance. Majority of nurses with 11-15 years professional qualification in the intervention group and 6-10 years in the control group demonstrated poor level of performance in evidence-based airway maintenance care decisions.

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Table 4.23d

Table 4.24: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy dressing decisions pre and post intervention in the intervention and control groups

Overall nurses' performance level of use of clinical guideline indicators in evidence-based tracheostomy dressing assessment decisions as displayed on Table 4.24 show that all 32(100.0%) nurses in the intervention group demonstrated poor performance level pre and post intervention as opposed to good knowledge of tracheostomy care decisions 32(100.0%) displayed after training. All 35(100.0%) nurses exhibited poor performance level in divergence to pre intervention result of 34(97.1%) nurses with poor performance level in the control group.

Table 4.24: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy dressing decisions pre and post intervention in the intervention and control groups

USE OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY DRESSING DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35			POST INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	34(97.1)	1(2.9)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)
CARE DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)

Table 4.25a: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy dressing decisions pre intervention in intervention and control groups

Study findings at pre intervention revealed nurses generally failed to perform tracheostomy stoma dressing in both study groups. The highest number of dressing decisions was recorded in P2 and P3 by 13(37.1%) nurses respectively in the control group. The least number of tracheostomy dressing decisions by 3(9.4%) nurses was observed at P3 in the intervention group.

Observed Assessment Decisions

Assessment practices prior to dressing decisions were highest amongst nurses observed in the control group. At P1, P2 and P3 9(25.7%) nurses at each observation assessed the tracheostomy dressing for soils before the procedure. The least number of assessment practices was observed amongst nurses in the intervention group 1(3.1%) at P3 and P4 respectively. Only 1(3.1%) nurse out of six that performed tracheostomy dressing assessed for last time of care in the intervention group and 3(8.6%) out of 10 dressing decisions in the control group at P1. Assessment for signs of infection at removal of soiled dressing was observed to be highest in the control group at P2 by 5(14.3%) nurses. The highest number of flange inspection for pressure on the stoma was at P1 by 5(15.6%) nurses in the intervention group.

Observed Care Decisions

Removal of inner cannula of the tracheostomy tube was the most frequent decision observed in both study groups. The highest occurrence of decision for inner cannula removal 14(40.0%) was observed at P4 in the control group. Decision for immediate replacement of cannula with a new one following removal was 7(20.0%) at P4 in the control group. Use of normal for tracheostomy stoma cleansing was observed in the control and intervention group at P4 and P5.

Table 4.25a

Table 4.25b: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy dressing decisions post intervention in intervention and control groups

The highest number of nurses observed to perform tracheostomy dressing decisions were 4(12.4%) in the intervention group at P1and 7(20.0%) at P3 in the control group.

Observed Assessment Decisions

Highest occurrence of assessment practices for soils prior to tracheostomy dressing decisions was observed in the control group, 6(17.1%) at P3. The highest occurrence of last time of tracheostomy care check was amongst 4(11.4%) nurse in the control group at P1. Tracheostomy stoma assessment for infections after removal of the old dressing occurred highest amongst 4(11.4%) nurses in the control group at P3. Inspection of flange pressure on the stoma was highest at P3 by 3(8.6%) nurses in the control group.

Observed Care Decisions

The removal of inner cannula occurred most frequently in nursing decisions. The highest observation was amongst 15(42.9%) nurses in the control group at P1. Immediate replacement with a new one after removal was observed to be highest at P3 by 10(31.2%) nurses in the intervention group. Cleansing of the stoma with normal saline was not observed in the only stoma dressing decision performed at P4 in the intervention group. Evidence-based recommended stoma cleaning technique was observed highest amongst 4(12.5%) nurses at P1 in the intervention group.

Table 4.25b

Table 4.26a: Nurses' performance level of evidence-based assessment decisions in tracheostomy dressing practices within demographic variables pre intervention in intervention and control group

Results on Table 4.26a show that dressing assessment practices was generally poor amongst participants in both study groups, within specialties at pre intervention. The highest number of nurses observed with good performance level on the ICU was recorded at P1 2(66.7%) in the intervention group, and in the control 2(66.7%) at P2 and 2(100.0%) nurses at P5. Poor performance level of dressing assessment decisions was observed amongst all nurses 12(37.5%) at P3, and all nurses in the Neurological unit in all 5 observations in the intervention group. Poor performance level amongst all participants in the three units of both study groups was observed at P3 respectively. Within period of work in the specialty, nurses with 1-10year experience 3(100.0%) at P1 in the intervention and 3(100.0%) at P1 and P4 respectively in the control group, demonstrated good performance level in assessment decisions taken prior to tracheostomy dressing. All 4 nurses with <1year experience in the specialty displayed poor performance level in all 5 observations in the intervention group. In the control group majority of nurses had poor performance level in all categories of period of work in the specialty. Poor performance of evidence-based assessment practices spanned across all cadre of nurses in both study groups in high proportions. Nurses with good performance level were in the minority in both study groups. The highest number of participants with good performance level, 3 nurses was observed at P1, P4 and 2 nurses at P5 respectively in the control group. Participants that demonstrated poor performance level, spanned across all qualifications in high proportions in the intervention and control groups. A similar trend of high proportions of poor performance level of evidence-based assessment practices in tracheostomy stoma dressing was also demonstrated across all categories of work experience in both study groups.

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Table 4.26a

Table 4.26b: Nurses' performance level of evidence-based care decisions in tracheostomy dressing practices within demographic variables pre intervention in intervention and control group

Pre intervention study findings of nurses' level of performance of evidence-based care decisions in tracheostomy dressing revealed all participants 32(100.0%) in the intervention and 35(100.0%) in the control group demonstrated poor performance level within all categories of all demographic variables in the study.

Table 4.26b

Table 4.26c: Nurses' performance level of evidence-based assessment decisions in tracheostomy dressing practices within demographic variables post intervention in intervention and control group

Post intervention results of nurses' performance level of assessment practices in tracheostomy dressing decisions revealed nurses' with good performance level were in the minority in all five observations. The highest number of nurses with good performance level 2(100.0%) was recorded at P3 in the Neurological unit and ICU of the intervention and control groups respectively. Nurses with good performance level were only distributed within the category of nurses with 1-10 years working experience in the specialties in both study groups. Within designation, poor performance level was demonstrated amongst nurses in the ACNO and CNO cadre in the intervention group. The highest occurrence of demonstration of good performance level 2(100.0%) was observed at P3 within NO I cadre in the control. The distribution of good performance level within qualification was within RN/RM and BSc qualified nurses in both study groups and Intensive care certified nurse in the control. All nurses in <1-5years and 16-20 years professional working experience demonstrated poor performance level. Poor performance level of evidence-based assessment practices in tracheostomy dressing decisions was revealed amongst nurses in all categories of professional working experience in P4 in the control group.

Table 4.26c

Table 4.26d: Nurses' performance level of evidence-based care decisions in tracheostomy dressing practices within demographic variables post intervention in intervention and control group

Table 4.26d revealed that at post intervention 0(0.0%) level of good performance of evidence-based care decisions in tracheostomy dressing practices was recorded in all five observations in the control group. In the intervention group, nurses with good performance level were in the minority in four observations. All nurses had poor performance level at P4.

The distribution of nurses performance level of evidence-based tracheostomy dressing care decision in the intervention group showed the highest number of nurses 3(75.0%) with good performance level was observed at P1 on the ICU. All nurses demonstrated poor performance level in all units at P4. The highest number of nurses 4(100.0%) with demonstration of good performance level was observed within the 1-10 years category of work experience in the specialty. Good performance level was not demonstrated amongst nurses in the ACNO and CNO cadre, while only nurses in the RN/RM, BSc Nursing and B.Ed qualifications recorded good performance level at P1 and P3 respectively. The highest number of nurses with good performance level of evidence-based care decisions occurred more frequently at P1 amongst 3(75.0%) nurses and 1(25.0%) nurse in the 11-15 and >20 years of professional work experience category in the intervention group respectively.

Table 4.26d

Table 4.27: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy tie change decisions pre and post intervention in the intervention and control groups

Study findings revealed poor performance level of nurses' use of clinical guideline indicators in tracheostomy tie change assessment decision making practices in intervention and control groups pre intervention. Post intervention results show only 1(3.1%) nurse in the intervention group demonstrated good performance level between both study groups in practice of assessment decisions.

Analysis of clinical guideline indicators use in evidence-based tracheostomy tie change care decisions revealed all nurses 100% in both intervention and control groups demonstrated poor performance level pre and post intervention. Study findings imply low level performance of desired consequences that meet standard of care in evidence-based tracheostomy tie change decisions in both study groups.

Table 4.27: Nurses' overall performance level in the use of clinical guideline indicators in evidence-based tracheostomy tie change decisions pre and post intervention in the intervention and control groups

USE OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY TIE CHANGE DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35			POST INTERVENTION OVERALL PERFORMANCE LEVEL INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	31(96.9)	1(3.1)	32(100.0)	35(100.0)	0(0.0)	35(100.0)
CARE DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)

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Table 4.28a: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy tie change decisions pre intervention in intervention and control group

Observed Assessment Decisions

At pre intervention evidence-based assessment practices prior to tracheostomy tie change decisions for cleanliness and security amongst nurses was greater in the intervention group 6(18.8%) at P1. In the control the highest number of observation was 2(5.7%) at P2. No assessment practices were observed at P3 in both study groups. 1-finger breathe assessment for patient comfort level and safety was performed by one nurse 1(3.1%) at P1 and P4 and also once at P1, P4 and P5 in the intervention and control groups respectively.

Observed Care Decisions

Evidence-based care decision for change and security of dirty tracheostomy tie was observed once in both study groups respectively at P2 (3.1%) in the intervention, and P3 (2.9%) in the control group.

Table 4.28a

Table 4.28b: Proportion of observed nurses' practice of use of clinical guideline indicators in evidence-based tracheostomy tie change decisions post intervention in intervention and control groups

Observed Assessment Decisions

Post intervention results revealed frequency of occurrence of evidence-based assessment decisions for tie cleanliness and security were low amongst participants in both study groups in all observations. Nurses in the intervention group demonstrated more occurrences of assessment decisions at P1 2(6.2%), P3 4(12.5%) and P5 3(9.4%). Occurrences were fewer in the control group with a record of one observation in each of the five observational sessions. Assessment for 1-finger width between the patient's neck and tie for safety and comfort level was generally low. Practice was observed more in the intervention group at P1, P3, P4 and P5 taken by one nurse (3.1%) in each observation respectively. Practice in the control group was noted only once by 1(2.9%) nurse at P2.

Observed Care Decisions

Observation of evidence-based decision for change and security of dirty tracheostomy tie was exhibited twice at P2 and P3 by 1(2.9%) nurse respectively in the control group, and once by 1(31%) nurse at P3 in the intervention group.

Table 4.28b

Table 4.29a: Nurses' performance level of evidence-based assessment decisions in tracheostomy tie change practices within demographic variables pre intervention in intervention and control group

Majority of nurses demonstrated poor performance level of evidence-based assessment decisions in tracheostomy tie change practices in all five observational session at pre intervention. Good performance level was exhibited by only 1(100.0%) and 1(100.0%) nurse respectively on the ICU in the intervention group at P1 and P4, and ENT unit 1(7.1%) nurse at P1 in the control. The nurses with good performance level in the intervention and control group are in the category of 1-10 years working experience in their specialty respectively. In the intervention both nurses are in the ACNO cadre, have RN/RM qualification with 16-20 years professional experience. The nurse in the control is in the NO I cadre with BSc degree in nursing, and 6-10 years professional experience.

Table 4.29a

Table 4.29b: Nurses' performance level of evidence-based care decisions in tracheostomy tie change practices within demographic variables pre intervention in intervention and control group

Results revealed only 1(100.0%) nurse respectively on the Neurological unit of the intervention group at P2 and ICU in the control group at P3 demonstrated good performance level of evidence-based care practices pre intervention. The only nurse with good performance level in the intervention group is in the 1-10 years working experience in the specialty category, PNO cadre with BSc degree in nursing and 16-20 years professional experience. In the control, the nurse with good performance level is in the 11-20 years category of working experience in the specialty, PNO cadre, RN/RM qualified with 11-15 years professional experience.

Table 4.29b

Table 4.29c: Nurses' performance level of evidence-based assessment decisions in tracheostomy tie change practices within demographic variables post intervention in intervention and control group

Post intervention study findings revealed only four (4) nurses in the intervention group, three (3) on the ICU and one (1) on the Neurological unit demonstrated good performance level at P1, P2, P3 and P4 respectively. All four (4) nurses were in the 1-10 years category of experience in the specialty, with 3 nurses in the NO I cadre and 1 in the PNO cadre. All have RN/RM qualification with > 20 years professional experience amongst 3 nurses and 1 nurse with 11-15 years professional experience. In the control only one nurse (100.0%) demonstrated good performance level on the Neurological unit in the CNO cadre, within the 1-10years working period in the specialty category, with Diploma in Management qualification and >20 years professional experience at P2.

Table 4.29c

Table 4.29d: Nurses' performance level of evidence-based care decisions in tracheostomy tie change practices within demographic variables post intervention in intervention and control group

Analysed data revealed same trend of majority of nurses with poor performance level displayed in all five (5) observations in both study groups. Good performance level in evidence-based care decisions in tracheostomy tie change practices was observed in only one (1) nurse in the intervention group at P3 in the Neurological unit . Two (2) nurses demonstrated good performance level in the control, also in the Neurological unit at P2 and P3. Within designation all three nurses are in the senior cadre, PNO in the intervention group and ACNO and CNO cadre in the control group respectively. Only nurse in the intervention was RN/RM qualified while nurses in the control had Management Diploma and Bachelor's degree in Nursing. Years of professional experience are varied with 11-15 years in the intervention group and >20 years in the control respectively.

Table 4.29d

Objective 6: To determine nurses' performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy care decisions pre and post intervention. The objective was set to determine the realities of nurses' documentation practices of clinical guideline indicators utilized in EB decision making processes for tracheostomy suctioning, airway maintenance, dressing, and tie change. Tables 4.30, 4.32, 4.34 and 4.36 display the results of nurses' overall performance level of EB documentation practices in five (5) observational sessions of assessment and care practices each in: tracheostomy suctioning, airway maintenance, dressing and tie change decisions pre and post intervention in the intervention and control groups. Tables 4.31a- 4.31d, 4.33a-d, 4.35a-d and 4.37a-d were drawn to display nurses' performance level of documentation practices of clinical guideline indicators in assessment and care practices of EB tracheostomy suctioning, airway maintenance, dressing and tie change decisions within demographic variables pre and post intervention in both study groups.

Table 4.30: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy suctioning decisions pre and post intervention in the intervention and control groups

Study findings revealed a demonstration of poor performance level of nurses in documentation practices of EB clinical guideline indicators of assessment decisions in tracheostomy suctioning, pre and post intervention in both study groups. Analysis of documentation practices of EB clinical indicators in tracheostomy suctioning care decisions revealed only 4(12.5%) nurses pre intervention, and 8(25.0%) post intervention demonstrated good performance level in the intervention group. Results show a display of very slight increase in number of nurses with good performance level after training. In the control, 13(37.1%) nurses demonstrated good performance level of documentation of EB care indicators pre intervention. Post intervention results show only 7(20.0%) nurses demonstrated good performance level, a drastic reduction from the number of nurses with good performance level pre intervention.

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Results imply observation of some level of consistency in nurses' poor performance level of EB documentation practices requiring training and re-training programmes in evidence-based decision making practices.

Table 4.30: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy suctioning decisions pre and post intervention in the intervention and control groups

DOCUMENTATION PRACTICES OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY SUCTIONING DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL						POST INTERVENTION OVERALL PERFORMANCE LEVEL					
	INTERVENTION GROUP n=32			CONTROL GROUP n=35			INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)
CARE DECISIONS	28(87.5)	4(12.5)	32(100.0)	22(62.9)	13(37.1)	35(100.0)	24(75.0)	8(25.0)	32(100.0)	28(80.0)	7(20.0)	35(100.0)

Table 4.31a: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy suctioning decisions within demographic variables pre intervention in the intervention and control groups

Displayed pre intervention results revealed the intervention group demonstrated poor performance level in documentation practices of clinical indicators utilized in EB tracheostomy suctioning assessment decisions across all demographic variables. In the control group, nurses with good performance level are in the minority. One nurse each with demonstration of good performance level in documentation of assessment indicators in EB tracheostomy suctioning decisions at P3, P4 and P5 worked on the ICU, with 1-10 years work experience in the specialty, are in the NO I cadre, RN/RM qualified, with 16-20 years professional experience respectively.

Table 4.31a

Table 4.31b: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy suctioning decisions within demographic variables pre intervention in the intervention and control groups

Study findings revealed nurses with good performance level of documentation of clinical guideline indicators of care decisions taken in EB tracheostomy suctioning, though in the minority were noted in all five (5) observations in both study groups. The number of nurses with demonstration of good level of performance were more in number than in assessment practices. The highest number of good performance level was recorded at P1 amongst six (6) nurses distributed in the ENT 1(16.7%), ICU 3(50.0%) and Neurology 2(33.3%) in intervention group. Nurses with good level of performance were more in the category of 1-10years working experience in their specialty. Majority of the nurses were in the NO I cadre. Good performance level was not observed in the NO II and CNO cadre in all five (5) observations. Amongst nurses with good performance level RN/RM qualified nurses were in the majority in all care practices observed. Others were BSc Psychology 1(16.7%) in al1 five (5) observations and MSc Nursing 1(16.6%) at P1 only. Results revealed the only nurse in the professional experience category of 1-5 years demonstrated poor performance level in all observations.

Findings in the control group revealed nurses with demonstration of documentation practices of evidence-based clinical indicators in care decisions of tracheostomy suctioning though less than 50 percentile of the study population were more than the intervention group in all observations. Eleven (11) nurses on the ICU who demonstrated good performance level at P3 and P5 respectively were in the majority. Majority of the nurses with poor performance level have worked for a period of 1-10 years in the specialties, were in the NO I and NO II cadre, hold RN/RM qualification and BSc Nursing degree, and have had >20 years professional experience. Nurses with good performance level were also observed to be distributed across all designation and professional experience categories.

Table 4.31b

Table 4.31c: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy suctioning decisions within demographic variables post intervention in the intervention and control groups

At post intervention Table 4.31c displayed that all 32 nurses in the intervention group demonstrated poor performance level 0(0.0%) in documentation practices of clinical guideline indicators in assessment decisions taken in EB tracheostomy suctioning in all five (5) observations. Results in the control group revealed only 1(100.0%) nurse at P1 demonstrated good performance level of documentation of clinical guideline indicators in assessment practices of EB tracheostomy suctioning. The only nurse worked on the ICU with working period experience of 1-10 years, in the NO I cadre, RN/RM qualified, and has professional experience of 11-15 years.

Table 4.31c

Table 4.31d: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy suctioning decisions within demographic variables post intervention in the intervention and control groups

Analysed results show some improvement in the performance level of documentation practices of EB care indicators above pre intervention level amongst nurses in the intervention group in all five (5) observations. Majority of nurses from amongst 9 (77.8%) with good performance level, observed at P3 worked on the ICU. Good performance level of documentation practices was demonstrated majorly amongst nurses in the ICU and neurological units, nurses with 1-10 years working experience in the specialty, NO I and NO II cadre, RN/RM qualification, and 6-10 years professional experience.

Results of the control group revealed good performance level of documentation of EB care indicators in tracheostomy suctioning decisions was maintained post intervention in all five observations amongst participants. Nurses on the ICU maintained their lead. Nurses with good performance level were majorly distributed within 1-10 years working experience in the specialty and all cadre of nurses. The highest record was observed in the NO II and NO I category. The highest number of nurses with good performance level within demographics were: 5(55.6%) RN/RM qualified, 2(50.0%) at P4 and 2(33.4%) at P5 with intensive care certification, and 2(25.0%) BSc Nursing degree holders. The only nurse with B.Ed degree demonstrated good performance in 4 observations. The lowest number of nurses with good performance level within 6-10 years professional experience category was 1(12.5%) at P1.

Table 4.31d

Table 4.32: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy airway maintenance decisions pre and post intervention in the intervention and control groups

Study findings revealed overall poor performance level of documentation of evidence-based assessment and care indicators in tracheostomy airway maintenance decisions in both study groups.

Table 4.32: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy airway maintenance decisions pre and post intervention in the intervention and control groups

DOCUMENTATION PRACTICES OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY AIRWAY MAINTENANCE DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL						POST INTERVENTION OVERALL PERFORMANCE LEVEL					
	INTERVENTION GROUP n=32			CONTROL GROUP n=35			INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)
CARE DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)

Table 4.33a: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy airway maintenance decisions within demographic variables pre intervention in the intervention and control groups

As displayed on Table 4.33a study findings revealed all nurses in both intervention and control groups demonstrated poor performance level 0(0.0%) respectively in documentation of clinical guideline indicators utilized in EB assessment practices of tracheostomy airway maintenance in all observations.

Table 4.33a

Table 4.33b: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy airway maintenance decisions within demographic variables pre intervention in the intervention and control groups

Analysed results revealed only 1(100.0%) nurse demonstrated good level of performance of documentation practices of clinical indicators in care decisions of EB tracheostomy airway maintenance in the intervention group at P3, pre intervention. Analysis within demographics revealed the nurse worked on the ICU, had 1-10 years working experience in the unit, in the ACNO cadre, RN/RM qualified, with 16-20 years professional experience.

All nurses (35) in the control group demonstrated poor performance level 0(0.0%) of documentation of clinical guideline indicators in EB tracheostomy airway maintenance decisions in all five (5) observations within demographics pre intervention.

Table 4.33b

Table 4.33c: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy airway maintenance decisions within demographic variables post intervention in the intervention and control groups

Results revealed all participants in the study groups, intervention 32 (100.0%) and control 35 (100.0%) demonstrated poor performance level of documentation of assessment practices in EB tracheostomy airway maintenance decisions post intervention.

Table 4.33c

Table 4.33d: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy airway maintenance decisions within demographic variables post intervention in the intervention and control groups

Post intervention analysis revealed all nurses in both study groups demonstrated poor performance level of documentation of clinical guideline indicators in, EB airway maintenance care decisions in all five (5) observational sessions respectively.

Table 4.33d

Table 4.34: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy dressing decisions pre and post intervention in the intervention and control groups

Results displayed on Table 4.34 revealed poor performance level of documentation of EB clinical indicators used in assessment and care practices of tracheostomy dressing decisions amongst all nurses, pre and post intervention in both study groups.

Table 4.34: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy dressing decisions pre and post intervention in the intervention and control groups

DOCUMENTATION PRACTICES OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY DRESSING DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL						POST INTERVENTION OVERALL PERFORMANCE LEVEL					
	INTERVENTION GROUP n=32			CONTROL GROUP n=35			INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)
CARE DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)

Table 4.35a: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy dressing decisions within demographic variables pre intervention in the intervention and control groups

Pre intervention results revealed all nurses observed in the intervention group 32(100.0%) and control group 35(100.0%), had poor performance level in documentation of assessment indicators in EB tracheostomy dressing decisions.

Table 4.35a

Table 4.35b: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy dressing decisions within demographic variables pre intervention in the intervention and control groups

Table 4.35b also revealed poor performance level amongst all nurses in the intervention and control groups of documentation of EB indicators in tracheostomy dressing care decisions pre intervention.

Table 4.35b

Table 4.35c: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy dressing decisions within demographic variables post intervention in the intervention and control groups

Post intervention results revealed poor performance level of all participants in both study groups of documentation of EB assessment indicators in tracheostomy dressing decisions.

