VOLUME - 11, ISSUE - 10, OCTOBER - 2022 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Nursing

ASSESSMENT OF THE EXISTING KNOWLEDGE AND PRACTICE OF THE NURSING PERSONNEL REGARDING ENDOTRACHEAL TUBE (ETT) SUCTIONING WORKING IN CRITICAL CARE UNIT (CCU) OF SELECTED HOSPITALS, KOLKATA

Ms. Obangkokla Nursing Officer AIIMS, Kalyani

KEYWORDS :

CHAPTER 1
INTRODUCTION

"When knowledge and skill work together, expect a masterpiece" John Ruskin

BACKGROUND OF THE STUDY

Respiration is an act of breathing. There are three major alterations in respiration that is hypoxia, altered breathing pattern and obstructed or partially obstructed airways. Assessing for and maintaining an open/patent airway is nurse's responsibility, one that often require immediate action [1].

Millions of people around the world suffering from respiratory diseases and certain respiratory symptoms are among major causes of consultation at various health care institutions, for instance respiratory problems like Asthma and respiratory allergies, COPD, Occupational lung diseases, Sleep apnea syndrome, Pulmonary hypertension etc associated with increased mortality [2].

Artificial airways are inserted to maintain a patent air passage for the client whose airway has become or may become obstructed. A patent airway is necessary so that air can flow to and from the lungs. Four common types of airways are oropharyngeal, nasopharyngeal, endotracheal and tracheotomy [1].

Endotracheal tubes are most commonly inserted for clients who have had general anesthetics or for those in emergency situations where mechanical ventilation is required. An endotracheal tube is inserted by the primary care provider, nurse, or respiratory therapist with specialized education. It is inserted through the mouth or the nose and into trachea with the guide of laryngoscope. One area of nursing practice that has caused concern is the endotracheal tube suctioning of intubated patients [3, 4].

American Nurses' Association(ANA) listed ten essential care to be provided for patients on mechanical ventilator, endotracheal (ET) suctioning is one among them[5].

Endotracheal (ET) suctioning is a process in which the catheter is inserted into the endotracheal tube and the secretions of patient's lung is removed by applying negative pressure. It is one of the most common procedures performed in patients with artificial airways. It is a component of bronchial hygiene therapy and mechanical ventilation. The procedure includes patient preparation, suctioning event, and follow-up care [6]. The main goal of ET suctioning is to remove accumulated lung secretions to maintain t he airway's permeability, provide adequate oxygenation, reduce the risk of VAP, and prevent pulmonary consolidation and atelectasis [7].

Endotracheal suctioning prevents accumulation of the secretions, thereby maintains airway patency and ensures optimal oxygenation and saving the patients' lives. However, failure to meet the standards in the implementation of this procedure can have numerous detrimental effects. Possible complications of endotracheal tube suctioning include hypoxia, bronchospasm, atelectasis, tracheal tissue injury, VAP, increase in intracranial pressure, and cardiac dysrhythmia. All intensive care nurses should be aware when performing this intervention of the potential hazards a patient is exposed to, and should endeavor to prevent or minimize these. Therefore, updating endotracheal tube suctioning practices is considered to reduce the incidence of this complication's [8].

Oleci Pereira Frota, Marisa Dias Rolan Loureiro1, Adriano Menis Ferreira1 (2011) evaluated the intensive care nursing professionals knowledge about endotracheal suctioning in two ICUs of a large university hospital in Brazil which stated that the knowledge of majority (73.2%) of the nursing professionals were qualified as fair but worryingly, it was considered poor in five areas with differing results among the professional categories. Taking into account that incorrect knowledge generates inappropriate behavior, it is inferred that the practice of these subjects may compromise patient's safety [9].

Nishamol YN (2011) conducted a descriptive study on assessment of the knowledge and practice of endotracheal suctioning among neuro nurses in Neuro medical ICU which stated that the neuro nurses had average knowledge about ET suctioning but in practice they were not practicing some critical care elements [10].

Tina Day, Sarah Farnell-Ward, Sheila Haynes and Jenifer Wilson-Barnett (2010) in two separate studies in intense and acute care units, realized nurses' lacking knowledge which was reflected in their performance [11].

Sean Keheller and Tom Andrews (2008) stated that different nurses acted differently in endotracheal suctioning and didn't observe experimental recommendations so the quality of this nursing care was lower than expected [12].

Ismet Eser, Gul Bulbul Maras and Elem Guler (2016) conducted a study on assessment of knowledge and practice of intensive care nurses for endotracheal suctioning in a teaching hospital in Western Turkey which showed that the knowledge level of most of the nurses was good and their practice level was fair. Hence Intensive care nurses must perform suctioning procedures safely and effectively to ensure delivery of quality of care and eliminate complications [13].