Table 4.35c

Table 4.35d: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy dressing decisions within demographic variables post intervention in the intervention and control groups

Analysis of study findings in the intervention group revealed demonstration of good performance level of documentation practices of EB care indicators in tracheostomy dressing decisions in only 1(100.0%) nurse in neurology unit at P2, and 2(50.0%) nurses at P3 in Neurology and ENT units respectively in the intervention group. All the three (3) nurses are in the category of 1-10years working experience in the units. One of the nurses is in the NO II cadre, while two (2) nurses were in the SNO and PNO designation respectively. Highest qualification of one of the nurses is Diploma (RN/RM qualified), while the other two have BSc Nursing and B.Ed Health Education qualifications respectively. The nurses were within 6-10years, 11-15 years and >20 years professional experience categories.

In the control, demonstration of good performance level was recorded in four (4) out of five (5) observations amongst minority of participants. The few nurses that demonstrated good performance level worked in the ENT and Neurology specialties with working experience of 1-10years in the units, in the NO II, NO I, SNO and ACNO designation. Highest qualification category of nurses were Diploma (RN/RM registration) and BSc Nursing degree. Within professional experience the nurses with good performance level were distributed within <1-5years, 11-15 years and > 20 years categories.

Table 4.35d

Table 4.36: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy tie change decisions pre and post intervention in the intervention and control groups

Results revealed overall, no participants demonstrated good performance level in documentation of clinical guideline indicators utilized in assessment and care decisions of EB tracheostomy tie change practices observed in both study groups, pre and post intervention.

Table 4.36: Nurses' overall performance level in documentation practices of clinical guideline indicators in evidence-based tracheostomy tie change decisions pre and post intervention in the intervention and control groups

DOCUMENTATION PRACTICES OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY TIE CHANGE DECISIONS	PRE INTERVENTION OVERALL PERFORMANCE LEVEL						POST INTERVENTION OVERALL PERFORMANCE LEVEL					
	INTERVENTION GROUP n=32			CONTROL GROUP n=35			INTERVENTION GROUP n=32			CONTROL GROUP n=35		
	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %	POOR n %	GOOD n %	TOTAL n %
ASSESSMENT DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)
CARE DECISIONS	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(100.0)	32(100.0)	0(0.0)	32(100.0)	35(100.0)	0(0.0)	35(0.0)

Table 4.37a: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy tie change decisions within demographic variables pre intervention in the intervention and control groups

Pre intervention results revealed none of the nurses 0(0.0%) demonstrated good level of observed practices of performance of documentation of EB assessment clinical indicators in tracheostomy tie change decisions in both intervention and control groups.

Table 4.37a

Table 4.37b: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy tie change decisions within demographic variables pre intervention in the intervention and control groups

Analysis of findings showed no record of observed demonstration of good performance level of EB documentation practices of tracheostomy tie care decisions in all observational sessions amongst participants in the intervention and control groups.

Table 4.37b

Table 4.37c: Nurses' performance level of documentation of clinical guideline indicators in assessment practices of evidence-based tracheostomy tie change decisions within demographic variables post intervention in the intervention and control groups

Study findings revealed no record of nurses' demonstration of good performance level of documentation of clinical guideline indicators in assessment practices of EB tracheostomy tie change decisions was observed across all demographics, in the intervention and control groups post intervention.

Table 4.37c

Table 4.37d: Nurses' performance level of documentation of clinical guideline indicators in care practices of evidence-based tracheostomy tie change decisions within demographic variables post intervention in the intervention and control groups

Results displayed revealed all participants in the intervention and control groups post intervention demonstrated poor performance level of observed documentation practices of EB care clinical indicators in tracheostomy tie change decisions.

Table 4.37d

Hypotheses Testing

H$_0$1: There is no significant difference in the pre and post test nurses' knowledge of evidence based tracheostomy care in the intervention and control groups.

Tables 4.38a - 4.38c show the analysis of data testing hypothesis one stated above.

Table 4.38a: Chi square result revealed there is a significant statistical difference in nurses' knowledge of EB tracheostomy care at pre and post intervention, in the intervention and control groups. At pre-test X^2 =1.980, p= 0.159 and X^2 =16.181, p=0.000 at post-test. Null hypothesis rejected.

Table 4.38a   Nurses' knowledge of evidence-based tracheostomy care at pre and post intervention in intervention and control groups

Knowledge Level	Pre Intervention Nurses' Knowledge of Tracheostomy Care						Post Intervention Nurses' Knowledge of Tracheostomy Care					
	Intervention Group n=32 %	Control Group n=35 %	Total N=67 %	X^2	Df	0.05 P=value	Intervention Group n=32 %	Control Group n=35 %	Total N=67 %	X^2	Df	0.05 P=value
Poor Knowledge	21(65.6)	17(48.6)	38(56.7)	1.980	1	0.159	0(0.0)	14(40.0)	14(20.9)	16.181	1	0.000
Good Knowledge	11(34.4)	18(51.4)	29(43.3)				32(100.0)	21(60.0)	53(79.1)			

Table 4.38b Independent Sample T-test was conducted to determine differences in mean score of nurses' knowledge of evidence based tracheostomy care at pre-test in the intervention and control group and post-test mean score of intervention and control groups. Results revealed at pre-test mean (SD) 20.3(3.1), 22.0 (4.6), t= -1.8, p= 0.080 and post-test mean (SD) 31.3(3.3), 22.9(3.9), t= 9.6 p= 0.000. The result indicate statistical difference in knowledge of evidence-based tracheostomy care between the intervention and control groups p=0.000. Null hypothesis is therefore rejected.

Table 4.38b Mean differences in nurses' knowledge score of evidence-based tracheostomy care pre and post intervention in intervention and control groups

Variable	Pre Intervention					Post Intervention				
	Intervention Group	Control Group				Intervention Group	Control Group			
	Mean Score SD	Mean Score SD	t	df	p=.05	Mean Score SD	Mean Score SD	t	df	p=.05
Nurses knowledge of evidence-based tracheostomy care	20.3(3.1)	22.0(4.6)	-1.8	65	0.080	31.3(3.3)	22.9(3.9)	9.6	65	0.000

Table 4.38c showed the result of analysis of mean differences of nurses' pre-post knowledge score in intervention group and control groups using paired sample t-test. Result revealed mean (SD) 20.3(3.1), 31.3(3.3), t= -16.296, p=0.000 in the intervention group and mean (SD) 22.0(4.6), 22.9(3.9), t= -0.941, p=0.353 in the control. There was a significant mean difference between nurses' knowledge score in both study groups. Null hypothesis rejected.

Table 4.38c: Pre-post nurses' mean knowledge score of evidence-based tracheostomy care in intervention and control group pre and post intervention

| | Nurses' knowledge of evidence-based tracheostomy care | | | | |
| | Pre Intervention | Post Intervention | | | |
	Mean SD	Mean Score SD	T	Df	P= 0.05
Intervention	20.3(3.1)	31.3(3.3)	-16.296	31	0.000
Control	22.0(4.6)	22.9(3.9)	-0.941	34	0.353

H₀ 2: There is no significant difference in the pre and post nurses' knowledge of decision making in the intervention and control groups.

Table 4.39a – 4.39c show the analysis of data testing the second hypothesis stated above.

Table 4.39a Chi square results reveal there is no significant difference in nurses' knowledge of decision making at pre and post intervention in the intervention and control groups. At pre-test X^2 =0.109, p= 0.742 and X^2 =0.324, p= 0.569 at post-test. Null hypothesis not rejected. This result confirms there is no significant statistical difference between nurses' knowledge of decision making pre and post intervention in both intervention and control groups p< 0.05.

Table 4.39a: Nurses' knowledge of decision making at pre and post intervention in intervention and control groups

Knowledge Level	Pre Intervention Nurses' Knowledge of Decision Making						Post Intervention Nurses' Knowledge of Decision Making					
	Intervention Group n=32 %	Control Group n=35 %	Total n=67 %	X^2	Df	0.05 P=value	Intervention Group n=32 %	Control Group n=35 %	Total n=67 %	X^2	df	0.05 P=value
Poor Knowledge	8(25)	10(28.6)	18(26.9)	0.109	1	0.742	3(9.4)	2(5.7)	5(7.5)	.324	1	0.569
Good Knowledge	24(75.0)	25(71.4)	49(73.1)				29(90.6)	33(94.3)	62(92.5)			

Table 4.39b shows the result of analysis of mean differences on nurses' knowledge score of decision making pre and post intervention between intervention and control groups. Independent Sample T-test was conducted to compare mean scores of nurses' knowledge of decision making pre and post intervention. There was no significant difference in pre-test mean scores (SD) 5.6 (1.7), 5.5(2.0), t= 0.105, p= 0.917 of the intervention group and control group but post-test mean scores showed a significant difference (SD) 6.7(1.3), 5.9(1.1), -1.313, t=2.6, p= 0.010 between the intervention and control group. Null hypothesis rejected.

Table 4.39b: Mean differences in nurses' knowledge score of decision making pre and post intervention between intervention and control groups

	Pre Intervention					Post Intervention				
Variable	Intervention Group n=32	Control Group n=35	t	df	P value 0.05	Intervention Group n=32	Control Group n=35	t	df	P value 0.05
	Mean SD	Mean SD				Mean SD	Mean SD			
Nurses' Knowledge of Decision Making	5.6(1.7)	5.5(2.0)	0.105	31	0.917	6.7(1.3)	5.9(1.1)	2.6	34	0.010

Table 4.39c Paired Sample T-test of pre-post mean score (SD) of the intervention and control group of nurses' knowledge of decision making revealed a statistical difference of 5.6(1.7), 6.7(1.3), t= -4.016 p= 0.000 in the intervention group, and 5.5(2.0), 5.9(1.1), t= -1.313, p= 0.198 in the control group. Null hypothesis rejected.

Table 4.39c: Pre-post nurses' mean knowledge score of decision making in intervention and control group pre and post intervention

	Nurses' knowledge of decision making				
	Pre Intervention	Post Intervention			
	Mean SD	Mean SD	T	Df	P= 0.05
Intervention	5.6(1.7)	6.7(1.3)	-.4.016	31	0.000
Control	5.5(2.0)	5.9(1.1)	-1.313	34	0.198

H_0 3: There is no significant difference in the Pre and Post nurses' knowledge of use of clinical guidelines in decision making in the intervention and control groups.

Table 4.40a-4.40c show the analysis of data testing the third hypothesis stated above.

Table 4.40a: Chi square results revealed there was no significant difference in nurses' knowledge of use of clinical guidelines in decision making pre and post intervention between the intervention and control groups. At pre-test $X^2 =0.624$, p= 0.429 and $X^2 =3.035$, p= 0.081 at post-test. Null hypothesis not rejected p<0.05.

Table 4.40a: Nurses' knowledge of use of clinical guidelines in decision making at pre and post intervention

Knowledge Level	Pre Intervention Nurses' Knowledge of Use of Clinical Guidelines in Decision Making						Post Intervention Nurses' Knowledge of Use of Clinical Guidelines in Decision Making					
	Intervention Group n=32 %	Control Group n=35 %	Total n=67 %	X^2	df	0.05 P=value	Intervention Group n=32%	Control Group n=35%	Total n=67%	X^2	df	0.05 P=value
Poor Knowledge	8(25.0)	6(17.1)	14(20.9)	0.624	1	0.429	3(9.4)	9(25.7)	12(19.9)	3.035	1	0.081
Good Knowledge	24(75.0)	29(82.9)	53(79.1)				29(90.6)	26(74.3)	55(82.1)			

Table 4.40b shows the result of analysis of mean differences in nurses' pre and post knowledge score of use of clinical guidelines in decision making in the intervention and control groups. Independent Sample T-test result showed pre-test mean score (SD) 3.0(0.92), 3.1(1.1), t= -0.341, p= 0.734 between the intervention group and control group. Post-test mean score (SD) 3.2(0.93), 3.1(0.91), t= -0.198, p= 0.844 showed there was no significant statistical difference in the mean scores of nurses' knowledge p<0.05. Null hypothesis not rejected.

Table 4.40b: Mean differences in nurses' knowledge score of use of clinical guidelines in decision making pre and post intervention between intervention and control groups

Variable	Pre Intervention				Post Intervention			
	Intervention Group n=32	Control Group n=35	t df	P value 0.05	Intervention Group n=32	Control Group n=35	t df	P value 0.05
	Mean SD	Mean SD			Mean SD	Mean SD		
Nurses' Knowledge of Clinical Guidelines	3.0(0.92)	3.1(1.1)	-0.341 65	0.734	3.2(0.93)	3.1(0.91)	0.198 65	0.844

Table 4.40c Paired Sample T-test analysis revealed pre-post mean score(SD) 3.0(0.92), 3.2(0.93), t= -1.099, p= 0.280 in the intervention and 3.0(1.1), 3.1(0.912), t= -0.266, p= 0.822 in the control. There was no significant statistical difference in mean knowledge score between intervention and control groups, p< 0.05 at 95% confidence interval. Null hypothesis not rejected.

Table 4.40c: Pre-post nurses' mean knowledge score of use of clinical guidelines in decision making in intervention and control group pre and post intervention

	Nurses' knowledge of use of clinical guidelines in decision making				
	Pre Intervention	Post Intervention			
	Mean SD	Mean SD	T	Df	P= 0.05
Intervention	3.0(0.92)	3.2(0.93)	-1.099		0.280
Control	3.0(1.1)	3.1(0.912)	-.226		0.822

H$_0$ 4: There is no significant difference between nurses' performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions before and after training in the intervention and control groups. Non-parametric tests Mann-Whitney U and Wilcoxon were used to test for statistical significance of median differences in the performance level of nurses' use of clinical guideline indicators in EB tracheostomy assessment and care decisions in intervention and control groups, pre and post intervention.

Table 4.41(a-b) display results of analysed data.

Table 4.41a: Mann-Whitney U Test of effect of educational intervention on nurses' performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions pre and post intervention in intervention and control groups.

Mann-Whitney U test was used to analyze median differences in pre and post performance level of use of clinical guideline indicators in EB tracheostomy assessment and care decisions in intervention and control groups. Displayed results indicated no statistical median differences in nurses' performance level of EB tracheostomy care decisions between intervention and control groups post intervention.

Results of EB tracheostomy suctioning assessment decisions revealed: median$_{pre}$ (intervention group:5.0); (control group:45.0), U=402.5, p=0.043; median$_{post}$ (intervention group:0.0); (control group:20.0), U=428.0, p=0.084. Null hypothesis not rejected.

There was no significant difference in nurses' performance level of EB tracheostomy suctioning care decisions between both study groups. median$_{pre}$ (intervention group:4.0); (control group:32.0), U=366.5, p=0.013, median$_{post}$ (intervention group:0.0); (control group:20.0), U=444.0, p=0.123 post intervention. Null hypothesis not rejected

Performance level between intervention and control group was also not significant for EB decisions making in airway maintenance care decisions: median$_{pre}$ (intervention

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group:86.6); (control group:0.0), U=318.5, p=0.001, median$_{post}$ (intervention group:63.6); (control group:50.0), U=455.5, p=0.180. Null hypothesis not rejected

Results however, show higher performance level of EB tracheostomy care decisions in the control group pre intervention.

Table 4.41a: Mann-Whitney U Test of effect of educational intervention on nurses' performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions pre and post intervention in intervention and control groups

OBSERVED NURSES' PERFORMANCE OF EVIDENCE-BASED DECISION MAKING PRACTICES IN TRACHEOSTOMY CARE	PRE INTERVENTION				POST INTERVENTION			
	INTERVENTION GROUP MEDIAN (IQR)	CONTROL GROUP MEDIAN (IQR)	U	P value	INTERVENTION GROUP MEDIAN (IQR)	CONTROL GROUP MEDIAN (IQR)	U	P value
SUCTIONING ASSESSMENT DECISIONS	5.0(60.0)	45.0(75.0)	402.5	0.043	0.0(43.0)	20.0(68.0)	428.0	0.084
SUCTIONING CARE DECISIONS	4.0(31.0)	32.0(40.0)	366.5	0.013	0.0(47.5)	20.0(72.0)	444.0	0.123
AIRWAY MAINTENANCE ASSESSMENT DECISIONS	0.0(20.0)	0.0(20.0)	543.5	0.811	0.0(0.0)	0.0(20.0)	493.5	0.335
AIRWAY MAINTENANCE CARE DECISIONS	86.6(53.3)	100.0(6.6)	318.5	0.001	63.3(50.0)	50.0(46.6)	455.5	0.180
DRESSING ASSESSMENT DECISIONS	6.6(17.6)	13.3(26.1)	452.0	0.167	5.3(19.1)	10.0(20.4)	463.5	0.219
DRESSING DECISIONS	0.0(10.0)	10.0(30.0)	466.5	0.200	0.0(15.0)	0.0(0.0)	525.0	0.556
TIE CHANGE ASSESSMENT DECISIONS	0.0(10.0)	0.0(0.0)	482.5	0.171	0.0(0.0)	0.0(0.0)	499.5	0.239
TIE CHANGE CARE DECISIONS	0.0(0.0)	0.0(0.0)	558.5	0.949	0.0(0.0)	0.0(0.0)	545.5	0.239

Table 4.41b: Wilcoxon Test of effect of educational intervention on nurses' pre-post performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions in intervention and control groups

Wilcoxon test was used to analyze median differences in pre-post performance level of use of clinical guideline indicators in EB tracheostomy assessment and care decisions in intervention and control groups. No significant median differences in intervention and control groups.

Results indicated nurses' performance level of EB tracheostomy suctioning assessment decisions were not significant: intervention group (median$_{pre}$:5.0); (median$_{post}$:0.0), Z= -1.360, p= 0.174; control group (median$_{pre}$:45.0); (median$_{post}$:20.0), Z= -.2.781, p=0.005. Null hypothesis not rejected.

Nurses' performance level of evidence-based airway maintenance care decisions in the intervention group (median$_{pre}$:86.6), (median$_{post}$:63.3), Z= -.216, p=0.829, and control group (median$_{pre}$:100.0), (median$_{post}$:50.0), Z= -4.171, p=0.000 not significant. Null hypothesis not rejected

Nurses' performance level in evidence-based tracheostomy dressing decisions not significant: (median$_{pre}$:0.0), (median$_{post}$:0.0), Z= -.407, p=0.684 in the intervention group; (median$_{pre}$:10.0), (median$_{post}$:0.0), Z= -2.868, p=0.004 in the control. Null hypothesis not rejected.

Table 4.41b: Wilcoxon Test of effect of intervention on nurses' pre-post performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions in intervention and control groups

OBSERVED NURSES' PERFORMANCE OF EVIDENCE-BASED DECISION MAKING PRACTICES IN TRACHEOSTOMY CARE	STUDY GROUPS	PRE INTERVENTION MEDIAN(IQR)	POST INTERVENTION MEDIAN(IQR)	Z	P value
SUCTIONING ASSESSMENT DECISIONS	INTERVENTION	5.0(60.0)	0.0(43.0)	-1.360	0.174
	CONTROL	45.0(75.0)	20.0(68.0)	-2.781	0.005
SUCTIONING CARE DECISIONS	INTERVENTION	4.0(31.0)	0.0(47.3)	-.873	0.383
	CONTROL	32.0(40.0)	20.0(72.0)	-.531	0.595
AIRWAY MAINTENANCE ASSESSMENT DECISIONS	INTERVENTION	0.0(20.0)	0.0(10.0)	-.752	0.452
	CONTROL	0.0(20.0)	0.0(20.0)	-.545	0.586
AIRWAY MAINTENANCE CARE DECISIONS	INTERVENTION	86.6(53.3)	63.3(50.0)	-.216	0.829
	CONTROL	100.0(6.6)	50.0(46.6)	-.4.171	0.000
DRESSING ASSESSMENT DECISIONS	INTERVENTION	6.6(17.6)	5.3(19.1)	-.228	0.820
	CONTROL	13.3(26.1)	10.0(20.4)	-1.304	0.192
DRESSING CARE DECISIONS	INTERVENTION	0.0(0.0)	0.0(15.0)	-.407	0.684
	CONTROL	10.0(30.0)	0.0(0.0)	-2.868	0.004
TIE CHANGE ASSESSMENT DECISIONS	INTERVENTION	0.0(10.0)	0.0(0.0)	-.603	0.547
	CONTROL	0.0(0.0)	0.0(0.0)	-.543	0.587
TIE CHANGE CARE DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	.000	1.000
	CONTROL	0.0(0.0)	0.0(0.0)	-.577	0.564

H$_0$ 5: There is no significant difference in nurses' performance level of documentation practices of use of evidence-based guideline indicators in tracheostomy care decisions before and after training in the intervention and control groups. Mann-Whitney U and Wilcoxon tests were conducted to test for significant median differences in performance of documentation practices pre and post and pre-post intervention to determine effectiveness of intervention in both study groups at p=.05 level of significance. Results are displayed on Table 4.41(a-b).

Table 4.42a: Mann-Witney U Test of effect of intervention on nurses' performance level of use of clinical guideline indicators in documentation practices of evidence-based tracheostomy care decisions pre and post intervention in intervention and control groups

Analysis of median differences in nurses' performance level of documentation practices in EB tracheostomy assessment and care decisions pre and post intervention in the intervention and control groups indicate no significant difference.

Documentation practice of EB suctioning assessment decisions: median$_{pre}$ (intervention group:0.0); (control group:0.0), U= 413.5, p= 0.018, and median$_{post}$ (intervention group:0.0); (control group:0.0), U= 467.0, p= 0.135 were not significant. Null hypothesis not rejected

Documentation practice of EB suctioning care decisions was also not significant between intervention and control groups: median$_{pre}$ (intervention group:0.0); (control group:20.0), U= 415.0, p=0.041, median $_{post}$ (intervention group:0.0); (control group:0.0), U= 537.0, p= 0.742 at p< 0.05. Null hypothesis not rejected.

Table 4.42a: Man-Whitney U Test of effect of intervention on nurses' performance of evidence-based documentation practices in tracheostomy care decisions pre and post intervention in intervention and control groups

OBSERVED NURSES' PERFORMANCE OF EVIDENCE-BASED DOCUMENTATION PRACTICES IN TRACHEOSTOMY CARE DECISIONS	PRE INTERVENTION				POST INTERVENTION			
	INTERVENTION GROUP	CONTROL GROUP			INTERVENTION GROUP	CONTROL GROUP		
	MEDIAN(IQR)	MEDIAN(IQR)	U	P value	MEDIAN(IQR)	MEDIAN(IQR)	U	P value
SUCTIONING ASSESSMENT DECISIONS	0.0(0.0)	0.0(20.0)	413.5	0.018	0.0(0.0)	0.0(20.0)	467.0	0.135
SUCTIONING DECISIONS	0.0(20.0)	20.0(100.0)	415.0	.041	0.0(55.0)	0.0(40.0)	537.0	0.742
AIRWAY MAINTENANCE ASSESSMENT DECISIONS	0.0(0.0)	0.0(0.0)	560.0	1.00	0.0(0.0)	0.0(0.0)	558.5	0.949
AIRWAY MAINTENANCE CARE DECISIONS	0.0(0.0)	0.0(0.0)	542.5	0.296	0.0(0.0)	0.0(0.0)	544.0	0.339
DRESSING ASSESSMENT DECISIONS	0.0(0.0)	0.0(0.0)	542.5	0.296	0.0(0.0)	0.0(0.0)	544.0	0.339
DRESSING DECISIONS	0.0(0.0)	0.0(0.0)	516.5	0.356	0.0(0.0)	0.0(0.0)	556.0	940
TIE CHANGE ASSESSMENT DECISIONS	0.0(0.0)	0.0(0.0)	560.0)	1.00	0.0(0.0)	0.0(0.0)	542.5	0.296
TIE CHANGE DECISIONS	0.0(0.0)	0.0(0.0)	560.0	1.00	0.0(0.0)	0.0(0.0)	560.0	1.00

Table 4.42b: Wilcoxon Test of effect of intervention on nurses' performance of evidence-based documentation practices of tracheostomy care decisions pre and post intervention in intervention and control groups

Wilcoxon test results as displayed on Table 4.42b revealed no statistically significant median (mdn) differences was found in pre-post analysis of nurses' performance level of documentation of evidence-based decisions in, tracheostomy suctioning assessment and care, airway maintenance assessment and care, dressing assessment and care, and tie change assessment and care practices in intervention and control groups respectively P= >0.05 at 95% confidence interval. Null hypothesis not rejected.

Table 4.42b: Wilcoxon Test of effect of intervention on nurses' performance of evidence-based documentation practices of tracheostomy care decisions pre and post intervention in intervention and control groups

OBSERVED NURSES' PERFORMANCE OF EVIDENCE-BASED DOCUMENTATION PRACTICES OF TRACHEOSTOMY CARE DECISIONS	STUDY GROUPS	PRE INTERVENTION MEDIAN(IQR)	POST INTERVENTION MEDIAN(IQR)	Z	P value
SUCTIONING ASSESSMENT DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	-1.863	0.063
	CONTROL	0.0(0.0)	0.0(20.0)	-1.163	0.245
SUCTIONING CARE DECISIONS	INTERVENTION	0.0(20.0)	0.0(55.0)	-0.656	0.512
	CONTROL	20.0(100.0)	0.0(40.0)	-2.732	0.006
AIRWAY MAINTENANCE ASSESSMENT DECSIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	1.000	0.317
	CONTROL	0.0(0.0)	0.0(0.0)	I.000	0.317
AIRWAY MAINTENANCE CARE DECISIONS	INTERVENTION	0.0(0.0	0.0(0.0)	1.000	0.317
	CONTROL	0.0(0.0)	0.0(0.0)	I.000	0.317
DRESSING ASSESSMENT DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	1.000	0.317
	CONTROL	0.0(0.0)	0.0(0.0)	I.000	0.317
DRESSING CARE DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	-1.317	0.188
	CONTROL	0.0(0.0)	0.0(0.0)	-1.030	0.303
TIE CHANGE ASSESSMENT DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	-1.000	0.317
	CONTROL	0.0(0.0)	0.0(0.0)	0.000	1.000
TIE CHANGE CARE DECISIONS	INTERVENTION	0.0(0.0)	0.0(0.0)	0.000	1.000
	CONTROL	0.0(0.0)	0.0(0.0)	0.000	1.000

CHAPTER FIVE

DISCUSSION

This chapter discusses the findings of the study in line with set study objectives and hypotheses.

5.1.1 Socio-demographic Data

Nurses that participated in the study worked on the ICU, ENT and Neurological units of the three study settings. Decision making in these settings is dynamic and often unpredictable, requiring that critical care nurses develop ability to make decisions in different and complex situations (Ramezani-Badr et al, 2009). The commonest period of work experience in the specialties was 1-10years. Sixteen nurses have had >20years professional practice experience. Designation of participants spanned across all nursing cadre and was also found significant between nurses in both study groups p=0.030. The study population was highly dominated by 53.7% RN/RM certificated nurses. Specialist nurses were: 6.0% with Intensive Care, 3.0% with ENT and 1.5% with Critical Care qualifications. Bachelor's and Master's degree holders in nursing were 23.9% and 3.0% of the nurses respectively. Others were certificated in other disciplines post RN/RM qualification. Amongst the collapsed variables for statistical analysis, only period of work experience in specialty was found significant p=0.004. This infers that the number of years nurses have worked in the specialty was significant between the intervention and control group.

5.1.2 Nurses' knowledge of evidence-based tracheostomy care pre and post intervention

Result imply training intervention enhanced nurses' knowledge of clinical guideline indicators and recommendations in EB tracheostomy care.

Amongst numerous factors required for effective decision making, knowledge has been identified as the foremost factor by several authors in literature. In this study, overall, only 34.4% of nurses in the intervention group at pre-test, demonstrated a

reasonably acceptable level of achievement of good fundamental theoretical knowledge of clinical guideline indicators and recommendations in EB tracheostomy care, applicable in professional context (Queensland University of Technology, 2013). Majority of the nurses that had good knowledge were in the control group. Study findings is an indication of gaps in nurses' knowledge of EB tracheostomy care - an implication for safe care practices. Study findings is supported by report of Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) that revealed, many subjects in their study demonstrated poor knowledge of research recommendations in tracheostomy care. Findings underscore the need for professional development of nurses managing tracheostomy conditions. The ultimate goal of nursing is to deliver to patients the best available care, and this goes hand in hand with the use of clinical guideline indicators and available research evidence in the provision of care.

It is very vital nurses are knowledgeable in the proper care of patients with tracheostomy, because inappropriate or inadequate care is associated with increased morbidity and mortality (Dennis-Rouse and Davidson, 2008). Further exploration of participants' responses revealed, majority of the nurses demonstrated knowledge of hand washing as a prerequisite clinical hygiene necessary before and after tracheostomy care practices in the intervention and control groups, respectively. This finding has direct implication for patient safety as nosocomial infections are amongst the commonest complications affecting hospital patients. Kelleher and Andrews (2008) and Jansson, Ala-kokko, Ylipalosaari and Kyngas (2013) wrote that earlier studies have reported modest or even low levels of adherence to hand-hygiene practices by nurses. The importance of aseptic technique before and after tracheostomy care practices is strongly emphasised.

Comparison of knowledge of EB tracheostomy suctioning practices between intervention and control groups at pre-test, revealed an indication of non-awareness of safety equipment required at the bedside amongst majority of participants in the intervention group. Findings showed 57.1% of participants in the control group had knowledge of the sizes of tracheostomy tube that should be available at patient's

bedside. Generally, a high percentage of nurses gave incorrect responses to recommended '2' nurses required in safe tracheostomy care, recommended suction pressure of 100-150mmHq, and calculation for correct suction catheter size. Other incorrect responses noted were, clinical guideline indicator for non-application of suction pressure at suctioning, and suction duration in both study groups. Application of suction pressure is an area of concern in tracheostomy care practices. It may cause trauma to the mucosa as it invaginates through the eyes of the suction catheter. Brown (2014) and Kelleher and Andrews (2008), wrote that Wood (1998), documented mucosal trauma predisposes the bronchial tree to higher risk of infection. According to Day, Farnell and Wilson-Barnett (2002b), the use of higher pressures in tracheostomy suctioning does not result in removal of more aspirations. However, only 12.5% and 22.9% correct responses from participants were recorded for evidence-based recommended suction pressure in intervention and control groups respectively in this study. Day, Farnell and Wilson-Barnett (2002b) also noted that it is a widely accepted recommendation that the external diameter of the suction catheter should not exceed one-half of the inner diameter of the tracheostomy tube. This catheter size allows air to enter the lungs while oxygen is being removed at suctioning. It also guards against excessive negative pressure and potential atelectasis. Use of larger sizes has been reported to increase trauma risk from greater mucosal contact (Celik and Elbas, 2000). Findings of Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) revealed all nurses in their study used larger than recommended suction catheter size supportive of poor knowledge of recommended practices by nurses. Longer suction durations beyond 10-15 seconds per session are reported to be associated with increased mucosal damage and hypoxaemia. Incorrect responses of majority of participants in this study at pre-test is highly significant considering the high risk of tracheostomy care.

Furthermore, only 50% of nurses in the intervention group responded correctly to documentation of clinical guideline indicators observed after suctioning procedure. Documentation of care activities ensures communication of care provided to members

of the healthcare team, promotes good nursing care, and supports nurses in meeting professional and legal standards. Proper documentation of care activities is a valuable data source in decision making. Knowledge of cardiac arrhythmias, atelectasis, bronchial obstruction as complications of poor suctioning practices, was also poor in both intervention and control groups. Nurses with knowledge of this complications were in the minority in both study groups. This has implication for basic knowledge needed by nurses working in Critical Care, ENT and Neurological units to improve current practices and guarantee adherence to EBP recommendations, that will ensure tracheostomy patient safety.

Further analysis of nurses' knowledge of clinical guideline indicators and recommendations in EB tracheostomy airway maintenance, stoma dressing and tie change revealed only 46.9%, 21.9% and 28.1% of participants in the intervention group responded correctly to: frequency of removal of inner cannula for inspection of tube blockage, minimum of twice daily tracheostomy dressing and, measurement of tension level and safe fit of tracheostomy tie respectively. The study results reflect unsatisfactory knowledge level amongst population of nurses. Result also have implication for sub-optimal clinical practices, particularly in airway maintenance, where the total number of responses to frequency for removal and inspection of inner cannula was below 50% of participants. Although the period between routine changes of inner cannula is controversial, twice daily changes is suggested, and frequency is determined by type and quantity of secretions produced (Higgins, 2009a). According to Morris, Whitmer and McIntosh (2013), stoma dressing should be cleansed every 4-8 hours. Nance–Floyd posit one dressing procedure per shift is required to absorb secretions and insulate the skin. Determination of 1-finger fit under tracheostomy ties aid avoidance of catastrophic consequences like tube dislodgement. This process also removes added weight and traction on the tube, keeping the tracheostomy tube flushed in a midline and neutral position (Morris, Whitmer and McIntosh, 2013, Nance-Floyd, 2011). Findings in this study is suggestive of support for Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a), who reported that, nurses are generally

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unaware of recommended tracheostomy care practices. The position of the authors is also supported by research findings of Kelleher and Andrews (2008), and Jasson, Ala-kokko, Ylipalosaari and Kyngas (2013).

Additionally, to gain further insight, analysis of knowledge of participants within their: ages, specialty, designation, professional qualifications, period of work in the specialty, and years of professional practice was done. Results revealed demography of participants has implication for quality patient care. At pre-test nurses with poor knowledge of EB tracheostomy care in the intervention group were aged between 36 and 45 years, and were in the majority. On the contrary, nurses with record of poor knowledge in the control were majorly in the age bracket of 26-35 years. Study findings revealed all nurses in the Neurological units had poor knowledge in the intervention group. Only 54.5% nurses in the ICU and 45.5% nurses in the ENT had good knowledge in the intervention group. In the control group 64.7% of nurses on the ENT had poor knowledge, while 61.1% of nurses on the ICU had good knowledge. Majority of nurses with 1-10years work experience in the specialties recorded good and poor knowledge in the intervention and control groups respectively. Within designation, nurses with poor knowledge were in the majority in all cadre of nurses in the intervention group. Majority of nurses within their cadre had good knowledge in the control. Poor knowledge was recorded amongst 66.6% and 35.3% RN/RM holders, in intervention and control groups respectively. Critical care nurses need to be aware of their professional responsibilities and require adequate support in practice by institutional policies. Amongst specialist nurses, all ENT certificated nurses 9.5% in the intervention had poor knowledge. In the control group, 5.9% of intensive and critical care certificated nurses' recorded poor knowledge respectively. Only 27.3% and 22.2% of BSc nurses had good knowledge in both intervention and control groups respectively. Kelleher and Andrews (2008) observed that, despite an increased uptake in post registration education among critical care nurses and a heightened interest in the expansion of nurses' role, literature suggests poor knowledge in many aspects of care that might be considered basic. Twycross and Powls (2006) noted in their study

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that no differences however, have been observed in EB practices of non-graduate and graduate nurses, suggesting graduate status does not affect clinical decision making.

Findings revealed a wide gap between good and poor knowledge amongst participants, irrespective of cadre, age, RN/RM, specialist or graduate qualification. This finding is suggestive of the need of nurses to be equipped with appropriate skills and knowledge, to ensure safe tracheostomy patient care and avert complications. According to Thompson, Cullum, McCaughan, Sheddon and Raynor (2004), use of relevant research findings increases the certainty that a particular course of action is most likely to lead to the desired outcome. Statistical analysis of nurses knowledge of EB tracheostomy care in airway maintenance, stoma dressing, and tie change within specialty was found significant $p=0.005$ in the control. This infers there are differences in the knowledge level of participants in the specialties of the control group at pre intervention test.

Post intervention results revealed all nurses (100%) in the intervention group showed an increase in knowledge level of EB tracheostomy care as compared to 78% in the control group. All demographic variables were found significant with nurses' knowledge at $p=0.000$. The significant improvement in knowledge amongst nurses in the intervention group could be attributed to knowledge acquired following exposure to the training programme. Similar findings were reported by Day, Wainwright and Wilson-Barnett (2001) in which significant improvements in knowledge were recorded amongst participants after teaching. Majority of nurses in the control group maintained good knowledge with 8.6% above pre-test level. Nurses working in the ICU (47.6%) maintained good knowledge level. Twelve nurses with poor knowledge and 19 with good knowledge have worked for 1-10years. Within designation 12.5% nurses in the NO I cadre and all nurses in ACNO cadre had poor knowledge. Nurses with good knowledge were, 42.9% of RN/RM holders, 14.3% of intensive care certificate holders, and 28.6% BSc nurses. Also 28.6% and 23.8% nurses with good knowledge had work experience of 6-10years and >20years respectively. Nurses with record of poor knowledge were 28.6% and 42.9% with 6-10years and >20years

practice experience respectively. No statistical significant difference was found between nurses' knowledge, and all the demographic variables in the control group.

On the whole, study findings on nurses' knowledge of clinical guideline indicators and recommendations in EB tracheostomy suctioning, airway maintenance, stoma dressing and tie change raised concern suggestive of an unsatisfactory level of theoretical competence expected of nurses in a professional context. There was a considerable lack of knowledge about various aspects of clinical indicators and recommendations in EB tracheostomy care at pre intervention assessment in the intervention group, and pre and post intervention assessment in the control group. It was encouraging to observe a marked improvement in nurses' knowledge after teaching intervention: an implication of an effective training in the intervention group. The result of this study has implication for effectiveness of use of clinical guidelines in provision of knowledge of clinical guideline indicators and research recommendations, as a framework for practice. The findings were suggestive of the current knowledge and practice level of EB tracheostomy care amongst nurses to be below 60 percentile, irrespective of: age, specialty, period of work experience in the specialty, designation, qualifications, or years of professional experience. Post intervention results support the advocacy for development and use of research-based guidelines, to provide a framework of practice for nurses. This will enable exercise of appropriate knowledge and clinical judgement skills, in the application of clinical guideline indicators and research evidence into tracheostomy care decisions.

Result of Hypothesis 1 indicated that there was no significant difference in the two groups at pre intervention. However, after training intervention, there was a significant statistical difference in knowledge of EB tracheostomy care between the intervention and control groups. Knowledge of nurses of EB tracheostomy care improved after training in the intervention group.

5.1.3 Nurses' Knowledge of decision making pre and post intervention

Nurses are significant decision makers in any developed health care system, and patients trust nurses to make decisions that do more good, than harm (Thompson, Aitken, Doran and Dowding, 2013). Study findings revealed a total of 73.1% nurses at pre-intervention and 92.5% at post-intervention test had good knowledge level of decision making, in both study groups. This result is impressive as nurses play crucial role in healthcare delivery. The knowledge level of decision making at pre intervention can be attributed to continuous education programmes organized in the study settings by the Nursing Services Department at regular intervals, to improve nurses' knowledge and care practices. Improved knowledge level of nurses post intervention, was observed to be positively influenced by the training programme in the intervention group. Nurses as professionals are required to adhere to accepted standards of practice and professional performance in decision making. The use of EB interventions, and integration of research findings is mandatory (Winters and Echeverri, 2012).

On critical analysis of study findings, only 11% of nurses identified the steps of decision making correctly in the control group. Thompson, Aitken, Doran and Dowding (2013), noted that the health care system require nurses whose clinical judgement and decisions contribute to and not distract, from the quality of health care. Understanding the concept of decision making and clinical decision making is crucial as critical and acute care nurses make lots of decisions, and face a decision or judgement task, every 30minutes and 10minutes. This has potential for introducing unnecessary harm, through less than optimal decisions. There was a good trend of knowledge, which was sustained amongst nurses within age groups, specialty, period they have worked in the specialty, designation, qualification, and years of professional practice in this study. The results revealed statistical significance between nurses' knowledge of decision making after training and their period of work experience in the current specialty at p=0.003. Nurses' knowledge of decision making was also

significant with designation p=0.031 at post intervention signifying a relationship between designation and nurses' knowledge level of decision making.

Results of Hypothesis 2 that was tested revealed that there was no significant difference in nurses' knowledge of decision making at baseline between the intervention and control groups. However after training, there was a significant difference in the knowledge of nurses in the intervention group that received training than the control group.

5.1.4 Nurses' knowledge of use of clinical guidelines in decision making pre and post intervention

Nurses' knowledge of use of clinical guidelines in decision making was generally good in both study groups, which improved after training in the intervention group. The broad purpose of clinical guidelines is to aid clinicians in provision and evaluation of care, against best practice (Osborne and Webster, 2010). At pre-test 79.1% of nurses and 82.1% nurses at post test had good knowledge of use of clinical guidelines in decision making. Majority of nurses had knowledge clinical guidelines as decision trees formulated to guide users in courses of actions, dependent on stated preconditions, and that they are useful in nursing practice. In relation to test item on knowledge of clinical guidelines promoting nurses autonomy: at pre intervention test, only 46.9% and 51.4% of nurses responded correctly in the intervention and control groups respectively. Post intervention test results revealed a decrease in the proportion of nurses with good knowledge of relationship between clinical guidelines and autonomy in the control group. At pre intervention test the highest proportion of nurses with good knowledge within units worked on the ENT ward in both study groups. Within nursing qualification, RN/RM holders took the lead of nurses with good knowledge of use of clinical guidelines in both study groups. At post intervention test all ENT certificated nurses in the intervention group and all Critical Care certificated nurses in the control group had good knowledge. Statistical test of relationship between nurses knowledge of use of clinical guidelines in decision

making and collapsed socio-demographic variables, at pre and post intervention in both groups. showed no statistical significance with all demographic variables.

Increase in nurses' knowledge of use of clinical guidelines in the intervention group, could be attributed to exposure to knowledge in the training intervention. The low knowledge level in the control group has implication for nurses' probable lack of understanding of the relatedness of clinical guidelines, to the independent function of the nurse in decision making. It is imperative nurse practitioners understand the difference between, protocols, nursing procedures, and clinical guidelines in terms of the amount of operational details they contain (Tong, 2001). According to Profetto-McGrath, Smith, Hugo, Taylor and El-Hajj (2007) the interest in finding ways to bridge the gap between nursing research and implementation of findings has been on the increase. Training of practicing nurses in understanding clinical guidelines as a means of translating research findings into feasible recommendations, ready for integration into practice is advocated. Nurses also need to be knowledgeable that use of clinical guidelines in nursing decision making addresses problems of variability and inappropriate practices by putting together, available evidence and clinical indicators to support effective, and efficient care. Majid, Foo, Luyt, Zhang, Theng et al (2011) reported that a meta-analysis done by Heather et al demonstrated that nursing practice based on evidence improves patient care when compared to traditional practices.

Hypothesis 3 results reveal there was no significant difference in nurses' knowledge of use of clinical guidelines in decision making at baseline, and after training intervention in the study groups.

5.1.5 Examination of nurses' self-report of evidence-based practices in tracheostomy care decisions pre and post intervention

According to Thompson, Cullum, McCaughan, Sheddon and Raynor (2004), to encourage nurses to engage actively in research evidence use in clinical decisions, there is a need to better understand the relation between decisions nurses make, and the knowledge that inform them.

Nurses' self-report responses to the open-ended questions was explored to provide insight into nurses' expressed reflections of their decision making practices in: EB tracheostomy suctioning, airway maintenance, dressing and tie change. Reports were content analysed into three themes: decision making steps required in EB tracheostomy care, responses relevant to best practices, and non-evidence-based responses at pre and post-tests.

For the first theme set as nurses' report on steps of decision making which includes documentation practices, revealed assessment practices of clinical guideline indicators prior to tracheostomy suctioning, was generally poor at pre-test. To determine suctioning need, a thorough clinical assessment of the patient including chest auscultation is recommended in EBP. Only 3.1% of nurses reported chest assessment by auscultation as a prime clinical guideline requirement before tracheostomy suctioning decisions, in the intervention group. In the control group there was no report of chest assessment for clinical indicators. Jansson, Ala-kokko, Ylipalosaari and Kyngas (2013), reported that previous studies have found majority of suctions were carried out without clinical indicators related to chest auscultation. Assessment of oxygen saturation level was reported by 12.5% of nurses in intervention, and 31.4% nurses in the control group. Nurses' report of assessment for respiratory rate and pattern was also poor in the intervention group. A higher number of nurses 22 and 11 in the control and intervention groups respectively reported: observation of consistency, colour, rate, and odour of tracheal secretions as necessary clinical guideline indicators for determining suctioning need in EB tracheostomy care decisions. This finding of high report amongst nurses is suggestive of a routine pattern of assessment practices in suctioning decisions, in both study groups. No report was made in both study groups for the two EB decision steps to either "do nothing" or "perform suctioning following evidence of clinical indicators from assessment" in the decision making for care selection. Only 9.4% and 3.1% of nurses reported: non-application of suction pressure at catheter insertion, and suction duration of 10-15 seconds per session in the intervention group respectively for implementation of EB

recommendations in tracheostomy suctioning. Monitoring of clinical indicators of: breathe sounds, saturation levels, vital signs, and patient status to evaluate tracheostomy patient condition was reported by 31.5% nurses in the intervention group, and 8.6% nurses in the control. Only 3.1% of nurses in the intervention group reported documentation of assessment findings after suctioning. No report was made for documentation of care activities in both groups. Nurses' report of decision making practices is reflective of the poor knowledge score for EB tracheostomy care at pre intervention test.

Post intervention test report revealed a demonstration of some level of improvement in knowledge recall in the intervention group after training, above the control. However, only 43.3% of nurses in the intervention group reported clinical guideline indication of auscultation practices in chest assessment prior to suctioning. Also 59.4% of nurses reported recommended application of suction pressure only when catheter is in position, and continuously at withdrawal in the intervention group. Report of other clinical guideline indicators and recommendations in practices of EB tracheostomy suctioning decisions in the intervention group, though below 50%, was more than pre-test level in the steps of the decision making process. Low level of nurses' report may probably be attributed to non-practice of EB clinical judgement skills, in assessment of clinical indicators prior to care decisions by nurses, posing challenge to recall. In the control group, nurses' report at post intervention test was observed to be inconsistent as the proportion of appropriate EB decision making practices, were even lower than pre intervention test result. This is probably due to guess work, or workplace stress.

Research findings are significant in that nurses' report of decision making practices in EB tracheostomy suctioning care were suggestive of unsatisfactory practices of clinical judgements necessary for clinical competence. Findings are also significant given that, majority of nurses in both study groups: have worked for 1-10years in the specialties, with 40.6% in the intervention group having professional practice experience of 11-15years, and 28.6% with 6-10 years practice experience in the control.

Study findings of nurses' report of EB decision making practices in airway maintenance was also generally poor - an important area of concern. Tracheostomy patient conditions change quickly. It is critical to assess for aspirations, cough, swallowing abilities, and breathing patterns. Managing critical conditions like tracheostomy require nurses to recognize potential signs and symptoms of hypoxia. Assessment practices required in determination of clinical guideline indicators for evidence of airway patency, was not reported by any of the participants in the intervention group. Only 2.9% of nurses in the control reported the need to assess for free airflow and breathing difficulty. Only 12.5% and 2.9% of nurses in the intervention and control groups respectively, reported administration of humidified oxygen in the evidence of indicators of thick and dry secretions in decision making for selection of care strategies. It is worthy of note that, adequate humidification and hydration keep secretions thin, and prevents occurrence of tube blockages, and complications of hypoxia. Implementation of suctioning in care decision was reported by only 18.8% in the intervention group, and 11.4% of nurses in the control. Removal and replacement of inner cannula before cleaning the dirty one was reported by only 18.8% and 34.4% of nurses respectively in intervention and control groups. Documentation of assessment findings and care activities rendered recorded 0.0% report in both study groups.