As suctioning is a fundamental aspect of airway management, the critical care nurses must be competent in this essential clinical skill. Appropriate technique and adherence to evidence-based guidelines will result in fewer complications for the patients and ultimately, financial benefit to the patients by avoidin prolonged hospital stay [7].

Nurses lacking adherence to aseptic technique is a factor in transmitting infection or cross infection which in turn increases patient's length of stay and patients become prone to more and more risk of infection. Researchers have identified that nurses are unaware of current suctioning recommendations and practice is often based on ritual and tradition as opposed to empirical. Nurse's lack of adherence to aseptic technique

may be a factor in transmitting infection or cross infection which in turn increases patient's length of stay. When an infection can be prevented by ordinary and reasonable care, nurses must use such care. Adequate knowledge along with the correct procedure performance is required to follow the aseptic technique which in turn prevents infection. So it's imperative to assess their knowledge and practice level for endotracheal suctioning [14].

The scientific knowledge on which nurses base their clinical practice is often lacking. Nurses lacking adherence to aseptic technique may be a factor in transmitting infection or cross infection. When an infection can be prevented by ordinary and reasonable care, nurses must use such care. Adequate knowledge is required to follow the aseptic technique [15, 16].

Unless, nurse's knowledge and practice level is identified, minimizing VAP and other complication's is difficult to be achieved [14].

There is often a gap between theoretical knowledge and its application in practice. This study will help to put ground and assess the existing knowledge and identify the practices regarding endotracheal suctioning in order to produce better patient outcome. From this we can conclude that assessment of nurse's knowledge and practical experience regarding proper ETT suctioning is crucial in order to perform suctioning procedure with efficiency and effectively.

Need of the study

Pneumonia is the second-most-common hospital-acquired infection in the United States, accounting for 17.8% of all hospital-acquired infections and 40,000 to 70,000 deaths per year [17]. According to the Centers for Disease Control and Prevention (CDC) median rates of ventilator-associated pneumonia (VAP) are 4.2 to 16.3 cases per 1000 ventilator days in adult critical care units. Rates for VAP are highest in trauma, burn, and neurosurgical units. The estimated occurrence of VAP in critical care units is 10% to 65%, with mortality rates between 33-50%. When VAP occurs, the likelihood of death increases 3- to 4-folds. In recent studies, ventilator-associated pneumonia (VAP) increased hospital length of stay by 16 to 17 days and increased costsby almost $30 000 per case [16].

Endotracheal suctioning must be performed according to right standards and codes in order to reduce its side effects [18].

Miia Jansson, Tero Ala-Kokko, Pekka Ylipalosaari and Helvi Kyngäs (2013) stated that the Critical-care nurses are currently not following current ETS recommendations. Significant discrepancies, which may constitute a risk factor for VAP by increasing microbial colonization of the lower airway, were identified [8].

Akram Ansari, Negin Masoudi Alavi, Mohsen Adib and Mohammadreza Afazel (2012) conducted a descriptive cross sectional study on assessing gap between the knowledge and performance of nurses' working in ICU regarding endotracheal suctioning. This study revealed that despite acceptable knowledge, nurses' performance in endotracheal suctioning were poor [19].

Many life-threatening complications can occur when a suctioning procedure is not performed with the correct technique. It has been reported that standard practice guidelines for suctioning are insufficient in clinical practice [20]. One of the major challenges for nursing service in country is improvement in clinical method's quality. In the past years special attention was given to education during service. The question to be asked is how much this increase in knowledge will affect their clinical performance? Assessment of clinical performance is possible by direct observation of nurse's behavior, but analysis by direct surveillance on nurses' performance on the bedside of patient was rarely paid attention.

Regarding the importance of performing endotracheal suctioning correctly in ICUs, the investigator is determined to implement a research to investigate nurses' knowledge and performance in the field of endotracheal suctioning in ICUs of selected hospitals. There is a hope that this research will help to clarify the present status of this care in ICUs and by finding weaknesses, offer solutions to improve the quality of this service.

Hence the investigator felt the need to assess the knowledge and practice of the staff nurses working in CCU, it has also been learned from personal clinical experience that even though the nurses has enough knowledge yet they fail to apply it in practice. This hampers the patient care as well as the growth of nursing and evidence based practice. Thus the investigator felt it highly necessary to conduct this type of research study.

Statement of the problem

"Assessment of the existing knowledge and practice of the nursing personnel regarding Endotracheal Tube (ETT) suctioning working in Critical Care Unit (CCU) of selected hospitals, Kolkata".

Purpose

The purpose of the research study was to assess the existing knowledge and practice of the nursing personnel regarding ETT suctioning.