Post intervention results revealed an improvement in knowledge recall of airway maintenance practices above pre intervention level in the intervention group. Howbeit, below 50 percentile of nurses in the study group reported appropriate clinical judgement skills required for determination of clinical guideline indicators in each decision making step. Only 68.8% and 50.0% of nurses reported the EB care recommendations of administration of humidified oxygen and patient hydration, in evidence of thick and dry secretions in the tracheostomy tube, respectively in intervention and control group. In the control group the highest number of nurses' report (31.4%), was noted for removal/replacement of inner tube before cleaning the dirty tube. Findings of nurses' self-report at pre and post intervention tests, have

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important relevance with direct implication for patients' safety, in critical care decision making of EB airway maintenance.

Nurses' self-report of EB decision making for tracheostomy dressing was also poor in the steps of decision making at pre intervention test. The study findings are shocking as wound dressing is a consistent independent function of the nurse in care activities. Assessment practices for clinical guideline indicators of soils to determine the need for stoma dressing change, and signs of infection at dressing removal was reported by just over 30% of nurses in both study groups. Percentage of nurses report was 57.1 in the control group for assessment indicators for evidence of soils, a percentage observed to be higher than reports recorded in the intervention group. Only 12.5% and 14.3% of nurses reported "performance of stoma dressing" following clinical indication of evidence of soils in the intervention and control groups respectively, in care decisions. Also, only 2.9% of nurses reported EB recommendation of removal and replacement of inner tube with a new one, before proceeding to wash the dirty tube.

Post intervention test result however, revealed improvement in nurses' self-report following training in the intervention group. The highest number of nurses 59.4%, 71.9% and 46.9% respectively in the intervention group reported: assessment of soils to determine need for stoma dressing change, performance of stoma dressing in evidence of soils, and dressing change in signs of stoma dressing that is not dirty or wet but was changed 4-6 hours previously. Low levels of report of clinical guideline indicators and recommendations in EB stoma dressing decisions was recorded amongst nurses in the control group. It is recommended by research evidence that stoma dressings are changed in the presence of excessive exudates, to promote skin integrity, prevent infections, absorb secretions, and insulate the skin. Results are suggestive of routine care, and lack of understanding of clinical judgement processes required in use of clinical guideline indicators and recommendations, in EB stoma dressing activities by nurses. Study findings are in support of findings of Day, Farnell, Haynes, Wainwright and Wilson-Barnett (2002a) that, nurses are generally unaware of EB recommendations in tracheostomy care. Implication is that nurses' performance of

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EB care decisions in tracheostomy dressing is below clinical competence level required in professional nursing, in both study groups.

EB care decisions are important in the nursing management of tracheostomy ties to lower the risk of accidental dislodgement of tracheostomy tubes, and ensure patient safety. Pre intervention test results revealed, the report of decision making practice was zero percentage, for assessment of clinical guideline indicators to ascertain tracheostomy tie is drawn below the neck, in both study groups. Only 9.4% and 5.7% of nurses' reported performance of tie change in the clinical indication of evidence of dirty tie in EB care decisions in the intervention and control groups respectively. Also only 12.5%, 9.4% and 25.0% nurses reported use of recommended 2-person technique, side to side tie change procedure, and 1-finger width measure for tension and retie decisions, in the intervention group respectively. For evaluation/reassessment decisions, only 3.1% of nurses in the intervention group reported the need for retie of tracheostomy tape in clinical indication of evidence of < or > 1-finger width between neck and tie. No reports were recorded for documentation practices of assessment and care decisions amongst nurses in both intervention and control groups. Thompson, Aitken, Doran and Dowding (2013) observed that there is need to improve nurses' clinical judgement and decisions - reflective of the findings of this study. According to Standing (2010) practice oriented educational programmes equip nurses with relevant skills, so they are fit for practice and purpose.

Post intervention result revealed some improvement in nurses' self-report of judgement skills required in EB decision making, evident in knowledge of clinical guideline indicators acquired following training, in the intervention group. Though the educational intervention on EB decision making to introduce clinical guideline indicators, and EB recommendations in tracheostomy care, equipped nurses with knowledge, the recall of their application in decision making was however, not encouraging. Proportion of nurses' recall were found to be low in many areas of clinical judgement, required in EB decision making, in the intervention group. This was evident in nurses report at post-test, as there was marked difference between

nurses' report of EB decision making practices pre and post intervention. Report of EB decision making was also low amongst nurses in the control group that did not have training. The highest report of EB assessment practices of clinical guideline indicators in tracheostomy tie decisions was made by 34.4% and 34.3% of nurses for: cleanliness, wetness, stains, and crusts of tapes, and tape security at both sides of the neck in the intervention group and control group respectively. Only 56.3% and 25.7% of nurses in the intervention and control groups reported decision for tie change in clinical indication of evidence of dirty tie. Report of evaluation and reassessment practices was low in the intervention group. Report of nurses on documentation of assessment and care decisions was also generally low in both study groups, considering the fact that the nursing process is utilized by nurses in care practices. It is imperative nurses are aware of documentation as possible predictor of patient deterioration (Collins, 2014). According to College of Registered Nurses of British Columbia Practice Support (2012), accuracy of documentation decreases potential miscommunication of errors. It enables assessment of client's status, nursing interventions carried out and, results of interventions to other nurses and care providers. Research findings are suggestive of the need for training and re-training of nurses to integrate theory and practice in nursing decision making practices.

The second theme of nurses' self-report at pre intervention, was drawn from best practice responses of core practice measures that are relevant and acceptable standards in nursing, in both study groups. Best practices according to University of IOWA (2015) refers to nursing practices that are based on best evidence available in nursing research, with the goal of application of most recent, relevant, and helpful nursing interventions based on research, in real-life practice. The highest proportion of self-report responses recorded were: 84.4% for explanation of procedure to patients and positioning, 65.6% for aseptic practices, 25% for availability of bedside equipment, and 9.4% for formulation of nursing diagnosis in tracheostomy care decisions amongst nurses in the intervention group. Patient information and positioning encourages patient participation, relieves anxiety and distress, thereby maximizing effectiveness

of tracheostomy care. Maintenance of asepsis in care activities on the other hand, reduces associated infection risk (Day, Farnell, Haynes, Wainwright and Wilson-Barnett 2002a). Formulation of nursing diagnosis is a step in the nursing process, a framework for nursing decisions utilized by nurses in the study settings for patient care activities. According to Jones (2007), the nursing process is the most familiar and comfortable model for nurses in decision making, as reflected in the report of some nurses in the intervention group. In the control group 46.9% and 17.1% nurses reported ensuring care practices that promote tube security and patency at suctioning. Only 5.7% and 8.6% of nurses in the control group reported daily tie changes, and ensuring adequate tie is available before the decision for change is made respectively. These findings are significant in the light of the fact that, they bear relevance to knowledge of practices that enhance patient safety and, positive care outcomes in real-life practice. Reports represent quality care deemed optimal, based on prevailing standards in nursing.

The third self-report theme was drawn from significant responses that were related to non-EB practices in decision making. In the intervention group 15.6% of nurses mentioned instillation of sodium bicarbonate for tracheostomy suctioning at pre intervention. Furthermore, 68.8% of nurses in the intervention and 40.0% of nurses in the control mentioned instillation of normal saline and sodium bicarbonate to soften or loosen secretions in maintenance of airway patency. The use of normal saline or sodium bicarbonate to loosen secretions is not recommended in practice. Responses are suggestive of routine unit-based practice from the high report of nurses.

Post intervention test results revealed marked reduction in non-EB report in the intervention group post training in comparison to the control. Results showed 2.9% of nurses reported instillation of sodium bicarbonate for suctioning and 42.9% reported the use of normal saline and sodium bicarbonate for airway maintenance in the control. Only 6.3% and 3.1% of nurses in the intervention group reported wrong suction time limit and, instillation of normal saline and sodium bicarbonate for airway patency respectively, after exposure to training. Study findings confirm the assertion

of Day, Farnell and Wilson Barnett (2002b) that studies have identified suctioning practices are potentially unsafe, and not based on current research recommendations. Findings are also supportive of Vincent, Hastings-Tolsma, Gephart and Alfonzo (2015), reporting Prasad and Ionnidis (2014) who wrote that, the negative ramification of continuing to engage in ineffective or harmful practices for patients and the healthcare system are vast.

5.1.6 Nurses' performance level of use of clinical guideline indicators in evidence-based tracheostomy care decisions pre and post intervention in the intervention and control group

In this study, nurses' performance of use of clinical guideline indicators in the practice of EB tracheostomy to direct assessment and care decisions in suctioning, airway maintenance, dressing, and tie change were examined by participant observation. Inquiry was done to determine effect of training intervention on nurses' competence, and consistencies of adherence in care decisions in the natural clinical setting. Implication of study results is poor application of good theoretical knowledge level, demonstrated after training in the intervention group to clinical practice that meet desirable standard of care.

Results of EB suctioning decisions revealed, overall, only 25.0% and 45.7% of participants in the intervention and control groups demonstrated good performance level in use of clinical guideline indicators in assessment decisions respectively. For EB care decisions, only 12.5% of participants in the intervention group and 14.3% in the control demonstrated good performance level in the use of clinical indicators in care practices. Post intervention results revealed reduction in number of participants 9.4% and 31.4% with good performance for assessment decisions in both study groups. Some level of increase was observed at post intervention for EB care decisions 15.6 % and 34.3% in both intervention and control groups respectively. Results in the intervention group that received training were similar to findings of Day, Wainwright and Wilson-Barnett (2001). The authors reported demonstration of a generally poor

performance of EB care practices of endotracheal suctioning by participants in their study at baseline, considering majority of the participants had received previous trainings and most of them had more than 5years experience in the ICU. Practice of nurses in their study however, improved post intervention. Pre and post intervention results of this study are supported by Day, Wainwright and Wilson-Barnett (2001), who reported findings of other authors that, problems in retaining knowledge and skills over time have long been documented in literature. Findings have implication for re-training of nurses.

Observed assessment and care practices of participants in use of clinical guideline indicators for EB tracheostomy suctioning revealed auscultation was carried out in minority of nurses pre and post intervention in the intervention and control groups. Assessment of oxygen saturation levels was observed only in the ICU, where pulse oxy-meters and monitors were available in both study groups. Majority of nurses were observed to assess for increased secretions, noisy respiration and increased respiration pre and post intervention in the control group. Results also revealed majority of nurses failed to carry out tracheostomy suctioning pre and post intervention in the intervention group. The highest number of suctioning practices observed was amongst nurses in the control group pre intervention. Observation of EB tracheostomy care practices revealed non-adherence to clinical guideline indicators and EB recommendations amongst majority of participants in the intervention and control groups in: application of suction pressure, tube rotation, limit of suction passes and suction duration practices. Findings are suggestive of nurses working from a combination of clinical signs as necessary for suctioning. Findings are also consistent with nurses' self-expressed information of decision making initiatives at knowledge tests, suggestive of routine pattern of assessment practices amongst nurses. Study findings confirm report of Janson, Ala-koko, Ylipalasaari and Kyngas (2013) that majority of suctioning practices by nurses were carried out without clinical indicators from chest auscultation. Results revealed an implication of tracheostomy patients being left for long periods without attention which has implication for patient safety.

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Clinical competence performance in the use of clinical guideline indicators in EB assessment practices in tracheostomy airway maintenance is a very crucial aspect of patient safety in nursing care. Generally, observations show that majority of nurses failed to assess for evidence of crusts or free airflow of tracheostomy tubes to determine care needs pre intervention in both study groups. At post intervention observed assessment practices were also noted to be lower than levels at pre intervention in both study groups. Findings are indicative of inadequate practices of clinical judgement that are essential for clinical competence by nurses in EB maintenance care decisions. The role of nurses in the provision of effective tracheostomy care in airway maintenance is very vital to patients' general well-being and quality of life. Patients are always at risk of tube blockages, complete removal of tube, or deterioration in clinical condition requiring close observation. Findings of the study are important and have direct implication for patient safety. Minority of participants were observed to encourage fluid intake by patients to loosen secretions in both study groups pre intervention. An increase in fluid intake encouragement in patient care was observed post intervention in the control group, above levels of nurses in the intervention group that received training. However, nurses that applied normal saline to loosen secretions in care decisions were observed to be lower in the intervention group post intervention. This finding is an implication of a positive effect of the training programme though minimal, on reduction of care decisions that are not recommended in airway maintenance practices in the intervention group.

Assessment practices of use of clinical guideline indicators prior to dressing decisions was observed in minority of participants for soils, infection, stoma breakdown, swelling and last time of tracheostomy care. Flange inspection for pressure on the stoma was observed to be practiced more in the control group amongst minority of participants. Post intervention results revealed a reduction in the occurrence of tracheostomy dressing amongst participants. Implication of this observation is that patients are left for prolonged periods without attention to stoma dressing, presenting threat to patient safety, infections and long hospital stay. Occurrence of EB care decisions for inner tube removal was observed highest in both study groups.

Replacement of inner tube before cleaning the dirty one improved post intervention in both study groups. Use of recommended guideline for stoma cleansing was observed in 4 observations in the intervention group. A reflection of uptake of training instructions in the intervention group of use of normal saline for stoma cleansing was also observed. Results revealed slight improvement in nurses' performance of replacement of inner tube with a new one before cleaning the old one, recommended stoma cleaning technique, and use of normal saline for stoma cleansing in the intervention group that received training .

Use of clinical guideline indicators in assessment practices for cleanliness and security of tracheostomy tie was observed amongst minority of participants pre and post intervention in the intervention and control groups. Assessment of 1finger width between tracheostomy tie and neck as clinical indicator for determination of patient comfort and safety, was observed in few nurses in 2 observations in the intervention group, and 3 observations in the control, pre intervention. The practice of 2-person technique in tracheostomy care decision was observed only once in both study groups respectively, pre intervention. At post intervention, assessment practices improved with the highest observation of 4 participants in the intervention group. Assessment practices was observed once in each of the five observation respectively in the control group. Care decision of tie change by 2-person technique was observed once in the intervention group, and twice in the control group. According to Paul (2010) nursing staff within diverse settings are expected to provide safe and effective care, they must be able to readily identify tracheostomy patient needs, apply evidence-based recommendations to care and prevent deterioration of patient conditions, which can result in re-admission into the ICU (Docherty, 2002). Furthermore, it is expected every healthcare worker must exercise clinical judgement in the care of patients with tracheostomy (Ministry of Health, Singapore, 2010). Nance-Floyd (2011) noted that whether seasoned veteran or novices, nurses who manage tracheostomy patients need to adhere to EB guidelines in care decisions to avoid poor patient outcomes.

Further exploration of nurses' use of clinical guideline indicators in assessment and care practices in: tracheostomy suctioning, airway maintenance, dressing and tie change within demographics revealed, poor performance level of participants cut across all variables. Every nurse according to Day, Wainwright and Wilson-Barnett (2001) is required to adhere to accepted standards of practice and professional performance, irrespective of length of period of work in the specialty, qualifications, designation, or years of professional practice. These standards mandate the use of EB interventions, and the integration of research findings into practice (Winters and Echeverri, 2012). According to Twycross and Powls (2006), experienced and less experienced nurses were observed to collect similar additional information before care interventions, supporting the conjecture that they were functioning at non-expert level of decision making.

Age, specialty, years of experience in specialty, designation, qualification and professional years of experience of participants appear not to have much influence on nurses' performance level of EB decisions in both study groups from study findings. However, nurses on the ICU in both study groups maintained good level of performance above nurses on the ENT and Neurological wards pre and post intervention. Ramezani-Badr, Nasrabadi, Yekta and Taleghani (2009) highlighted that decision making in critical care is dynamic and unpredictable, and that the most significant characteristic of critical care nurses is their ability to make different decisions in complex situations. Study findings revealed poor performance level in all areas of EB tracheostomy care decision was predominant amongst participants in the ENT and Neurological units, suggestive of special attention in re-training programmes of nurses managing tracheostomy patients on the wards. Findings has implication for institution of tracheostomy care nurse programmes, which should include EB knowledge and hands-on training to improve nurses' performance of tracheostomy care decisions (Sodhi, 2013). Day, Farnell. Haynes, Wainwright and Wilson-Barnett (2002a) wrote that there is evidence practitioners are not adequately educated or experienced to care for patients with tracheostomy tubes on the wards. Standing

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(2010) on the other hand advanced that, theoretical knowledge is of limited value unless it helps to inform and guide high standard of patient care that is responsive, and adjusted to individual needs and circumstances.

Routine practices in care decisions across demographics, was observed to be dominant amongst participants who are exposed to regular continuing education programmes in their institutions of practice, before the intervention programme. Findings are in support of report of St. Clair (2005) of inconsistencies in knowledge levels and variations in clinical practice of tracheostomy care decisions, presenting threat to patient safety. As nurses are increasingly involved in clinical decision making, it is becoming important for them to utilize best evidence to make effective and justifiable decisions (Majid, Foo, Luyt, Zhang, Theng et al, 2011). Standing (2010) reported it appears nurses have challenge in understanding clinical information necessary in assessment practices for safe clinical decisions. Research findings indicate a need for further research into tracheostomy care practices of nurses in decision making.

The primary motive of this study is to reduce clinical uncertainty by provision of knowledge of EB clinical guideline indicators to improve nurses' decision making in tracheostomy care practices. Use of clinical guideline indicators aim at improving quality or standard of care, and are mechanisms for reduction of variations in practice. The use of clinical guidelines to direct care discourage practices that are not based on sufficient evidence (Shaban, 2012). Cullen and Titler (2004) noted integration of EBP into care delivery can best be done at the bedside by direct care providers, in conjunction with quality improvement programmes. According to Standing (2010), Benner (1984) postulated that the capacity to integrate theory and practice underpins the notion of the nurse as a knowledge doer. Dowding and Thompson (2002) also opined that integration of theory and practice is needed to justify, explain and defend judgement and decisions.

Poor performance level of nurses in this study in the use of clinical guideline indicators to direct care decisions may probably be due to participants' disposition to

care provision, considering that, nursing process - a framework for decision making practices that are based on evidence, is the structure in place for care provision in the study settings. Participants are also privileged in exposure to continuing education as a standard for practice improvement in the study settings on regular basis. This established structure of performance improvement programmes, which should ultimately encourage nurses in the exercise of use of clinical guideline indicators in clinical decision making practices, appear as only theoretical knowledge amongst participants. Study setting 'A' has an established nursing audit unit to assess and enhance care practices. It was observed the effect of such programmes did not reflect in nurses' care practices in the study setting.

Test of Hypothesis 4 revealed analysis of Mann-Whitney U Test on statistical median differences of nurses' performance level of evidence-based decisions in tracheostomy care between intervention and control group pre and post intervention. The results showed significantly higher performance level of EB decisions in tracheostomy suctioning assessment, tracheostomy suctioning care and airway maintenance care decisions in the control group at pre intervention. There was no significant differences post intervention between both study groups.

Wilcoxon test analysis of median differences in pre and post intervention performance level of evidence-based decisions in the study groups was also done. Pre-post intervention analysis of performance level of EB decisions in the control group indicated nurses' performance level of evidence-based suctioning assessment decisions, airway maintenance care decisions and tracheostomy dressing decisions were significantly higher in the control above the intervention group that received training. There was no significant differences in performance level of nurses post intervention.

Findings of this study indicated a disparity between knowledge acquired at training and its application to practice in the intervention group. Statistically significant higher performance level of the control group at pre intervention is probably due to

participants' consciousness of being observed by the researcher, as performance level could not be sustained post intervention. Post intervention result is suggestive of actual performance level of participants in both study groups. Study findings raised concern of nurses' performance level in the use of clinical guideline indicators to direct EB tracheostomy care decisions, as suggestive of an unsatisfactory level of clinical competence expected of nurses managing critically ill patients. Nevertheless, Koh, Manias, Hutchison, Donath and Johnston (2008) wrote that patient outcomes could be significantly improved if knowledge gained from health research is better translated into practice, yet research knowledge has been slow to influence practice.

Mehrdad, Joolaee, Joulaee and Bahram (2012) noted that changing attitudes and enhancing, is the first step towards establishing EBP. Their observation is supported by Koh, Manias, Hutchison, Donath and Johnston (2008) who also identified individual professional knowledge, skills, attitude and habits as one of the barriers amongst many factors which underpin health professionals' adoption and adherence, to protocols developed from clinical guidelines. Findings of their study on nurses' perceived barriers to the implementation of fall prevention clinical guidelines in Singapore, also revealed knowledge and motivation was topmost in the responses of participants. Majority of the respondents in their study were diploma and certificated nurses who according to the authors were probably, neither exposed to research nor EB practice within their curriculum. Fewer nurses in the study had degree qualification which had an implication on responses of participants. Their findings are similar to qualification distribution of nurses in this study, where majority of participants 53.7% were RN/RM registered nurses who, probably are neither exposed to research nor EBP within their training curriculum. Nurses with Bachelors and Masters degree in nursing were 23.9% and 3.0% respectively. Specialist nurses were 6.0% Intensive Care, 3.0% ENT, and 1.5% Critical Care nurses. This finding is probably suggestive of individual professional knowledge, attitude, habit, and exposure to research in EB care provision, as hindrances to professional behaviour in

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the use of clinical guideline indicators to direct EB tracheostomy care decisions amongst nurses, in the intervention group after training.

Puffer and Rashidi (2004) observed evidence indicates that, though nurses are increasingly using guidelines to ensure quality of care, there is a wide variance in their adherence to them. It has also been noted that despite pronouncement, guidelines have had limited effect on changing professional behaviour and practice. There is still insufficient rigorous evaluative research on implementation strategies for clinical practice guidelines in hospitals (Koh, Manias, Hutchison, Donath and Johnston, 2008). However, successful implementation of clinical guidelines reduces inappropriate variations in practice. It provides a set of instructions for clinical decision making to improve patient safety and patient outcomes, and also promotes cost effective and quality care (Koh, Manias, Hutchison, Donath and Johnston, 2008).

5.1.7 Nurses' performance level in documentation practices of clinical guideline indicators utilized in evidence-based tracheostomy care decisions pre and post intervention.

Documentation practices of clinical guidelines indicators utilized in the direction of EB assessment and care decisions in tracheostomy suctioning, airway maintenance, dressing and tie change pre and post intervention, were explored in the intervention and control groups and analysed. Research findings are suggestive of actual documentation practices of nurses in the study groups.

Documentation is an important function of professional nursing practice. It is vital nurses document their assessment, clinical judgement, and actions, because standards of nursing and legal responsibilities of the profession demand thorough documentation of nursing care (Higuchi, Davies, Edwards, Ploeg and Virani, 2011). Assessment is the first standard of nursing practice (American Nurses Association, 2010 cited in Okaisu, 2014). Overall analysis of nurses' documentation of assessment practices in EB tracheostomy suctioning revealed no nurse demonstrated good performance level in documentation of clinical guideline indicators that directed assessment decisions pre

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intervention, in the intervention and control groups. Tracheostomy suctioning should be done only when necessary, and not on routine basis (Doncaster and Bassetlaw Hospital, 2014). Clinical guideline indicators for determination of EB tracheostomy suctioning need include: coarse breathe sounds, noisy breathing, increased or decreased respiratory rates, decreased oxygen saturation, copious secretions, and patient attempting to cough (Liverpool Health Service, 2006). According to Okaisu (2014) adequate assessment is essential in guiding interventions and evaluating care. Study findings imply nurses generally failed to document assessment findings of clinical guideline indicators that informed the need for tracheostomy suctioning. Clinical indicators of patient status during and after suctioning intervention should be documented in the patient's clinical records to provide EB report of tracheostomy suctioning care decisions. Findings of nurses documentation of clinical guideline indicators in tracheostomy suctioning care decisions revealed overall, only 12.5% and 37.1% of nurses in the intervention and control groups respectively demonstrated good performance level, pre intervention. Implication of result is that majority of nurses also failed to document clinical guideline indicators in EB tracheostomy care decisions in both study groups.

Post intervention results showed same trend of poor performance level in documentation of clinical indicators applied in assessment decisions amongst nurses in both study groups. Good performance of documentation practices of EB indicators in tracheostomy suctioning care decisions improved slightly above pre intervention levels to 25% in the intervention group, after training. In the control, good performance level dropped to 20%. Implication of pre and post intervention result, is evidence of disparity in level of documentation of clinical guideline indicators utilized in assessment and care decisions of EB tracheostomy suctioning between the study groups. Consistency in demonstration of poor performance level of documentation practices in both study groups, is implied. According to Okaisu (2014), Whitcomb et al (2013) observed that, given the significance of nursing documentation and the

reality of poor documentation practices, it is not surprising that there have been resolute calls and subsequent efforts to improve quality of nursing documentation.

Study findings within demographics at pre intervention revealed, no participant in the intervention group demonstrated good performance level in documentation practices of clinical indicators applied in assessment decisions in EB tracheostomy suctioning. In the control group, minority of nurses (3), (one nurse each in three different observations) demonstrated good level of performance of documentation of clinical indicators utilized in assessment decisions. Distribution of the nurses was within: the ICU, 1-10years working experience in the specialty, NO I designation, RN/RM highest educational qualification category, and 16- 20 years professional experience categories. Analysis of documentation practices in tracheostomy care decisions revealed minority of nurses demonstrated good performance level in the intervention and control groups, in all observations, respectively. Distribution was highly amongst nurses on the ICU, 1-10years working experience in the specialty, NO I, NO II and PNO designation, RN/RM and Bsc Nursing in the highest educational qualification category, and within all professional experience categories in both study groups. Poor performance levels in documentation of EB assessment decisions suggest majority of nurses' generally failed to document assessment findings, which can constitute hindrances to early detection of changes in patient's clinical status, posing risk of deterioration in tracheostomy patient conditions.

At post intervention, all participants in the intervention group demonstrated same trend of poor performance level in documentation of EB clinical guideline indicators in assessment decisions of tracheostomy suctioning as in pre intervention, after training. In the control group: only one (1) nurse in the ICU, with 1-10 years working experience in the specialty, in the NO I cadre, RN/RM qualification, and 6-10 years professional working experience demographic categories demonstrated good performance level of documentation of EB assessment indicators. Result of care decisions revealed minority of participants in the intervention group, demonstrated good performance level of documentation of clinical guideline indicators utilized in

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EB tracheostomy suctioning in each of the five (5) observational sessions. Finding indicates minimal improvement above pre intervention levels, in the intervention group. Nurses in the control group with good performance level of documentation of clinical indicators in tracheostomy care decisions was also observed to be in the minority in all five (5) observations. In both study groups, the highest number of nurses with good performance level was nine (9), and lowest was four (4) respectively. Good performance level within both study groups was minimally distributed within categories of specialty, years of working experience in the specialty, designation, highest professional qualification, and professional working experience. No nurse with specialist qualification demonstrated good performance level pre and post intervention in the study. Study finding revealed a level of positive effect of training programme on nurses' documentation of EB care decisions in tracheostomy suctioning practices in the intervention group. Implication of research findings is an indication nurses' documentation practices in assessment and care decisions in tracheostomy suctioning, can be improved upon by re-training. Okaisu (2014) however, reported that research findings reveal training alone is insufficient to improve nursing documentation practices, and that practice change require multi-pronged efforts to change organisational culture.

Decrease in tracheal secretions is a clinical indication that they just became thicker, and so are more readily retained putting the patient at risk of breathing difficulties. The inner tube should be assessed regularly for early detection of blockage to direct care decisions in airway maintenance. Further exploration of nurses' documentation of clinical guideline indicators applied in EB airway maintenance practices, revealed an overall poor performance level in assessment and care decisions in both study groups, pre and post intervention. Nurses' communicate their observations, decisions, actions and outcomes to other health care professionals through documentation. Findings suggest nurses' failed to exercise professional judgement, and application of knowledge and skills pertinent in EB airway maintenance decisions, in tracheostomy care. Within demographics, results of pre intervention documentation of EB

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assessment indicators revealed poor performance level in the intervention and control groups. Analysis of care decisions revealed, only one nurse in the intervention group demonstrated good performance level on the ICU, in the 1-10 years category of working experience in the specialty, ACNO cadre, RN/RM qualification, and 16-20 years professional experience. All nurses in the control group demonstrated poor performance level. Post intervention results also revealed no nurse in both groups demonstrated good performance level in documentation of clinical indicators that directed EB assessment and care decisions. Study findings corroborate report of Kedebe, Endris, and Zegeye (2017) that even though nursing care documentation is an important part of nursing practice, it is commonly left undone. Results are suggestive of increase in the likelihood of tracheostomy patients receiving inconsistent care in airway maintenance practices - an all important nursing activity that is highly related to patient safety

The decision to dress a tracheostomy wound should be based on evidence of clinical need. It should follow a comprehensive stoma assessment and documentation of clinical indicators, consideration of patient comfort, and respiratory secretions. Data analysis of nurses' documentation practices in the use of clinical guideline indicators to direct tracheostomy dressing decisions, pre and post intervention, revealed overall, all nurses demonstrated poor performance level in assessment and care decisions in both study groups respectively. Analysis of nurses' documentation practices within demographics showed that, at pre intervention all nurses demonstrated poor performance level in documentation of assessment and care decisions, in the intervention and control group. Study findings infer lack of understanding of accountability in documentation practices amongst nurses. Post intervention result revealed only one nurse demonstrated good performance level in assessment decisions, in the intervention group. In the control, a total of eight (8) nurses from four observational sessions demonstrated good performance in care decisions. Nurses in both groups were distributed minimally within all three specialty units, 1-10 years working experience in the specialty, NO II, SNO, and ACNO designation, RN/RM

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and B.Sc Nursing highest educational qualification category, and within all categories of professional working experience. Results support study findings of Voyer, McCusker, Cole, Monette, Champoux et al (2014), that nursing documentation activities is far from optimal. Implication of findings is that nurses' documentation practices of clinical indicators applied in EB assessment and care decisions in tracheostomy dressing is below clinical competence level required in professional nursing, in both study groups.

Nurses' documentation practices of clinical guideline indicators utilized in EB tracheostomy tie change decisions was also analysed. The tracheostomy tube is held in place by tapes around the neck. Assessment and care decisions are essential to ensure ties are secure and tension free to ensure patient comfort and safety. As professional nurses, we are held responsible for ensuring safe quality care. The only proof is through documentation (Duclos-Miller, 2016). Analysis of overall results revealed, all nurses recorded poor performance level in documentation of clinical indicators employed in assessment and care decisions in both study groups, pre and post intervention. Critical analysis of nurses' EB documentation in tie change practices within demographics for further insight revealed all nurses in both study groups showed poor performance level of documentation of assessment and care indicators pre and post intervention. Research findings infer nurses failed to provide evidence of assessment and care decisions in tracheostomy tie change that ensure patient safety.

Research findings imply a culture of poor documentation practices amongst nurses in the study groups. In spite of numerous improvement efforts globally, inadequate documentation continues to be reported as nurse authors investigate barriers and challenges (Okaisu, 2014). Documentation of clinical guideline indicators in tracheostomy assessment and care decisions in suctioning, airway maintenance, dressing, and tie change was predominantly distributed amongst nurses working in the ICU, 1-10year working experience, NO I cadre, and RN/RM and Bsc Nursing highest professional qualification. No nurse with specialist qualification demonstrated good performance level of documentation practices. According to Wang, Hailey and Yu

(2011), accumulated evidence of failure to provide accurate nursing documentation is documented in literature. This observation is supported by Björvell (2002), who wrote that Davies et al (1994) discovered that assessment was poorly documented, as were details of intervention in nursing documentation practices. Okaisu (2014) also reported findings of a Dutch study revealed, inadequate documentation of important aspects of assessment, and other related nursing care.

Quality of care provided can only be measured by the quality of nursing documentation (Duclos-Miller, 2016). Contents of written records were scrutinized for documented evidence of clinical guideline indicators utilized in assessment and care decisions made in tracheostomy suctioning, airway maintenance, dressing, and tie change. Examination of nursing records of documentation practices of clinical guideline indicators used in direction of tracheostomy care decisions revealed, majority of nurses failed to document assessment and care decisions, and time they were performed immediately following care activities on appropriate charts. Study findings support report of Björvell (2002) that, audit studies invariably describe evidence that indicate RN's have problems integrating the nursing process, and care planning into daily record keeping.

Low proportion of documentation of important information necessary for other members of the health team to have clear picture of patient status was observed. Documentation on nursing process forms of nursing related non-directive care decisions, were often vague. Writings were without evidence of clinical indicators that informed assessment and care decisions, time care was given, or outcomes of care. Significant changes in patient conditions were not documented on many occasions by nurses in both study groups. Voyer, McCusker, Cole, Monette, Champoux et al, (2014) reported that literature documents clinical handover notes contain much greater detail about patients' condition, care, and response to care, than information found in official nursing documentation.

In this study, late entries or non-documentation of frequent care activities given like suctioning events were observed. American Health Information Management

Association (2001 cited in Voyer, McCusker, Cole, Monette, Champoux et al, 2014) recommended documentation during or immediately after care, or following occurrence of an event, instead of recording at a later time. According to Voyer, McCusker, Cole, Monette, Champou et al (2014) overwhelming nursing staff may decide to postpone documentation of important observations to later on in their shift. Such delays in recording according to the authors, suggest nursing staff rely on memory, which increases the risk of omitting something or overlooking it. Late or non-documentation by nurses in this study could be attributed to staff shortage. This observation is supported by findings of Bello (2015) of 17.5% of nurses indicating shortage of staff, as barrier to documentation practices in a study conducted at Ahmadu Bello University Teaching Hospital, Zaria. Other observations in the study were care entries that did not include outcomes of interventions like stoma conditions, signs of infection, suction aspirations etc on patient's charts, nursing process or nurses' report for handover.

On the contrary, all medical prescriptions administered were observed to be documented after performance of such care activities, including time they were carried out e.g medications, intravenous infusion change, tube feeding, fluid chart entries etc. Study finding confirm report of Björvell (2002) that, rather than documenting the prospective planning of nursing care, tradition of RN's is still to document care given retrospectively, which is primarily the medical care ordered by the physician. Recordings were noted to be done generally at the end of the shift by an individual nurse other than nurses that carried out the actual care activities on the patients on hand-over notes. Findings in this study are supported by Wang, Hailey and Yu (2011) who reported that a number of studies have shown inadequate documentation of the five steps of the nursing process.

According to Daniels (2004), documentation provides a written document of the practitioners' accountability to the client, the institution, the profession and the society. Study findings show that nurses' documentation pattern does not demonstrate that nursing knowledge, skills and judgment has been applied according to

professional standards after training, in the intervention group. According to Collins (2014) documentation is a reflection of nurses' clinical judgement, and is associated with practice management and patient outcomes. Documentation practices of participants in this study is suggestive of shortcomings in assessment and care practices. Results are suggestive of documentation practices that are below professional and ethical standards amongst participants.

Hypothesis 5 was set to test for significant differences in nurses' performance level of documentation practices of clinical guideline indicators utilized in EB tracheostomy care decisions at pre and post intervention. Mann-Whitney U test results indicated significantly higher performance level of documentation practice in EB suctioning assessment decisions and suctioning care decisions in the control group at pre intervention. There was no significant median difference post intervention between the intervention group that received training, and the control group that did not.

Further analysis with Wilcoxon test revealed no statistically significant median differences in pre-post analysis of nurses' performance level of documentation of clinical guideline indicators utilized in EB decisions, in assessment and care practices of tracheostomy suctioning, airway maintenance, dressing, and tie change in intervention and control groups.

Study findings has implication for audit approaches to nursing documentation which should constitute structure or format, process, and content of care activities. The content of nursing documentation according to Wang, Hailey and Yu (2011) should be the central focus of audit because of its implication to nursing practice.

5.2   Limitations of the study

The study was limited by the small sample size due to the critical care specialty focus of the study. Another limitation was organisational in the study settings. In the intervention study setting, some nurses could not be accessed for structured observations at stage 1 because of the nature of their clinical responsibilities, very

busy night shift, and absence from duty as a result of one type of leave or the other. In the control, some eligible participants were eliminated in stage 3 due to delay in tracheostomy patient admission from insufficient functional ventilators, death and transfer of eventual admissions to units outside the ICU at post intervention. Also, there were incessant strikes of the different groups of health workers locally in the hospitals, and nationally at Federal level in the three study settings between year 2013 and 2015, which constituted a huge limitation. The strikes probably inadvertently, affected availability and delay of tracheostomy patient admissions. This was responsible for the setback, delay in commencement, and unduly long period of data collection of the study that was originally scheduled for 12 weeks.

The study could also have been limited by Hawthorne Effect, one of the main problems in observational studies. This could constitute a threat to normal behaviour in decision making and documentation practices of nurses in tracheostomy care, as a result of attention gained at structured observation.

5.3   Implication for Nursing Practice

The study has implication for clinical practice changes, educational support and research. Findings suggest nurses' knowledge and practice of EB tracheostomy care and decision making needs improvement, requiring training and re-training in the use of clinical guideline indicators in tracheostomy care decisions. To improve standards of care, it is vital nurses are aware of research evidence to empower them to make informed decisions about EB tracheostomy care practices, based on individual patient needs. According to Day, Farnell and Wilson-Barnett, (2002b) some authors have asserted that all healthcare professionals are responsible for their clinical practice. Nurses themselves need to ensure their knowledge and skills are up to date and EB.

This study has established a probable current status of nurses' knowledge and decision making practices of tracheostomy care irrespective of specialty, length of period of work in the specialty, designation, highest professional qualification, and years of professional practice - which is a cause for concern. To ensure satisfactory practices

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that are consistent with EB recommendations, enforcement of nurses' use of clinical guideline indicators for care decisions is being advocated.

Nursing Services Departments in health care institutions should make concerted effort to improve nurses' knowledge base and adherence to use of clinical guideline indicators in EB decision making in tracheostomy care. This step will be beneficial to nurses and impact positively on patient care outcomes. Nursing Departments should also collaborate with management of their health institutions for provision of adequate facilities, policies, and standard clinical guidelines to enhance quality decision making. Continuous research, supervision, evaluation, and audit of decision making practices in EB assessment and care interventions should be instituted. Standard by which, nurses' performance of using clinical guideline indicators in tracheostomy care can be measured on individual and unit basis, should be set to enable achievement of excellence in decision making (Albanese et al, 2010).

5.4   Implication for Further Studies

- Replication of the study in other Federal Hospitals, State Hospitals and Federal Medical Centres in the different geopolitical zones in Nigeria will be necessary to generalize findings.

- Further studies to determine how nurses are exposed to decision making and development of nurses' decision making are necessary.

- There is need for conduction of studies into strategies that could enhance nurses' use of clinical guideline indicators in EB decision making.

- Conduction of teaching intervention studies on use of clinical guideline indicators in EB tracheostomy care decision making to improve nurses' knowledge and competence in tracheostomy patient care.

- Conduction of studies on knowledge and attitude of nurses on adherence to use of clinical guideline indicators in care decisions is necessary.

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5.5   Recommendations

The Standard of Practice of the Nursing and Midwifery Council of Nigeria (NMCN) (2015) states that the nurse is expected to provide care using current EB principles and practice, and the nursing process. The nurse must demonstrate skills and abilities required for lawful, safe and effective professional practice without supervision. In the light of the position statement of the NMCN, and the findings of this study there is a pressing need for the nursing profession to design strategies for empowering nurses to make care decisions that will enhance professional nursing practice. Recommendations made are:

- Curriculum of nursing education should be reviewed to include exposure of nurses in training in all nursing programmes basic, post basic or baccalaureate to the knowledge of use of clinical guideline indicators in EB decision making, clinical judgement, critical thinking, and documentation skills in diverse clinical conditions.

- Training and re-training of nurses by organization of practice oriented continuous education programmes, in-service training, seminars, workshops, and conferences in all hospitals by Nursing Services Departments to develop EB decision making skills of nurses in the application of clinical guideline indicators and documentation practices.

- NMCN and other professional nursing associations should organize periodic educational programmes, workshops, seminars, and on-line modules on EB decision making, critical thinking, clinical judgement, and documentation to improve the decision making capabilities of practicing nurses in the federation.

- Reinforcement of the use of the nursing process as a framework for provision of nursing care to strengthen nurses' use of clinical guideline

indicators in decision making skills in patient care beyond present level of practice.

- Nursing Services Departments should collaborate with management of their health institutions for provision of appropriate policies, adequate facilities, and standard EB clinical guidelines to enable nurse practitioners base care decision on clinical indicators for application of sound clinical judgement and current empirical evidence.

- Institution of nursing research unit in every hospital to carry out nursing studies and provide evidence base for practice.

- Institution of performance and quality improvement programmes in every healthcare facility to determine effective ways of improving clinical competence of nurses, through regular auditing and prompt feed-back mechanism.

- Provision of work environment that will encourage, support and promote decision making by nurse managers, educators, administrators, researchers and clinicians.

- Individual nurses are to ensure their knowledge and skills are up to date in EB decision making practices.

5.6 Summary and Conclusions

This Quasi-experimental study conducted a structured observational study in Federal Teaching Hospitals in South-West Nigeria, purposively selected into intervention and control groups. Only ENT, Neurological, and Critical Care units where tracheostomy patients are nursed were utilised in the study settings. The observational study adopted a structured "observer as participant" approach with "overt involvement" of the researcher, and teaching intervention to determine nurses' knowledge and examine the

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realities of nursing decision making practices, in use of clinical guideline indicators in EB tracheostomy care.

An actual sample of 67 nurses, available and accessible in the intervention and control groups, concluded participation in the study due to limitation of access to structured observation of some nurses. Six objectives and five hypotheses set for the study were explored extensively, with significant findings highlighted and inferences drawn. A benchmark of attainment of 60% score in knowledge and practice of use of clinical guideline indicators and recommendations in EB tracheostomy care was set, to determine a reasonably accepted level of achievement of fundamental knowledge and competence, applicable in professional context.

Research findings in this study revealed poor knowledge of clinical guideline indicators and recommendations in EB tracheostomy care at pre intervention, in the intervention group. Knowledge score was higher in the control group. Overall, only 34.4% of nurses in the intervention group attained good fundamental knowledge score which improved after exposure to training. All nurses 32(100%) in the intervention group showed an increase in knowledge level post intervention. This finding implies the need to intensify continuous education for nurses, and institution of tracheostomy care nurse programme. Training progamme should include knowledge of research recommendations and clinical guideline indicators to enhance professional capabilities, and current practices in EB tracheostomy care decisions. Self-report information of nurses' on EB decision making practices in tracheostomy care highlighted, findings suggestive of performance of routine pattern of assessment amongst nurses in suctioning decisions, in both study groups. Critical analysis of nurses' decision making practices within demographics to provide further insight into nurses' use of clinical guideline indicators in EB tracheostomy care decisions: revealed about 50% of participants in the intervention group demonstrated good performance level in airway maintenance care practices in 3 observational sessions post intervention. Thus an indication that re-training could impact positively on nurses EB decision making practices. Overall, nurses' performance level of use of clinical

guideline indicators to direct assessment and care decisions in EB tracheostomy care practices were poor in both study groups pre and post intervention. Observed nurses' decision making practices were suggestive of routine practices of tracheostomy care decisions amongst participants in intervention and control groups. This observation is supportive of findings of self-report information of nurses' decision making practices in the study.

Furthermore, results revealed a disparity between knowledge of clinical guideline indicators acquired at training and its' application in EB decision making practices in the intervention group. Statistically significant higher performance level of the control group at pre intervention is probably due to Hawthorn effect from being observed by the researcher, as performance level could not be sustained post intervention. Non-adherence to use of clinical guideline indicators and recommendations in EB tracheostomy care decisions was also observed. Study findings are suggestive of the current status of nurses' knowledge and EB decision making practices of tracheostomy care irrespective of: specialty, length of work in the specialty, designation, highest professional qualification, and years of professional practice. Findings are also suggestive of individual professional knowledge, attitude, habit, and exposure to research in EB care provision, as hindrances to professional behaviour, in the use of clinical guideline indicators to direct tracheostomy care decisions in the intervention group, after training intervention.

Results support literature that educational intervention is required for nurses at all levels in the use of clinical guidelines to enrich and promote encouragement in the exercise of EB recommendations in the performance of best practices, in tracheostomy care decisions. It is worthy of note that, theoretical knowledge is of limited value unless it helps to inform and guide high standard of patient care that is responsive, and adjusted to individual patient needs and circumstances. Use of clinical guideline indicators to direct EB nursing decision making should be enforced and intensified on the neurological and critical care units. Effort should be made by nurse leaders to

address nurses' attitude towards use clinical indicators in care decisions by means of a culture friendly approach.

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APPENDIX I

DEPARTMENT OF NURSING
UNIVERSITY OF IBADAN

INFORMED CONSENT

EDUCATIONAL INTERVENTION ON NURSES' USE OF CLINICAL GUIDELINE INDICATORS IN TRACHEOSTOMY CARE IN FEDERAL TEACHING HOSPITALS IN SOUTH-WEST NIGERIA

Name(s) and Affiliation(s) of researcher(s) of applicant(s):

KOROYIN, Mercy Oyeinbrakemi. Department of Nursing. University of Ibadan. Email: timikoroyin@yahoo.com. Phone number 08033811203

Purpose of Study:

The purpose of this study is to find out the effect of an educational intervention on nurses' knowledge and practice of use of clinical guideline indicators in evidence-based tracheostomy care decisions in Federal Teaching Hospitals in South West Nigeria.

Procedure of the Research:

The research process will involve observation of nurses' use of clinical guideline indicators in performance of tracheostomy care decisions in suctioning, airway maintenance, dressing, and tie change, as evidence for such care presents in nursing practice. Observation of decision activities will last for ten minutes or less at each instance the need for care arise in patients. Your consent to be observed in the performance of evidence-based decision making in tracheostomy care is being solicited. You will also be required to fill out a questionnaire and participate in an educational training programme on evidence-based tracheostomy care decisions. Only nurses caring for tracheostomy patients are being recruited for the study.

Expected Duration of Research and Participants Involvement:

This research process is expected to last for a period of 12 weeks. Observation of nurses' decision making activities will last for ten minutes or less at each instance the

need for such care activities arise in the process of nursing care. You will be required to fill out a questionnaire and to participate in an educational training programme on evidence-based decision making in tracheostomy care.

Risk(s):

There are no risks involved in your participation in the study.

Costs to the Participants in joining the Research:

Your participation in this research will cost you nothing.

Benefit(s):

The goal of this study is to promote the development of strategies for improved patient care in tracheostomy care decisions and development of the nursing profession.

Confidentiality:

The study will be undertaken with total confidentiality and all obtained information will not be divulged to other persons. All information that will be collected will be coded with no names attached. You will not be linked in any way by name or any identifier in any publication or reports emanating from the study.

Voluntariness:

Your participation in this study is entirely voluntary. You are free to refuse to take part in the study.

Alternatives to Participation:

If you choose not to participate, this will not affect your employment in this hospital in any way.

Due Inducement(s):

You will not be paid any fees, however you will be compensated with refreshments and lunch for participating in the educational programme of this research.

Consequences of Participants' Decision to Withdraw from Research and Procedure for Orderly Termination of Participants:

You have the right to withdraw at any given time if you choose to participate. Please note that information obtained before your choice to withdraw cannot be removed anymore because they may have been modified. The researcher however promise to make effort to comply with your wishes as much as is practicable.

What Happens to Participants and Communities when Research is Over:

Hospital management will be informed of the outcome of the study. Management will be enjoined to encourage participants to continue in practice of evidence-based care decisions.

Statement of Sharing Benefits among Researchers and whether this Include or Exclude Research Participants:

There is no plan to contact any participant either now or in the future about commercial benefits.

Conflict of Interest: No form of conflict of interest in this study.