Objectives of the study

1. To assess the existing knowledge of the nursing personnel regarding ETT suctioning.
2. To identify the practices of the nursing personnel regarding EET suctioning.
3. To find out the relationship between existing knowledge and practice regarding ETT suctioning.
4. To find out the association between existing knowledge and practice with the selected demographic variables.

Assumptions

The study assumes that the nursing personnel

- have some knowledge regarding ETT suctioning.
- are following the standard practice of ETT suctioning.

Operational definition

Knowledge

In this study, it refers to the range of correct responses of the nursing personnel related to endotracheal tube suctioning as measured by structured knowledge questionnaire.

Practice

In this study, it refers to the activities performed by the nursing personnel in relation to endotracheal suctioning, as measured by observational checklist.

Nursing personnel

In this study, it refers to all the registered nurses who had obtained a diploma or Bachelor degree in nursing from a recognized institution affiliated to Indian Nursing Council and working in critical care units of selected private hospitals.

Critical care unit

In this study, it refers to any specialized unit of hospital, designed and equipped for care of critically ill patients to reduce mortality rate and to improve quality of care of the patients.

Hospital

In this study, it refers to selected private hospitals of Kolkata.

Delimitations

The study was delimited to

- nursing personnel working in selected private hospitals only.
- those who were working in critical care unit.
- those who were performing endotracheal tube suctioning.

Variables

Research variables

- Knowledge of the nursing personnel regarding ETT suctioning.
- Practices of the nursing personnel regarding ETT suctioning.

Demographic variables

- Age (in years).
- Gender.
- Professional qualification.
- Years of professional experience.
- Years of experience in C.C.U.
- Exposure to in-service education program.

Conceptual framework

The conceptual framework adopted for the study was based on Ludwig Von Bertalanffy's open system model (1968) to assess the existing knowledge and practice of the nursing personnel regarding endotracheal tube (ETT) suctioning. The System Model has three major components that is the input, process and output. In an open system, the output becomes input as a feedback. For this present study, input, process and output are explained as follows.

Input

Input are the factors when processed provide an output. In this study, input referred to the nursing personnel working in critical care units, involved in direct patient care and their demographic factors like age (in years), gender, professional qualification, years of professional experience, years of experience in CCU and exposure to in-service education program.

Process

Process refers to strategies through which intervention will occur. In the present study, process includes assessment of existing knowledge and practice of nursing personnel regarding ETT suctioning working in critical care unit using the structured knowledge questionnaire and observational checklist.

Output

Output refers to the expected change in behavior or outcome of the intervention. In this study, output comprises findings related to existing knowledge score and practice score of nursing personnel regarding ETT suctioning, relationship between existing knowledge and practice and association between existing knowledge and practice with selected demographic factors.

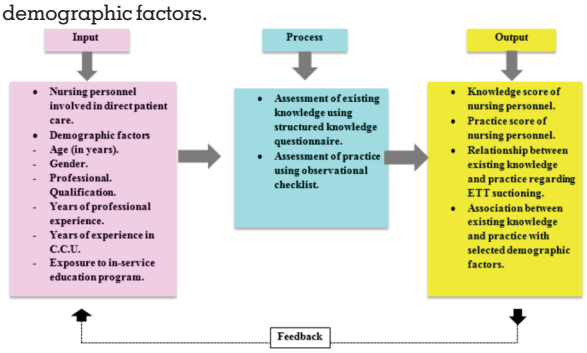

Figure 1 Schematic presentation of the conceptual framework based on Ludwig Von Bertalanffy's Open System Model (1968).Summary

This introductory chapter dealt with background of the study, need of the study, statement of the problem, purpose, objectives, assumptions, operational definition, delimitations, variables and conceptual framework of the study.

Organization of report

The content matters of the report were organized in the next four chapters and would be presented as follows

Chapter II

It deals with review of literature of research studies and non-research studies related to the present study.

Chapter III

It would present the research methodology of the study and plan for data analysis.

Chapter IV

It deals with data analysis and interpretation.

Chapter V

It would deal with the major findings, discussion in relation to other studies, conclusions, implications, limitations and recommendations based on findings of the study.

The end of chapters would also give a selected list of references and appendices.

CHAPTER II

Review of literature

Review of literature is a key in the research process that provides a solid background for the research study. A literature review is an account of the previous efforts and achievements of scholars and researchers on a phenomena. It assist the researcher to generate research question, to identify the theoretical and conceptual framework of research problem, to assess the feasibility of the study, to plan for methodology, to develop tool for data collection and to plan for statistical analysis [21].

The literature review for this study mainly deals with the articles, literatures, relevant books, thesis, and information found in printed and non- printed form about endotracheal suctioning procedure and nurse's knowledge and practices regarding endotracheal suctioning. A well- structured literature review is characterized by a logical flow of ideas; current and relevant references with consistent, appropriate referencing style; proper use of terminology; and an unbiased and comprehensive view of the previous research on the topic [22].