Statement of Person Obtaining Informed Consent:

I have explained fully and have given sufficient information including purpose, method, benefits and risks of this study to Mr/Mrs/Miss……………………………… to make an informed decision. Name …………………………………………… Signature and Date ………………………....

Statement of Person Giving Consent:

Now that the study has been described and explained to me, and I fully understand the content of the research process I am willing to take part in the study. I understand the purpose, method, and benefit of the study and that there are no risks involved. I have a copy of this informed consent.

………………………….   …….. ……………………..

Signature of participant/date   signature of researcher/date

DETAILED CONTACT INFORMATION OF THE PRINCIPAL INVESTIGATOR

The Principal Investigator Mrs M.O. Koroyin can be contacted at The Department of Nursing, University of Ibadan. GSM Number 08033811203.

APPENDIX II

STRUCTURED CHECK LIST FOR OBSERVATION OF NURSES' OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY CARE DECISIONS

APPENDIX III

**STRUCTURED CHECKLIST FOR CHART REVIEW OF NURSES' EVIDENCE-BASED
DOCUMENTATION OF CLINICAL GUIDELINE INDICATORS IN TRACHEOSTOMY CARE**

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APPENDIX IV

STRUCTURED QUESTIONNAIRE

DEPARTMENT OF NURSING

UNIVERSITY OF IBADAN

EDUCATIONAL INTERVENTION ON NURSES' USE OF CLINICAL GUIDELINE INDICATORS IN TRACHEOSTOMY CARE IN FEDERAL TEACHING HOSPITALS IN SOUTH-WEST NIGERIA

</div>

Dear Participant,

I am a graduate student in the above named institution who is conducting a study on the effect of educational intervention on nurses' use of clinical guideline indicators in tracheostomy care in Federal Teaching Hospitals in South-West Nigeria. Your participation in the study will be greatly appreciated. You are assured that your responses will receive utmost confidentiality. The findings from the study will aid in the development of strategies for the improvement of patient care, and development of the nursing profession.

THANK YOU.

SERIAL NO…………

SECTION A: DEMOGRAPHIC DATA

1. Age --------------------years

Please tick (✓) as appropriate

2.   Sex: Male ☐   Female ☐

3. Name of Unit/Specialty   ENT ☐   ICU ☐   Neurology ☐

4. Please specify your post on the ward

    Nursing Officer II   ☐

    Nursing Officer I   ☐

    Senior Nursing Officer   ☐

    Principal Nursing Officer   ☐

    Assistant Chief Nursing Officer ☐

    Chief Nursing Officer   ☐

    Assistant Director Nursing   ☐

5. What is your years of work experience in the current specialty …………years.

6. What is your years of professional qualification…………………..

7. What is your highest professional qualification.

RN ☐

RN/RM ☐

Diploma in any nursing specialty ☐ Specify……………………………………

B.Sc Nursing ☐ Specify Bachelors degree in any other discipline …………....

M.Sc Nursing ☐ Specify Masters degree in any other discipline ……………

M.Phil Nursing ☐Specify M. Phil degree in any other discipline ……………….

Ph.D. Nursing ☐ Specify Ph.D. degree in any other discipline………………..

SECTION B: NURSES' KNOWLEDGE OF CLINICAL GUIDELINE INDICATORS IN EVIDENCE-BASED TRACHEOSTOMY CARE

Choose the appropriate option to the following questions

8. Tracheostomy is the surgical opening into the trachea through the

(a) larynx

(b) nose

(c) neck

(d) pharynx

9. Tracheostomy incision site is between the

(a) 1st and 2nd, 3rd and 4th tracheal ring

(b) 2nd and 3rd, 3rd and 4th tracheal ring

(c) 3rd and 4th, 4th and 5th tracheal ring

(d) 4th and 5th, 5th and 6th tracheal ring

10. An important equipment that must be available and kept at the tracheostomy patient's bedside is spare tracheostomy tubes which must be

(a) 1 same size as the patient is wearing and 1 smaller size

(b) 2 same size as patient is wearing

(c) 2 larger size than patient is wearing

(d) 1 larger size and 1 smaller size than patient is wearing

11. Types of tracheostomy tubes include tracheostomy tube with an inner cannula.

True or **False**

12.   Hand washing is an essential clinical guideline indicator before and after tracheostomy care

        (a) to make patient happy
        (b) to make patient less anxious
        (c) to reduce infection risk
        (d) to reduce tracheal secretions

13.   Which of the following are clinical guideline indicators for suctioning in tracheostomy patient care: (i) visible secretions (ii) low oxygen saturation (iii) gurgly or noisy respiration (iv) sudden dyspnoea
        (a) (i) only
        (b) (i), (ii) and (iii) except (iv)
        (c) All of the above
        (d) None of the above

14.   What is the recommended negative suction pressure for adult tracheostomy patients?
        (a) 100 – 200mmHq
        (b)   20 – 100mmHq
        (c)   50 – 100mmHq
        (d) 100 – 150mmHq

15.   Evidence-based recommendation in tracheostomy suctioning is insertion of sterile catheter into the tracheostomy tube without suction pressure while starting the procedure
                    True or **False**

16.   Which of the following is the clinical guideline indication for **question 14 above**
        (a) To prevent stimulation of cough reflex
        (b) To reduce trauma to trachea
        (c) To prevent decreased respiratory rate
        (d) To prevent pain

17.   Evidence-based recommendation is to maintain continuous suction pressure while withdrawing the catheter. This is so because:
        (a) It prevents restlessness and dyspnoea
        (b) It reduces patient anxiety and prevents choking
         (c) It reduces trauma to tracheal wall and removal of secretions is more effective
        (d) It allows oxygen saturation and prevents increased breathe sounds

18. Recommended length of suction duration per session is
    (a) 8-10 seconds
    (b) 20 seconds
    (c) 5 seconds
    (d) 10-15 seconds

19. In clinical indication for further suctioning in a patient, the nurse should:
    (a) allow the patient to rest before re-inserting catheter to prevent hypoxia
    (b) insert the catheter until cough reflex is stimulated
    (c) remove the inner cannula before reinserting the suction catheter
    (d) allow patient to rest to prevent irritation of the trachea

20. Which of these clinical indicators should be documented after suctioning in the patients chart? (i) amount of secretions (ii) odour and consistency (iii) patient status
    (a) (i) and (ii)
    (b) (ii) and (iii)
    (c) None of the above
    (d) All of the above

21. How do you calculate the correct size of a suction catheter that is to be used?
    (a) Divide the tube size by 2 and multiply by 3
    (b) Divide the tube size by 4 and multiply by 2
    (c) Divide the tube size by 3 and multiply by 2
    (d) Divide the tube size by 2 and multiply by 4

22. **Tick (✓) as many complications of poor suction technique as you know from the following:**
    a) Cross Infection   b) Increased Coughing   c) Mucosal Trauma
    d) Tube Blockage   e) Excess Secretions   f) Hypoxaemia
    g) Vomiting   h) Apnoea   i) Cardiac Arrythmia
    j) Atelectasis   k) Laryngeal Spasm   l) Bronchial Obstruction
    m) Increased patient anxiety

23. The clinical indication for tracheostomy dressing should be based on:
    (i) patient discomfort (ii) comprehensive assessment (iii) soaked dressing by tracheal secretions   (iv) sudden dyspnoea
    (a) (i) and (ii) only
    (b) (i), (ii), and (iii) only
    (c) (i) and (iv) only
    (d) All of the above

24. How often should a tracheaostomy stoma be reviewed?
    (a) Every Night
    (b) Every Shift
    (c) Every Hour
    (d) Every Morning

25. When an old dressing is removed the nurse should inspect the stoma for guideline indicators of:
    (a) colour, amount of secretion and signs of infection
    (b) puffiness, reduced oxygen saturation and amount of secretion
    (c) colour, amount of secretion and discomfort
    (d) mucosal damage, skin discolouration and hypoxia

26. Tracheostomy dressing should be done at least
    (a) Once daily
    (b) Weekly
    (c) Twice daily
    (d) Twice weekly

27. Regular inspection of the tracheostomy flange is an important clinical indicator to:
    (a) promote patient comfort and reduce secretion
    (b) prevent wound damage from flange pressure on stoma
    (c) prevent dyspnoea and discomfort from secretions
    (d) reduce secretions and increase oxygen saturation

28. Clinical guideline indicator for removal of an inner tracheostomy tube for inspection of blockage is:
    (i) each change of shift/as required by patient (ii) at least twice weekly
    (iii) twice monthly

    (a) (i) and (ii) except (iii)
    (b) (iii) and (i) except (ii)
    (c) All of the above
    (d) None of the above

29. When the inner cannula is removed
    (a) it should be discarded immediately
    (b) it should be replaced immediately with the spare tube before cleaning the old one
    (c) it should be cleaned and replaced after cleaning procedure
    (d) it should be replaced without cleaning

30. How can you measure the safe fit of tracheostomy tapes?
  (a) Two finger space between the neck and tie
  (b) No space between the neck and tie
  (c) One finger space between the neck and tie
  (d) Three finger space between the neck and tie

31. Humidification is the warming and moistening of inspired air. It is essential in tracheostomy care:
  (a) to replace normal action of nasal mucosa
  (b) to help the patient breathe without the tube
  (c) to prevent distress
  (d) to enable the patient speak

32. How many nurses are required in evidence-based tracheostomy care?
  (a) 1 nurse
  (b) 2 nurses
  (c) 3 nurses
  (d) No Idea

SECTION C: NURSES' KNOWLEDGE OF DECISION MAKING, EVIDENCE-BASED DECICION MAKING AND CLINICAL GUIDELINES

Tick (✓) the most correct Option

33. Decision making is the process of
  a) Practical application of scientific method to practical problems of the everyday world of nursing practice.
  b) Rational examination of ideas, inferences, assumptions, principle and actions.
  c) Systematic, sequential process of choosing between alternatives and putting the choice into action.
  d) A framework used by the nurse to organize thinking about health care needs of individuals families and communities.

34. Choose the option that has the decision making process arranged in the correct order.
  a) Information collection, consideration of alternative strategies, problem identification selection of course of action, implementation
  b) Information collection, problem identification, consideration of alternative strategies, selection of course of action, implementation
  c) Information collection, problem identification, selection of course of action, consideration of alternative strategies, implementation
  d) Information collection, selection of course of action, consideration of alternative strategies, problem identification, implementation

35. Decision making do not foster constructive problem solving
    a) True
    b) Partially true
    c) False
    d) Not sure

36. Critical thinking is a skill required in decision-making.
    a) All of the time
    b) Some of the time
    c) Most times
    d) No Idea

37. Sources of information for nursing decisions include: (i) patient charts (ii) other health workers (iii) patient's family (iv) nurses' observation
    a). None of the above
    b). (i), (ii), (iii) except (iv)
    c). (i), (iii), (iv) except (ii)
    d). All of the above

38. Clinical decision making is related to choosing and implementing nursing interventions, evaluating their effectiveness and communicating interventions to patients, families and colleagues.

    (a) True
    (b) False
    (c) No Idea
    (d) Not Sure

39. Evidence-based practice is founded on:
    (a) Tradition and habit
    (b) A mixture of established and new treatments
    (c) Systematic evaluation of the evidence of the effectiveness of interventions
    (d) Effective practices

40. Evidence-based decisions in nursing practice are nursing decisions based on:
    (i) research (ii) best available evidence (iii) patient experiences and preferences (iv) quality assessment and patient data.

    (a) None of the above

    (b) (i), (ii), (iii) except (iv)

    (c) (i), (iii), (iv) except (ii)

    (d) All of the above

41. Clinical guidelines are decision trees formulated to guide users to courses of

   actions, dependent on stated preconditions

   (a) True
   (b) False
   (c) Not Sure
   (d) No Idea

Tick (✓) as appropriate to the following questions:

42. Clinical guidelines are useful in nursing practice

   (a) True   (b) False   (c) No Idea

43. Clinical guidelines reduce nurses autonomy

   (a) True   (b) False   (c) No Idea

44. Clinical guidelines do not promote individual care

   (a) True   (b) False   (c) No Idea

45. The use of clinical guidelines in nursing decision making does not improve
     quality of care nurses give to patients

   (a) True   (b) False   (c) No Idea

SECTION D: PROCESS   OF NURSES' EVIDENCE-BASED PRACTICES IN TRACHEOSTOMY CARE DECISIONS

46. Mr "A" 25 years old, two (2) days post operative following tracheostomy is on admission on your unit. Specify below relevant **clinical guideline indicators and recommendations in evidence-based assessment and care decision steps** that are required **before, during and after carrying out the under-mentioned procedures** in the management of Mr "A":

(i) Tracheostomy Suctioning --

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(ii) Maintenance of Airway Patency ---

(iii) Tracheostomy Dressing ---

(iv) Tracheostomy Tie Change ---

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INTERVENTION TRAINING PROGRAMME GUIDE FOR EVIDENCE-BASED DECISION MAKING IN TRACHEOSTOMY CARE FOR NURSES

Greetings/Welcoming of participants

Self introduction of researcher, participants and research assistants.

Opening remarks by researcher, overview of the session, goal of the programme and time limits.

MODULE I: CONCEPT OF CLINICAL DECISION MAKING, EVIDENCE-BASED DECISION MAKING AND CLINICAL GUIDELINES

Broad Objective

To provide general information on concept of: decision making, clinical decision making, EB decisions and clinical guidelines.

Specific Objectives

- Explain nursing decision making, EB decision making and clinical guidelines

- Discuss the relevance of EBP in tracheostomy care

- Discuss the benefits of EB decision making on nurses' performance and patient outcomes in tracheostomy care

Learning Outcome

At the end of the session nurses will be able to

- demonstrate understanding of concept of EB decision making and use of clinical guidelines in tracheostomy care

Method - Brain Storming, Group Discussion, Questions and Answers

Time Limit – 20 minutes

Setting – Nurses' Continuing Education Seminar Room

Teaching Aids - Power Point Presentation, Model of Algorithm for Evidence-based Decision Making in Tracheostomy Care

Outline of Activities/ Content of Discussion

- Review of participants' knowledge of decision making, EBP, clinical guidelines, and equipment at patients' bedside.

- Give an overview of nursing decision making in tracheostomy care.

- Discuss the need for EB decisions in tracheostomy care and benefits to nursing and patients.

- Introduce the use of clinical guidelines and clinical indicators in tracheostomy care decisions

MODULE II: BRIEF REVIEW OF THE TRACHEA, TRACHEOSTOMY, AND DETERMINATION OF NURSING CARE NEEDS BY EVIDENCE OF CLINICAL INDICATORS

Broad Objective

To review nurses' theoretical knowledge underpinning EB tracheostomy care.

Specific Objectives

- To find out nurses knowledge of tracheostomy care

- To discuss current literature relating to clinical indicators in tracheostomy care

- To highlight correct EB assessment procedures and bedside equipment

- To enable nurses question their own practice and encourage practice change

Learning Objectives

At the end of the session nurses will be able to:

- Recap knowledge of normal the trachea, tracheostomy and physiological changes in tracheostomy

- Demonstrate knowledge of principles of EB tracheostomy care

- Demonstrate knowledge of equipment for tracheostomy care and features of tracheostomy tubes

- Demonstrate knowledge and explain rationale for patient assessment for clinical indicators

Method – Discussions, Questions and Answer Session

Time Limit – 35 minutes

Teaching Aid – Power Point Presentation, Model of trachea, tracheostomy tubes and bedside equipment for tracheostomy care

Outline of Activities

- Review of nurses' knowledge of anatomy of the trachea, definition of tracheostomy, physiological changes in tracheostomy, and tracheostomy tubes

- Review principles of tracheostomy care

- Discuss rationale for patient assessment and clinical indicators

- Review local protocol for tracheostomy care in use in the health institution

MODULE III: EVIDENCE-BASED DECISION MAKING FOR TRACHEOSTOMY SUCTIONING

Broad Objective

To foster nurses' understanding of the process of evidence-based decisions in tracheostomy suctioning.

Specific Objectives

- Explain the scientific process of EB clinical decisions in tracheostomy suctioning

- Discuss the nursing activities that indicate sufficient evidence base for nursing decision making as different from routine care.

Learning Outcome

At the end of the session nurses will be able to

- demonstrate an understanding of the process of implementing EB decisions in tracheostomy suctioning with the aid of clinical guideline indicators within clinical guidelines

Method - Discussion, Demonstration, Questions and Answers

Time Limit – 35 minutes

Teaching Aids - Power Point Presentation, Model Algorithm for Evidence-based Decision Making in Tracheostomy Suctioning, Copies of the algorithm will be made available for all participants, tracheostomy tray, Suction tubes, tracheostomy tubes

Outline of Activities/ Content of Discussion

- Review the use of clinical guidelines in practice to support and enhance understanding of use of clinical guideline indicators

- Introduce the topic for the session and activities

- Discuss specific nursing activities the nurse would need to make in evidence-based tracheostomy suctioning:

  - Assessment of inspiratory and expiratory effort

  - Determination of breathe sounds

  - Documentation of clinical indicators and evidence for need of suctioning

  - Demonstrate the decision making process with the aid of the evidence-based clinical guidelines and clinical guideline indicators

MODULE IV: EVIDENCE-BASED DECISION MAKING FOR TRACHEOSTOMY DRESSING

Broad Objective

To review existing protocol of tracheostomy dressing and introduce the process of EB decision making in stoma care.

Specific Objectives

- To review scientific process of EB decision making

- To discuss clinical activities that indicate the use of evidence in nursing decisions in stoma care as different from routine care

Learning Outcome

At the end of the session nurses will be able to

- demonstrate an understanding of critical nursing decision points in tracheostomy dressing with the aid of clinical guidelines and clinical indicators

Method - Discussion, Demonstration, Questions and Answers

Time Limit – 30 minutes

Teaching Aids - Power Point Presentation of the Model Algorithm for Evidence-based Decision Making in Tracheostomy Dressing, video clip

Outline of Activities/ Content of Discussion

- Introduce topic for the day

- Discuss EB clinical indicators and decision points for

    - Stoma Assessment

    - Flange Inspection

    - Ascertaining decision for removal of inner cannula

    - Assessment of old dressing

    - Checking patient clinical records for previous records of last dressing change to determine dressing need

- Documentation of assessment findings of clinical indicators as evidence for dressing decisions

- Demonstrate process of decision making with EB clinical guidelines and clinical indicators

MODULE V: EVIDENCE-BASED DECISION MAKING FOR TRACHEOSTOMY TIE CHANGE AND AIRWAY MAINTENANCE

Broad Objective - To reflect on nurses' decision making process for tracheostomy tie change and management of presentation of thick and dry secretions in the airway

Specific Objectives

- To review scientific process of EB decision making

- To discuss clinical activities that indicate the use of evidence in nursing decisions in tie changes and airway maintenance as different from routine care

Learning Outcome

At the end of the session nurses will be able to

- demonstrate an understanding of nursing decision points in tracheostomy tie change and airway maintenance with the aid of clinical guidelines and clinical indicators

Method - Discussion, Demonstration, Questions and Answers

Time Limit – 25minutes

Teaching Aids - Power Point Presentation of the Model Algorithm

Outline of Activities/ Content of Discussion

- Introduce topic for the day

- Discuss EB nursing decisions for:

    - Tracheostomy tie assessment for indicators of cleanliness and security

    - Measurement of width between tie and skin of neck

    - Assessment for indicators of thick secretions and airway patency

    - Documentation of findings and evidence of clinical indicators for care decisions

    - Demonstrate process of decision making with the EB clinical guidelines and clinical indicators

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TERMINATION AND EVALUATION OF TRAINING PROGRAMME

Objectives

- To assess what participants have learnt in the five sessions

- To evaluate the impact of the training programme on participants

- To formally terminate the intervention programme

Activities

Question and answer session and practical demonstration of nurses' capacity in utilization of clinical guidelines in evidence-based tracheostomy care practices

- Review of lessons taught

- Sharing of experiences/ suggestions/evaluation of programme

Time Limit – 25minutes

ADMINISTRATION OF POST TEST

CONCLUSION

- Appreciation of participants for their willingness to participate in the study and cooperation throughout the programme by the researcher.
- Encouragement of participants to continue with knowledge acquired from training in evidence-based decision making practices of use of clinical guideline indicators in tracheostomy care
- Formal conclusion of intervention programme.

TRAINING MANUAL FOR EVIDENCE-BASED DECISION MAKING IN TRACHEOSTOMY CARE FOR NURSES

PREAMBLE

Tracheostomy care involves high risk procedures that require adherence to evidence-based guidelines and clinical indicators in patient care. Patients with tracheostomy are at high risk for airway obstruction, impaired ventilation, infections and other lethal complications which can be prevented by skilled bedside nursing care. For achievement of positive outcomes in tracheostomy patient care nurses need to keep abreast with best practices, develop, and maintain necessary skills in decision making (Nance-Floyd, 2011). This training manual is in five modules focused on relevant concepts of EB decision making and use of clinical guideline indicators in EB tracheostomy care decisions.

MODULE I: CONCEPT OF CLINICAL DECISION MAKING, EVIDENCE-BASED (EB) DECISION MAKING AND USE OF CLINICAL GUIDELINES IN TRACHEOSTOMY CARE

INTRODUCTION

Decision making is one of the most frequent activities performed by professional nurses (Jones, 2007). In the critical care setting decision making is dynamic and often unpredictable requiring that critical care nurses develop ability to make decisions in different complex situations. Ineffective clinical decisions in critical care units may have serious consequences on patient outcomes, particularly in tracheostomy care. Making accurate decisions is essential for both patients and nurses in the improvement of patient outcomes (Ramezani-Badr et al, 2009). Evidence-based practice has also become the desired standard within all health disciplines because the integration of best evidence into clinical practice is fundamental to optimizing patient outcomes (Profetto-McGath, Negrin, Hugo and Smith, 2010).

Broad Objective

To provide general information on concept of decision making, EBP, EB decision making, and clinical guidelines to introduce use of clinical guideline indicators in EB tracheostomy care.

Specific Objectives

- Explain nursing decision making, EB decision making, clinical guidelines and clinical guideline indicators

- Discuss the relevance of EBP in tracheostomy care

- Discuss the benefits of EB decision making on nurses' performance and patient outcomes

Learning Outcome

At the end of the session nurses will be able to

- demonstrate understanding of the relevance of EB decision making in tracheostomy care

Method - Brain Storming, Group Discussion, Questions and Answers.

1.1 DECISION MAKING

- According to Cherry and Jacob (2005) Yoderwise (2003) defined decision making as a purposeful and goal directed effort using a systematic process to choose among options.

- The decision process involves the evaluation of several possible solutions and making a choice among them.

- Critical thinking skills are required by the nurse to be able to differentiate among alternative solution and selecting the most appropriate in clinical situations.

1.1.2 DECISION MAKING PROCESS

The theoretical approach to the process of decision making emphasize a number of steps which includes:

a. Information collection and problem identification
b. Consideration of alternative strategies
c. Selection of a course of action for implementation (Hancock et al, 2006).

- Nurses make a jillion decisions daily most of which are made in microseconds but can have very serious consequences.
- Some decisions allow for more thinking time, consultation with others, and a search for resources before arriving at a conclusion.
- All decisions made however, must be accurate and made in a timely manner (Rubenfeld and Scheffer, 2006).

1.2 CLINICAL DECISION MAKING

- Clinical decisions are integral part of nursing decision making in which nurses combine clinical and background information in their skills to reach decisions about treatment and management of patients in their care (Jones, 2007, Lauri, Salantera, Chalmers, Ekman, Kim, Kappeli and MacLeod, 2001).
- Care situations may require a quick response or allow for reflection, collaboration with others, and a carefully considered response.
- Nurses need to develop and enhance ways to see all sides of an issue, find various approaches to solve problems, and make careful, intelligent decisions (Jones, 2007).
- Two main phases in nursing clinical decision making are: (a) diagnostic phase in which observation of patient condition, data collection and data processing lead to identification of patient problems and (b) management phase in which plans of action and treatment options lead to nursing intervention (Lauri et al, 2001).

1.3 EVIDENCE-BASED (EB) DECISION MAKING

- EB decision making is an advanced process of clinical decision making and patient care.

- It signifies that the clinician must take patient's condition, preferences, values, experiences and circumstances into account at clinical decision making.

- It de-emphasizes intuition, unsystematic clinical experience and pathophysiologic rationale as sufficient for clinical decision making in nursing care.

- It stresses the examination of evidence from clinical research, quality assessment, patient data and planning.

- Decisions made are based on systematic appraisal of the best available evidence.

- The clinician must also link evidence to other activities that promote the exercise of evidence-based patient choice in care decisions.

- To accomplish this, the best available evidence must be found.

The **skills required of an evidence-based decision maker** are as follows:

- an ability to define criteria such as effectiveness, safety, and acceptability
- ability to find articles on the effectiveness, safety and acceptability of a new test or treatment
- ability to assess the quality of evidence
- ability to assess whether the results of research are generalizable to the whole population from which the sample was drawn
- ability to assess whether the results of the research are applicable to the local population (Muir Gray, 1999).

1.4 CLINICAL GUIDELINES

- Clinical guidelines are important components in the delivery of EB health care practice.

- Clinical guidelines are essentially algorithmic formulations that guide users to courses of (diagnostic or therapeutic) action, dependent upon stated prior conditions (clinical indicators) though they do not necessarily claim to determine clinical action completely (Harrision, Dowswell and Wright, 2002).

- They are developed by a collaborative panel of content experts who prepare evidence tables and rate each recommendation based on the strength of evidence.

- The intent of developing a clinical guideline is to give providers information including clinical indicators for clinical decisions.

- Incorporating guidelines into nursing practice help nurses anticipate minimizing risks to their patients, improving quality of care and increasing cost effectiveness.

- Clinical guidelines ensure reduction in variation of care provided, facilitates achievement of expected clinical outcomes, reduce care delays and length of stay, and maintain and increase patient and family satisfaction (Watkins, 2005, Cherry and Jacob, 2005).

1.5 RELEVANCE OF EVIDENCE-BASED PRACTICE (EBP) IN TRACHEOSTOMY CARE

- EBP offers considerable assistance to nurses to improve research utilization in practice.

- EBP enables nurses address healthcare questions with evaluative and qualitative approach in tracheostomy care.

- It allows the practitioner to assess current and past research, clinical guidelines, and other information resources in order to identify relevant literature while differentiating between high-quality and low-quality findings.

- Provides continuity of patient care in both clinical and community settings (The Joanna Briggs Institute, 2010, Russell and Harkin, 2001).

- It is fundamental to optimizing patient outcomes (Profetto-McGath, Negrin, Hugo and Smith, 2010).

2.6 Question and Answer Session

MODULE II: BRIEF REVIEW OF THE TRACHEA, TRACHEOSTOMY, AND DETERMINATION OF NURSING CARE NEEDS BY EVIDENCE OF CLINICAL INDICATORS

INTRODUCTION

Tracheostomy care involves high risk procedures that require adherence to evidence-based guidelines in patient care. Patients with tracheostomy are at high risk for airway obstruction, impaired ventilation, infections and other lethal complications which can be prevented by skilled bedside nursing care. For achievement of positive outcomes in tracheostomy patient care nurses need to keep abreast with best practices, and develop and maintain the necessary skills (Nance-Floyd, 2011).

Broad Objective

To review nurses' theoretical knowledge underpinning EB tracheostomy care to enable use of clinical guideline indicators in EB care decisions.

Specific Objectives

- To find out nurses knowledge of EB tracheostomy care

- To discuss current literature relating to clinical indicators in EB tracheostomy care

- To highlight correct EB procedures and bedside equipment in decision making

Learning Objectives

At the end of the session nurses will be able to

- recap knowledge of anatomy of the trachea, tracheostomy and physiological changes in tracheostomy

- demonstrate knowledge of equipment for tracheostomy care and features of tracheostomy tubes

- demonstrate knowledge and explain rationale for patient assessment for clinical indicators in EB tracheostomy care

Method – Discussions, Questions and Answer Session

2.1   REVIEW OF ANATOMY OF THE TRACHEA
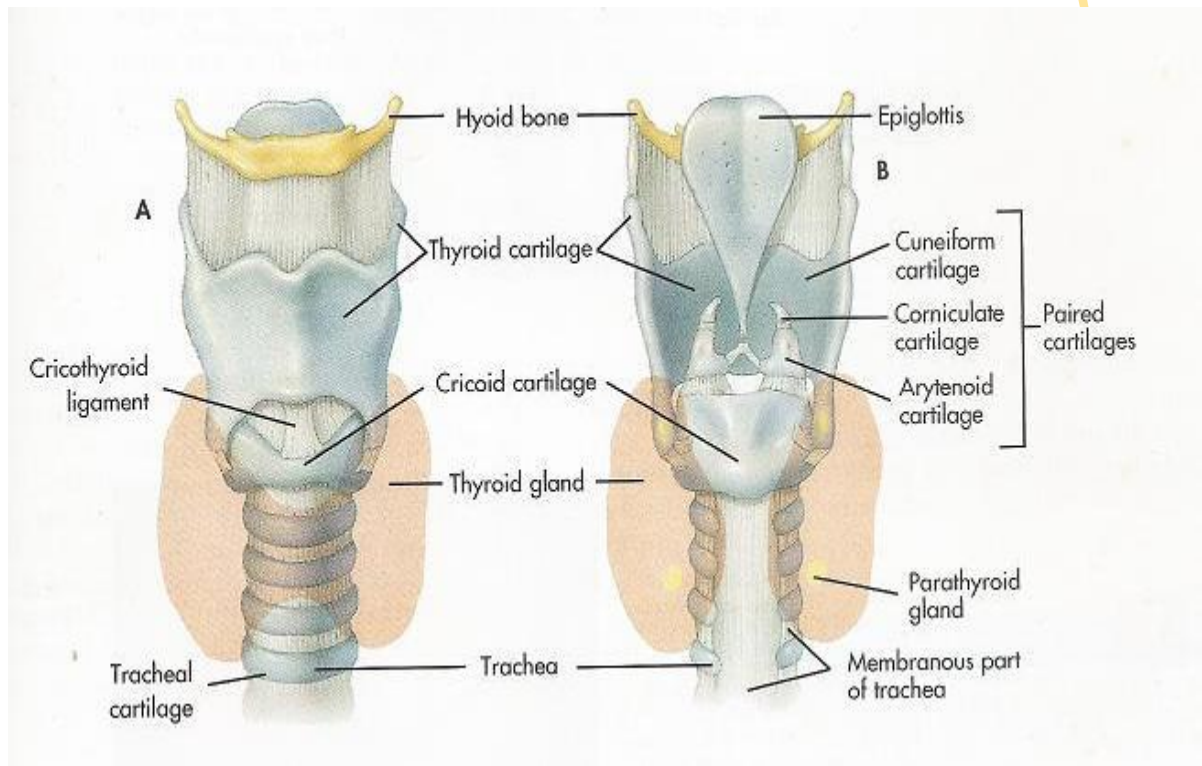
        (A) Anterior View   **(B) Posterior View**

Figure 1:   The Trachea

- The trachea or windpipe is a membranous air tube extending from the larynx into the thorax where it divides to form the two primary bronchi.
- It consists of connective tissue and smooth muscles reinforced with 16-20 C-shape rings of cartilage in its walls.
- The adult trachea is 1.4 – 1.6cm in diameter.

- It begins immediately inferior to the cricoid cartilage, projects through the mediastinum and divides into right and left bronchi at the level of the 5th thoracic vertebra.

- The C-shaped cartilages form the anterior and lateral sides of the trachea protecting it and maintain an open air passage.

- The posterior wall of the trachea is made up of a ligamentous membrane and smooth muscle which can alter the diameter of the trachea

- The trachea is lined with pseudostratified columnar epithelium containing numerous cilia and goblet cells that produce mucus.

- The cilia propel mucus and foreign particles in the trachea towards the larynx from where they enter into the oesophagus and are swallowed (Seeley, Steven and Tate, 1996).

2.2   DEFINITIONS

- **TRACHEOSTOMY** is an incision made below the cricoid cartilage through the 2nd and 4th tracheal rings to create an opening into the trachea. It may be temporary or permanent.

- **TRACHEOSTOMY TUBE** is an artificial airway or device inserted into the trachea to aid breathing following surgical incision into the trachea.
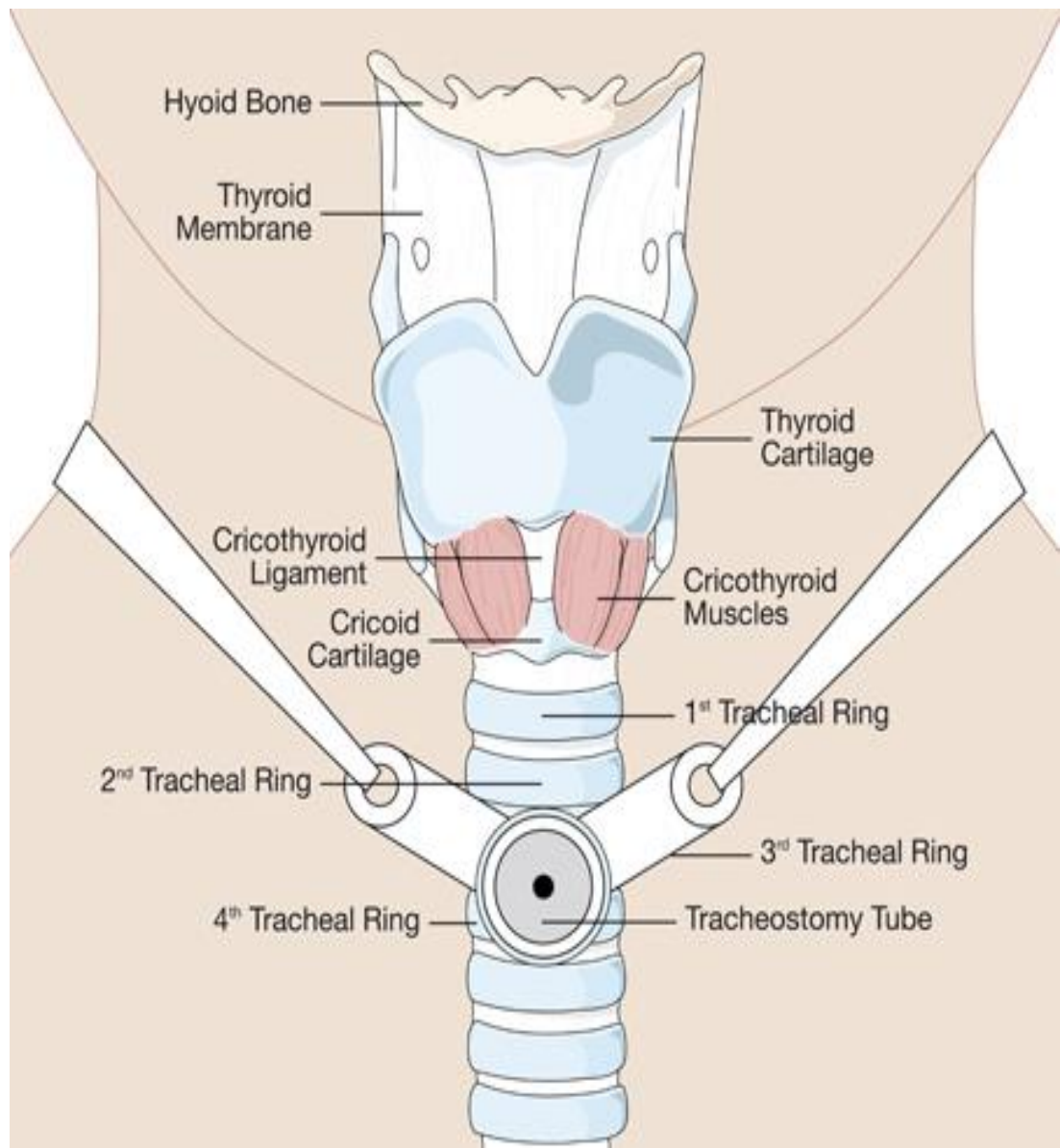
Figure 2: Tracheostomy Tube in Situ (Anterior View)
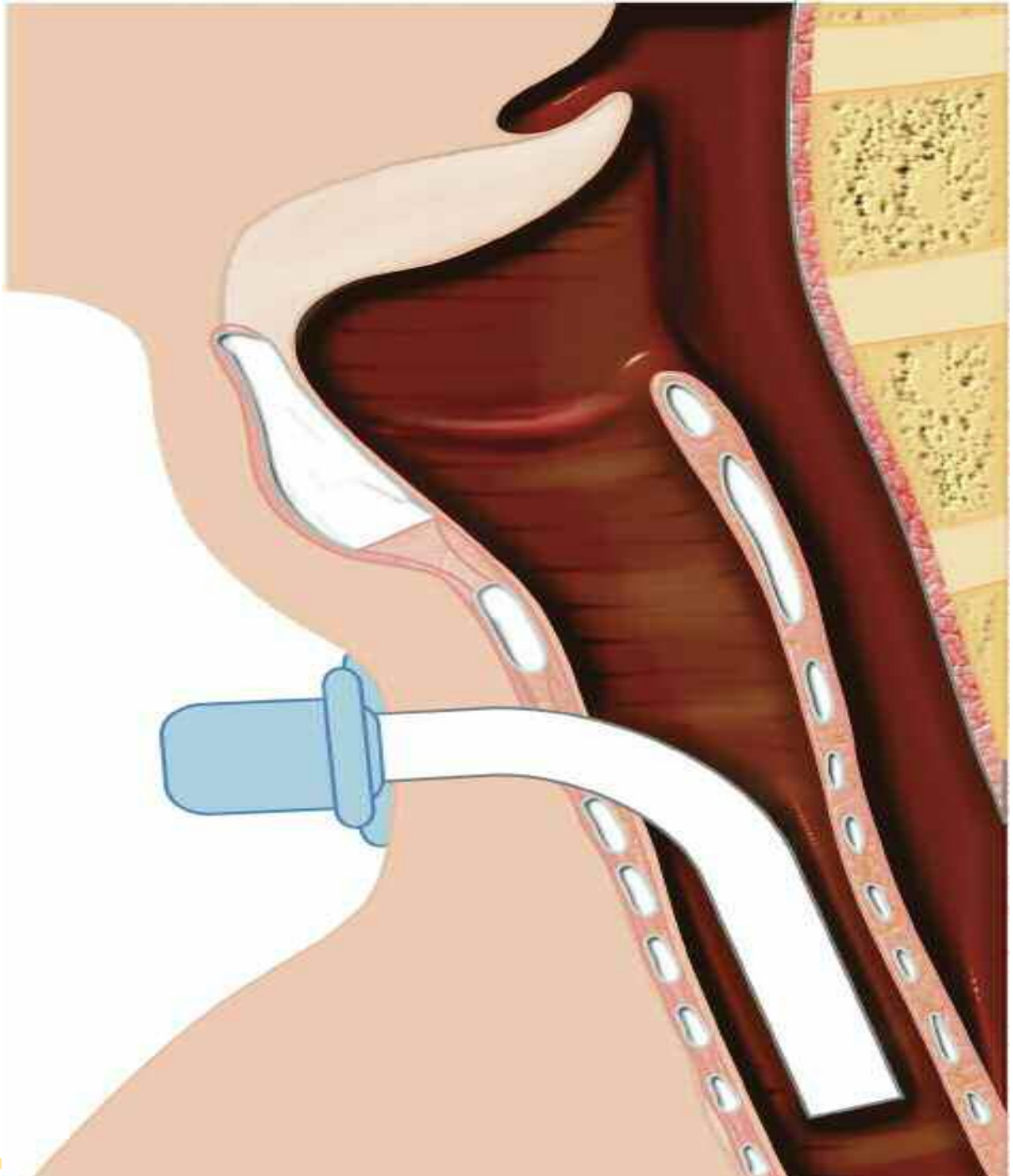
Figure 3: Tracheostomy Tube in Situ (Lateral View)

2.3   COMPONENTS OF TRACHEOSTOMY TUBE
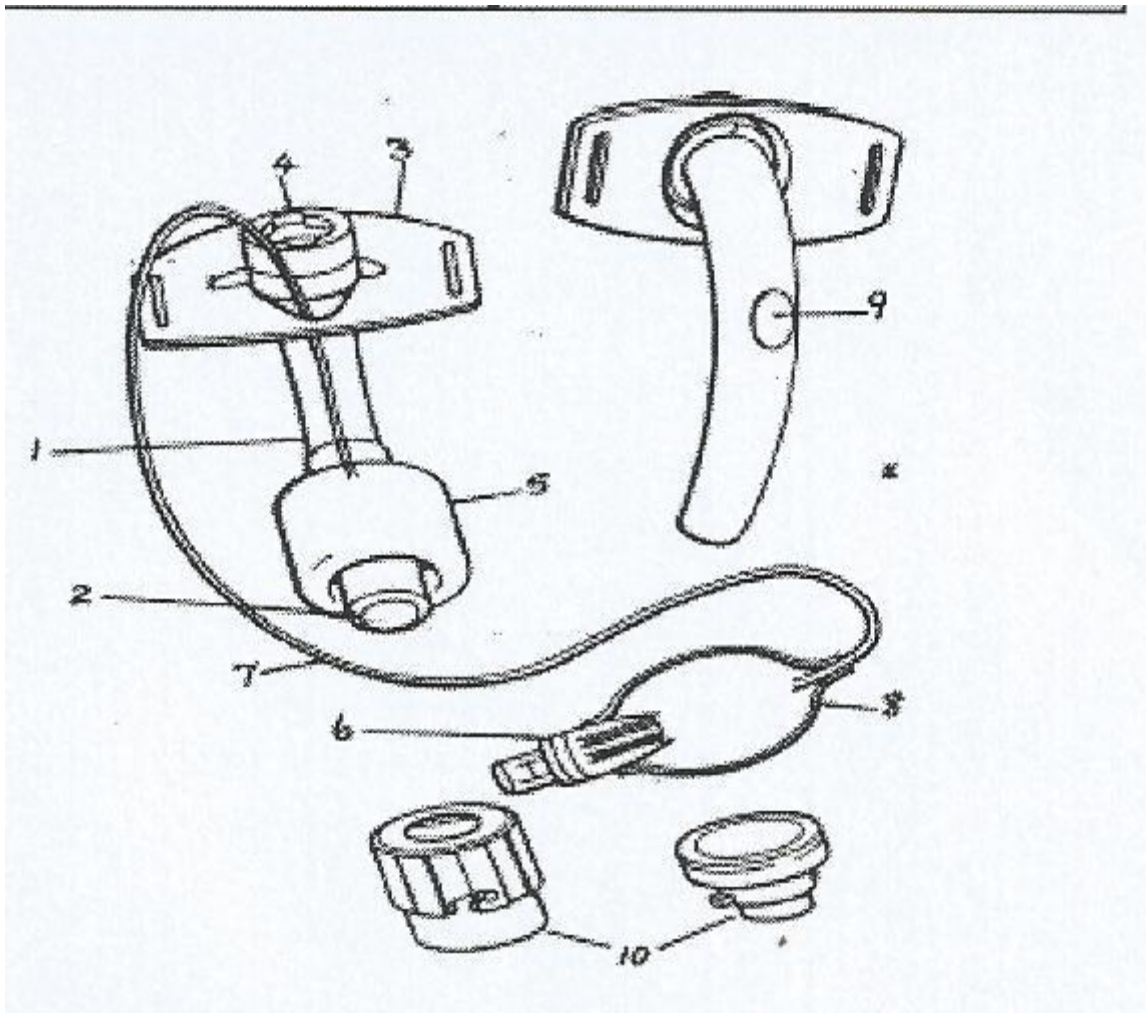
Figure 4: Components of the Tracheostomy Tube

1. Outer tube: Can be metal or plastic

2. Inner tube: Fits snugly into outer tube. It can easily be removed for washing

3. Flange: Made of flat plastic or metal attached to the outer tube. It lies flushed against the patients' neck.

4. 15mm outer diameter terminator: It fits all ventilator and respiratory equipment

5. Cuff: Inflatable air reservoir (high volume, low pressure). It helps to anchor the tracheostomy tube in place and provides maximum airway sealing with the least amount of local compression.

6. Air Inlet Valve: Air is injected via the air inlet valve to inflate the cuff. It is a one way valve that prevents spontaneous escape of injected air

7. Air Inlet Line: route for air from air inlet valve to the cuff

8. Pilot Cuff: Serves as an indicator of the amount of air in the cuff

9. Fenestration: Hole: situated on the curve of the outer tube – used to enhance airflow in and out of the trachea. Single or multiple fenestrations are available

10. Speaking Valve/Tracheostomy Button or Cap: used to occlude the tracheostomy tube opening. (a) former – used during expiration to facilitate speech and swallow. (b) latter – used during both inspiration and expiration prior to decannulation (Sydney West Area Health Service, 2005).

2.4   PHYSIOLOGICAL CHANGES OF TRACHEOSTOMY

- On insertion of a tracheostomy tube the upper airway is bypassed
- Normal functions of humidification, warming and filtering of inspired air is bypassed
- Mucocillary transport and coughing mechanism are impaired

Note: Airway patency maintenance is important

2.5   INDICATIONS FOR TRACHEOSTOMY

- Bypass acute upper airway obstruction
- Chronic upper airway obstruction
- Prevention/treatment of retained tracheobronchial secretions
- Prevention of pulmonary aspirations
- To facilitate weaning from mechaical ventilation by decreasing anatomical dead space (St. James's Hospital/Royal Victoria Eye and Ear Hospital, 2000).

2.6 PATIENT ASSESSMENT FOR CLINICAL INDICATORS IN TRACHEOSTOMY CARE

Nursing assessment for clinical indicators is required to determine the need for suctioning, dressing, airway maintenance and tie change in tracheostomy patient care.

- The nurse should note that indications of increased secretions occur in response to tracheal trauma following tracheostomy. Secretions are usually colored by blood which usually diminish gradually and disappear
- Patient health status is monitored at regular intervals for blood pressure, respiratory rate, chest sounds and color

IMPORTANT EVIDECE BASED CLINICAL GUIDELINE INDICATORS AND NURSING DECISION POINTS

- Evidence of increase in respiratory rate, crackles and wheezes *may be an indication for suctioning*
- Evidence of marked respiratory effort, unequal movement of the sides of the chest and retraction of soft tissues in the intercostals and supraclavicular spaces *is an indication of respiratory insufficiency due to obstruction below the tracheostomy tube*
- Observed evidence of cyanosis and distress not relieved by suctioning *should be reported*
- Evidence of increasing restlessness in the patient especially if accompanied by rapid pulse rate *may be an indication of hypoxia or bleeding*
- The neck and surgery site should be observed frequently *for early identification of interstitial emphysema possibly due to leakage of air into the subcutaneous tissue*
- Tracheostomy wound should be observed at all times for bleeding immediately postoperative and checked daily *for signs of infection and sloughing*
- Observe color, consistency, and amount of tracheobronchial secretions and ***document findings*** *on patients clinical records* (Day et al, 2002, Serra, 2000, Walsh et al, 2007)

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2.7 REVIEW OF LOCAL PROTOCOL FOR TRACHEOSTOMY CARE

- Nurses performing tracheostomy care need to be familiar with the policy and procedure for tracheostomy tube care in the health facility
- Advocacy for changes that support EBP to hospital management will be considered at the end of training if current practice does not support such.
- Nurses will be urged to conduct patient care studies comparing different approaches to tracheostomy care (Nance-Floyd, 2011).

2.8 Question and Answer Session

MODULE III: EVIDENCE-BASED DECISION MAKING FOR TRACHEOSTOMY SUCTIONING

INTRODUCTION

The model or framework of evidence-based care decisions for tracheostomy patient suctioning should be creative, responsive, holistic and individualized, based on sound knowledge and in accordance with local policies. Suctioning of the tracheostomy tube is done for clear airway maintenance and normal breathing pattern to ensure breathing is without exaggerated effort or awareness of the breathing sensation. It should be done without trauma or hypoxia. Suctioning is done only for patients who evidently cannot clear their own airways. Its timing should also be tailored to each patient rather than performed on a set schedule.

Broad Objective

To foster nurses' understanding of the process of evidence-based clinical judgement in tracheostomy suctioning.

Specific Objectives

- Explain the scientific process of evidence-based clinical decisions in tracheostomy suctioning.

- Discuss the nursing activities that indicate sufficient evidence base for nursing decision making as different from routine care.

Learning Outcomes

At the end of the session nurses will be able to:

- demonstrate an understanding of the process of implementing EB decisions in tracheostomy suctioning with the aid of clinical indicators within clinical guidelines

Method - Discussion, Demonstration, Questions and Answers

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3.1 SPECIFIC NURSING ASSESSMENT, CARE, AND DOCUMENTATION ACTIVITIES IN EVIDENCE-BASED TRACHEOSTOMY SUCTIONING USING CLINICAL GUIDELINE INDICATORS

a) Assessment for clinical indicators and Determination of Breathe Sounds

- Carry out a complete assessment of the patients' inspiratory and expiratory effort

- Clinical indicators that suggest the need for suctioning include:
  - increased work of breathing
  - changes in respiratory rate (increased or decreased rate)
  - gurgly respirations
  - decreased oxygen saturation
  - copious secretions,
  - wheezing,
  - coarse breathe sounds and
  - the patient's unsuccessful attempts to clear secretions (Nance-Floyd, 2011, Liverpool Health Service, 2006).

According to Nance-Floyd (2011), one researcher wrote that fine crackles in the lung bases indicate excessive fluid in the lungs, and wheezing patients should be assessed for a history of asthma and allergies.

b) Documentation of Findings

- Findings of clinical indicators from patient assessment should be documented in patients' observation chart, patient care plan, and nurses report e.g coarse breathe sound, secretions etc

- This ensures continuity of care based on evidence.

3.1.1 EVIDENCE BASED DECISION POINTS

- Tracheostomy suctioning is done when the patient is evidently unable to clear his or her own secretions, or is only able to clear them into the tube with cough-like mechanisms.

- Timing of suctioning is tailored to the identified need of each patient rather than performed on a set schedule.
- Frequency of suctioning is determined by patient's assessment data (clinical indicators) of his breathing (Coarse or Adventitious) and rate of production of secretions (Nance-Floyd, 2011, Liverpool Health Service, 2006, St Clair, 2005).

Documentation of Findings

- Suctioning done is documented after each procedure during each shift
- Indication for suctioning decision must also be documented at the end of each procedure and every shift
- At the end of suctioning, evaluate and document patients' physiologic and psychological responses (clinical indicators) to the procedure i.e amount of secretions, odour and consistency and patient status.

3.2 EVIDENCE BASED SUCTIONING PROCEDURE

- Wash hands before and after procedure.
- Tracheal suctioning is done using a sterile glove and a sterile suction catheter moistened with sterile water.
- Negative pressure is not applied during insertion of catheter but when in it is in position and during withdrawal to reduce tracheal trauma.
- Before suctioning, hyperoxygenate the patient.
- Ask a spontaneously breathing patient to take two to three deep breaths; then administer four to six compressions with a manual ventilator bag.
- With a ventilator patient, activate the hyperoxygenation button.
- Experts recommend using suction pressure of up to 120 mmHg for open-system suctioning and up to 160 mmHg for closed-system suctioning.
- For each session, limit suctioning to a maximum of three catheter passes.
- During catheter extraction, suctioning can last up to 10-15 seconds; allow 20 to 30 seconds between passes.

- If suctioning must be repeated allow patient to take several breathes or give oxygen again before suctioning.
- For open-system suctioning, catheter size should not exceed half the inner diameter of the internal tracheostomy tube.
- To determine the appropriate-size French catheter, divide the tracheostomy tube size by two and multiply this number by three.
- A #12 French catheter is routinely used for closed suctioning.
- Premeasure the distance needed for insertion. Experts suggest 0.5 to 1 cm past the distal end of the tube for an open system, and 1 to 2 cm past the distal end for a closed system (Nance-Floyd, 2011, Walsh et al, 2007).

3.3   COMPLICATIONS OF POOR SUCTIONING

- Cross Infection
- Vomiting
- Tube Blockage
- Atelectasis
- Excess Secretions
- Apnoea
- Increased Patient Anxiety
- Bronchial Obstruction
- Laryngeal Spasm
- Increased Coughing
- Mucosal Trauma
- Hypoxaemia
- Cardiac Arrythmia

3.4 Demonstration of the decision making process with the aid of evidence-based decision algorithm.

3.5   Question and Answer Session

MODULE IV: PROCESS OF EVIDENCE-BASED DECISIONS IN TRACHEOSTOMY DRESSING

INTRODUCTION

Tracheostomy dressing changes promote skin integrity and help prevent infection at the stoma site and the respiratory system (Nance-Floyd, 2011). The stoma or opening into which the tracheostomy tube is inserted is a potential route of infection. The wound and skin surrounding the stoma should therefore be kept as much as possible from secretions as the proximity of secretions increases infection risk. Frequency of dressing and cleaning of the wound site varies, depending largely on the amount of secretions or soiling (Higgins, 2009, Walsh et al, 2007). Higgins (2009) suggest that the decision to dress a tracheostomy wound should be based on clinical need, and should follow a comprehensive stoma assessment, consideration of patient comfort, and respiratory secretions.

Broad Objective

To review existing protocol of tracheostomy dressing and introduce the use of clinical guideline indicators in EB tracheostomy stoma dressing decisions.

Specific Objectives

- To review scientific process of evidence-based decision making

- To discuss clinical activities of use of clinical guideline indicators in EB nursing decisions in stoma care as different from routine care

Learning Outcomes

At the end of the session nurses will be able to:

- demonstrate an understanding of use of clinical indicators and critical nursing decision points in tracheostomy dressing with the aid of clinical guidelines

Method - Discussion, Demonstration, Questions and Answers

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4.1 SPECIFIC NURSING ASSESSMENT, CARE, AND DOCUMENTATION ACTIVITIES IN EVIDENCE-BASED TRACHEOSTOMY DRESSING USING CLINICAL GUIDELINE INDICATORS

a) Comprehensive Assessment of Stoma Site for Clinical Indicators

- Start by observation and assessment of indicators of amount of secretions and level of soiling of stoma dressing
- Open old dressing
- Assess the stoma for indicators of color, amount of secretions, dried blood and signs of infection which includes:
  - purulent discharge
  - pain around the site
  - odour
  - abcesses
  - cellulitis or
  - discolouration
- Obtain wound swab from the site or from the discharge and send to the laboratory for analysis and report immediately in evidence of infection
- Document findings

b) Assessment of Flange Plate

- Inspect stoma site for skin breakdown caused by flange pressure.
- Document findings

c) Assessment of Indicators and Removal of Cannula

- Ascertain decision for removal of inner cannula for cleansing
- Changing of the inner tube should be done at least twice a week.
- A clean tube should be inserted immediately an old one is removed.
- Document findings

d) Inspection of Dressings

- Assess dressing for wetness, dryness or stains
- Document findings

e) Check Patient Clinical Records

- Check patients' previous record (i.e nursing notes, patient care plan, observation charts) for last time of tracheostomy dressing change if less than or more than 6 hours
- Document findings (Nance-Floyd, 2011, Higgins, 2009, Serra, 2000, St. Clair, 2005).

4.1.1 EVIDENCE-BASED DECISION POINTS

- Perform dressing where tracheostomy site is dirty following assessment and document findings. Perform procedure as per local guidelines
- Perform tracheostomy dressing if last dressing was changed more than 6 hours ago and document findings. Perform procedure as per local guidelines.
- Do nothing if dressing change was performed less than six hours ago and and site is not dirty. Document findings (St. Clair, 2005).

4.2 INTRODUCTION TO EVIDENCE BASED TRACHEOSTOMY DRESSING/REVIEW OF LOCAL PROTOCOL FOR TRACHEOSTOMY DRESSING

Research evidence in tracheostmy care dressing according to Nance-Floyd (2011) shows that:

- secretions can cause maceration and excoriation at the site
- the site should be cleaned with Normal Saline Solution
- a skin barrier should be applied to the site after cleaning
- loose fibers increase infection risk
- the tracheostomy tube should be secured at all times to prevent accidental dislodgment, using the two-person technique
- slimeline dressing is also recommended (Higgins, 2009).

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- Tracheostomy stoma should be reviewed at least once every shift
- Change a wet dressing immediately.
- Apply new dressing to aid absorption of secretions and insulation of neck skin at least once every shift
- Start wound cleansing at the 12 o'clock position of the stoma and wipe toward the 3 o'clock position. Begin again with new gauze square at 12 o'clock and clean toward 9 o'clock. To clean the lower half of the site, start at the 3 o'clock position and clean toward 6 o'clock; then wipe from 9 o'clock to 6 o'clock, using clean moistened gauze square with 0.9% normal saline for each wipe.
- Continue this pattern on the surrounding skin and tube flange.
- Avoid use of hydrogen peroxide mixture unless the site is infected, as it can impair healing. If used on an infected site, be sure to rinse afterward with Normal Saline Solution.
- The use of cheap cotton wool that fragments easily should be avoided to prevent loose particles from entering the stoma.
- Small amount of white soft paraffin can be applied as barrier film if the skin needs further protection.
- Slimline tracheostomy dressing that has a 'T' shape cut into them are recommended. If not, the shape can be cut with sterile scissors. The dressing has foam and a mat side with the mat side placed against the skin.
- The use of gauze or similar materials should be avoided as they tend to stick to the wound and can be inhaled (Higgins, 2009, Nance-Floyd, 2011, Serra, 2000).

4.3   Demonstration of the decision making process with the aid of evidence-based decision algorithm.

4.4   **Question and Answer Session**

INTRODUCTION

Constant attention and meticulous care is required in decision making to reduce the patient's fear of choking as increased secretions occur in response to the tracheal trauma. Following bypass of upper airway with the insertion of a tracheostomy tube, the natural warming and humidification of air are adversely affected requiring maintenance of a systemic hydration of the airway. Humidification is required immediately following tracheostomy to warm and moisten inspired air, and prevent encrustations within the trachea and the tube as these will increase airway resistance. The tracheostomy tube is checked frequently for airway patency.

The patient's neck should be well supported with tapes around the neck which should be properly tied to secure the tracheostomy tube in position. Cotton string ties or a Velcro holder is used to secure the tracheostomy tube in place. Velcro tends to be more comfortable than ties, which may cut into the patient's neck. It is also easier to apply. Tapes should be changed daily (Stellenberg et al, 2004, Walsh et al, 2007, Nance-Floyd, 2011).

Broad Objective - To reflect on existing protocol of tracheostomy tie change and presentation of thick and dry secretions.

Specific Objectives

To review scientific process of evidence-based decision making

To discuss clinical activities that indicate the use of evidence in nursing decisions in tie changes and care of thick and dry secretions as different from routine care

Learning Outcomes – at the end of the session nurses will be able to:

Demonstrate an understanding of critical nursing decision points in tracheostomy tie changes and management of thick and dry secretions with the aid of clinical guidelines

Method - Discussion, Demonstration, Questions and Answers

5.1 SPECIFIC NURSING ASSESSMENT, CARE, AND DOCUMENTATION ACTIVITIES IN EVIDENCE-BASED TRACHEOSTOMY TIE CHANGE AND AIRWAY MAINTENANCE USING CLINICAL GUIDELINE INDICATORS

a) Tracheostomy Tie Assessment for Cleanliness and Security

- Check for wetness, stains and crusts on tracheostomy tie to determine need for change
- Check to ensure tapes are tied on the tubes at each side and back of the patient's neck in a reef knot
- Check to ensure rope is drawn underneath the patient's neck and fastened in a double knot.
- Document findings

EVIDENCE-BASED DECISION POINTS

- Tracheostomy tie observed to be dirty?
  - Perform tie change as per local protocol.
  - Document findings and care given.
- Tracheostomy tie observed to be clean?
  - Do nothing.
  - Document findings.
- Tracheostomy tie observed to be tied securely on the tubes at each side of the patient's neck in a reef knot?
  - Do nothing.
  - Document findings.
- Tracheostomy tie observed to be insecurely tied?
  - Secure ties as per local guidelines.
  - Document findings and care given.
- Tracheostomy rope is drawn underneath the patient's neck and fastened in a double knot.
  - Do nothing.

- Document findings.
- Tracheostomy rope is not drawn underneath the patient's neck and not fastened in a double knot.
    - Secure rope as per guidelines.
    - Document findings and care given.

b) Measurement of Tension and Comfort Level of Tracheostomy Tie and Skin of the Neck

- Check for tension and comfort level of the patient by inserting the little finger between the tapes and the skin of the neck to ascertain 1 finger width.
- Document findings.
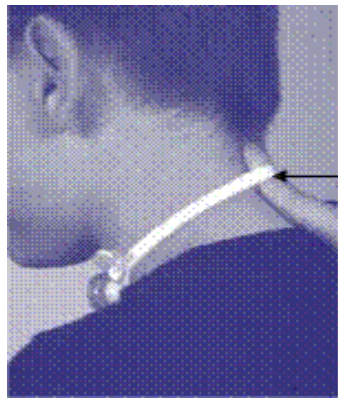
One finger should slip comfortably between the ties and the child's neck

Figure 5: Checking for Tension and Patient Comfort Level

EVIDENCE-BASED DECISION POINTS

- Width between the tapes and the skin of the neck observed to be one finger?
    - Do nothing
    - Document findings
- Width between the tapes and the skin of the neck observed to be less than or more than one finger?
    - Change and retie tapes to prevent tension and ensure patient comfort
    - Document findings and care given.

c) Assessment for Thick Secretions and Airway Patency

- Observe patient for apparent decrease in tracheal secretions. This is an indication that tracheal secretions just became thicker and so are more readily retained.
- Observe tracheostomy site for presence of thin secretions, pink and moist mucous membrane
- Observe tracheostomy site for presence of thick and dry secretions
- Note time for last suctioning and humidification
- Document findings

EVIDENCE-BASED DECISION POINTS

- Thin tracheal secretion with pink and moist mucous membrane observed?
    - Do nothing
    - Document findings
- Thick and dry secretions observed?
    - Apply humidified oxygen to liquefy secretions
    - Encourage oral fluids to liquefy secretions
    - Document findings and care.

5.2 INTRODUCTION OF EVIDENCE-BASED RECOMMENDATIONS FOR TIE CHANGES AND LIQUEFYING OF SECRETIONS

a) SECURING TRACHEOSTOMY TUBE

- Research literature recommends two persons should be present at the procedure when changing the securing device to prevent tube dislodgment. In the two-person technique, the tube is removed by one person while the other inserts the new tube immediately, remove the introducer, after which the tapes are securely tied. This technique ensures one person holds the trach tube in place while the other changes the securing device (Stellenberg et al, 2004, Serra, 2000, Nance-Floyd, 2011).

b) LIQUEFYING SECRETIONS

- The best ways documented in literature to liquefy secretions are to humidify secretions and hydrate the patient.

- *Do not* use normal saline solution (NSS) or normal saline bullets routinely to loosen tracheal secretions because this practice:

    - may reach only limited areas

    - may flush particles into the lower respiratory tract

    - may lead to decreased post suctioning oxygen saturation

    - increases bacterial colonization

    - damages bronchial surfactant.

- Despite the potential harm caused by NSS use, one survey found that 33% of nurses and respiratory therapists still use NSS before suctioning.

- Other researchers have found that inhalation of nebulized fluid also is ineffective in liquefying secretions (Nance-Floyd, 2011).

- Recommended fluid intake is a minimum of 3000ml to aid liquefaction of pulmonary secretions unless it is contraindicated in cases of cardiac insufficiency or oedema.

- Accurate intake and output records must be maintained (Walsh et al, 2007).

5.3 Demonstrate process of decision making with the evidence-based decision tool

5.4   Question and Answer Session

TERMINATION AND EVALUATION OF TRAINING PROGRAMME

OBJECTIVES

- To assess what participants have learnt in the five sessions

- To evaluate the impact of the training programme on participants

- To formally terminate the intervention programme

ACTIVITIES

- Review of previous sessions

- Sharing of experiences/ suggestions/evaluation of programme

SIX IMPORTANT POINTS PARTICIPANTS MUST KNOW

- All clinical nursing decisions made in tracheostomy patient care must be accurate, timely and based on evidence of clinical guideline indicators.

- Intuition, unsystematic clinical experience and pathophysiologic rationale is de-emphasized as sufficient for clinical decision making.

- Patient's condition, preferences, values, experiences and circumstances must be taken into account at clinical decision making.

- Evidence-based tracheostomy care decisions should be based on patient clinical need, comprehensive assessment of clinical indicators, consideration of patient comfort and research evidence, and not on set schedule.

- Continuity of care based on evidence is ensured by documentation of nursing assessment findings of clinical indicators in patient observation chart, care plan and nurses' report.

- Evidence-based practice enables nurses address healthcare questions with evaluative and qualitative approach in tracheostomy care decisions.
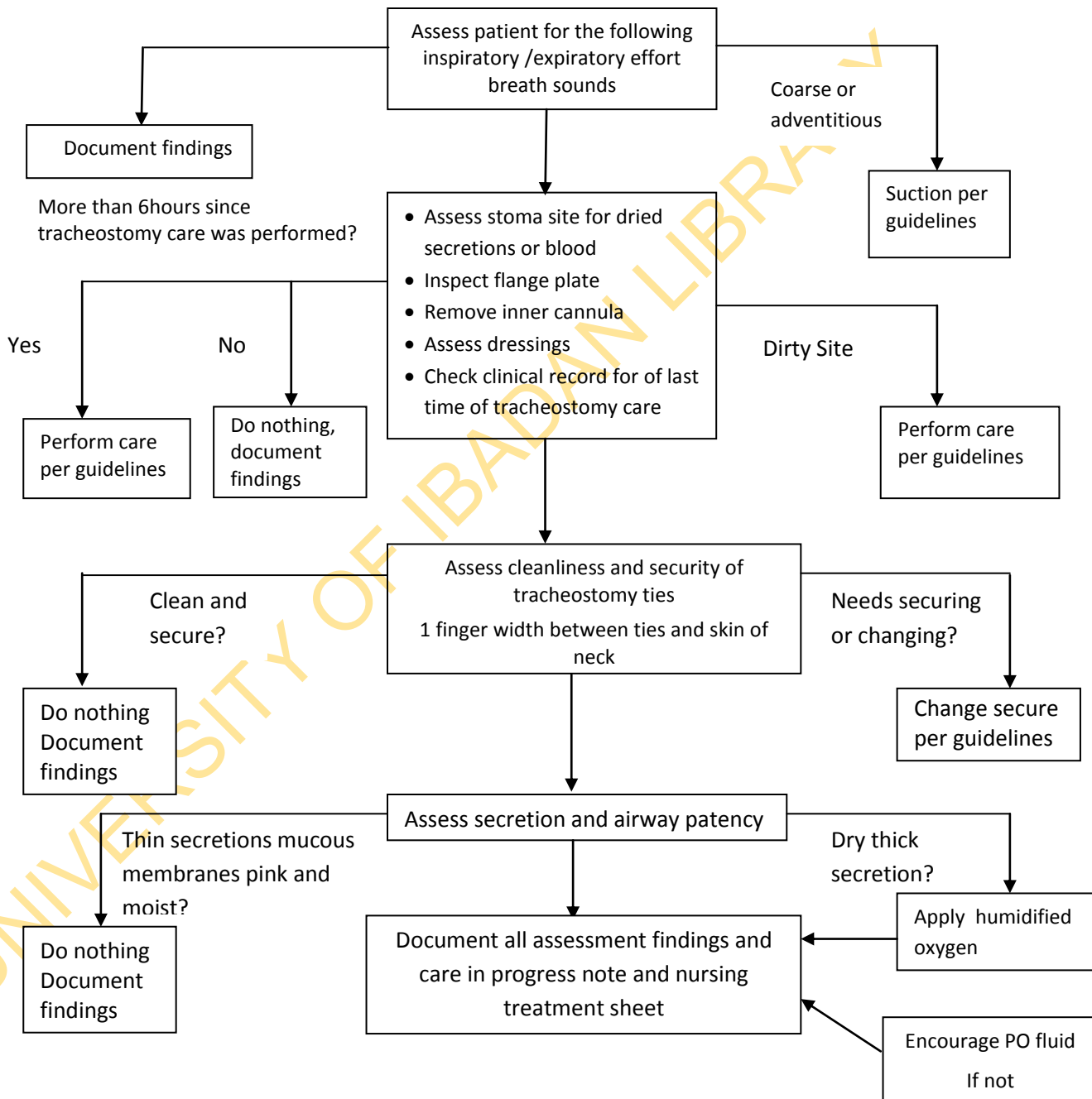
ADMINISTRATION OF POST TEST

CONCLUSION

- The researcher thanks participants for their willingness to participate in the study and cooperation throughout the programme

- Encouragement of participants to continue with knowledge acquired in practice

- Formal conclusion of intervention

APPENDIX VII

EVIDENCE BASED TRACHEOSTOMY CARE AND SUCTIONING
ALGORITHM ADAPTED FOR THE STUDY

```
                    ┌─────────────────────────────┐
                    │ Assess patient for the       │
                    │ following inspiratory/        │
                    │ expiratory effort breath      │
                    │ sounds                        │
                    └─────────────────────────────┘
                                                      Coarse or
┌──────────────────┐                                  adventitious
│ Document findings │                                 ┌──────────────┐
└──────────────────┘                                  │ Suction per  │
                                                      │ guidelines   │
More than 6hours since                                └──────────────┘
tracheostomy care was performed?
                    ┌─────────────────────────────┐
                    │ • Assess stoma site for      │
Yes          No     │   dried secretions or blood  │   Dirty Site
                    │ • Inspect flange plate        │
┌──────────┐ ┌──────│ • Remove inner cannula       │  ┌──────────────┐
│ Perform  │ │ Do   │ • Assess dressings           │  │ Perform care │
│ care per │ │ nothing,│ • Check clinical record    │  │ per guidelines│
│ guidelines│ │ document│   for of last time of     │  └──────────────┘
└──────────┘ │ findings│   tracheostomy care       │
             └──────┘ └─────────────────────────────┘

                    ┌─────────────────────────────┐
        Clean and   │ Assess cleanliness and       │  Needs securing
        secure?     │ security of tracheostomy ties│  or changing?
                    │ 1 finger width between ties   │
┌──────────┐        │ and skin of neck             │  ┌──────────────┐
│ Do nothing│       └─────────────────────────────┘  │ Change secure│
│ Document  │                                         │ per guidelines│
│ findings  │                                         └──────────────┘
└──────────┘

        Thin secretions ┌─────────────────────────┐   Dry thick
        mucous          │ Assess secretion and     │   secretion?
        membranes pink  │ airway patency           │   ┌──────────────┐
        and moist?      └─────────────────────────┘   │ Apply         │
┌──────────┐                                           │ humidified    │
│ Do nothing│  ┌─────────────────────────────┐         │ oxygen        │
│ Document  │  │ Document all assessment      │         └──────────────┘
│ findings  │  │ findings and care in progress │
└──────────┘  │ note and nursing treatment    │         ┌──────────────┐
              │ sheet                         │         │ Encourage PO │
              └─────────────────────────────┘         │ fluid        │
                                                        │ If not       │
                                                        └──────────────┘
```

Source: St. Clair (2005). A New Model of Tracheostomy Care: Closing the Research-Practice