The literature review for the present study is presented under the following headings

- Literature related to knowledge regarding endotracheal suctioning.
- Literature related to practices regarding endotracheal suctioning.
- Literature related to knowledge and practice regarding endotracheal suctioning.

I. Literature related to knowledge regarding endotracheal suctioning.

Bhanu Paramjyothi, Limi Elsa Daniel and Dr. Indira S (2016) conducted a study to assess the knowledge regarding ET suctioning among staff nurses and student nurses in NMCH, Nellore. Descriptive cross sectional design and convenient sampling technique was used for the study which included 30 samples. Data was collected using structured questionnaire. Results of the study showed that, with regard to level of knowledge of ET suctioning among staff nurses, 1(7%) staff nurse had inadequate knowledge, 11(73%) staff nurses had Moderate knowledge, and 3(20%) had adequate knowledge. Among nursing students, 3(20%) students had inadequate knowledge, and 12(80%) had moderate knowledge. The study

concluded that comparing the level of knowledge between staff nurses and nursing students, Staff nurses had adequate level of knowledge than nursing students regarding endotracheal suctioning [23].

Honeymol Antony, Josmi George P, Mahima MG, Hezil Reema Barboza (2016) conducted a descriptive study to assess the knowledge regarding suctioning techniques among the Staff Nurses at selected hospitals of Mangaluru. A quantitative research approach with non-experimental descriptive design was adopted to assess knowledge of staff nurses regarding suctioning techniques. The findings of the study demonstrated that among 100 staff nurses, maximum percentage (51%) belonged to the age group of 21-25 years, majority (93%) of staff nurses were females, most (56%) of the staff nurses had academic qualification of B.Sc. Nursing, maximum number of staff nurses (72%) had professional experience of 1-5- year's and most of the staff nurses (62%) did not have other source of information. The mean percentage of knowledge score was 53.43%. There was a significant association between knowledge and previous information (2= 5.09, table value 2= 3.84) and sources (2= 23.36, table value 2= 7.81). There was no association between knowledge and other demographic variables. Hence the study concluded that the staff nurses had average level of knowledge on suctioning techniques and there was significant association between knowledge and previous information and sources [24].

Raju Ram Parihar (2015) conducted a study on effectiveness of planned teaching programme on the knowledge of endotracheal suctioning among staff nurses working in ICU, Rajasthan. A pre-experimental study was carried out to assess the knowledge of 26 staff nurses selected by purposive sampling technique using a structured knowledge questionnaire and PTP was administered and the post-test was conducted after fifteen days. The study findings indicated that the mean pre-test knowledge score (17.07) of the staff nurses had average knowledge regarding endotracheal suctioning. The mean post-test knowledge score (25.30) was higher than the pre-test score. The 't' test computed for knowledge ('t'(25)=8.11, P≤0.001) showed highly significant difference suggesting that the PTP was effective in increasing knowledge regarding endotracheal suctioning among staff nurses. The study concluded that the staff nurses had inadequate knowledge regarding endotracheal suctioning as per current research recommendations. They required further education and continuous updates to enhance their knowledge regarding endotracheal suctioning. PTP served as an effective teaching strategy to increase their knowledge and improve their practices [25].

Alessandra Negro, Roberta Ranzani, Mariagrazia Villa and Duilio Manara (2014) conducted a survey study to assess the intensive care nurses knowledge regarding endotracheal suctioning guidelines. An anonymous questionnaire based on previous studies was sent to a selected sample composed of the intensive care unit (ICU) nurses of 16 ICUs in 11 Italian hospitals. The results of the study revealed that the questionnaires were sent to 379 nurses, out of which 65% of questionnaires returned completed. The study found that majority (58%) nurses scored good knowledge regarding endotracheal suctioning and only 2.5% of the nurses gave fully correct answers. Correct answers were more common amongst the more experienced ICU nurses. Hence the study concluded that the ICU nurses' knowledge of guidelines regarding endotracheal suctioning was not complete; however, experienced nurses demonstrated a better knowledge of the subject [26].

Oleci Pereira Frota, Marisa Dias Rolan Loureiro1, Adriano Menis Ferreira1 (2011) evaluated the intensive care nursing professionals knowledge about endotracheal suctioning in two ICUs of a large university hospital in Brazil. An exploratory descriptive study in which a quantitative approach was used for the study. Data was collected through the means of a questionnaire. The sample consisted of 27 professionals out of which 51.9% were male. Results of the study revealed that globally, the knowledge of majority (73.20%) professionals was qualified as fair, but worryingly, it was considered poor in five areas with differing results among the professional categories. Taking into account that incorrect knowledge generates inappropriate behavior, it was inferred that the practice of these subjects may compromise patient's safety. Study concluded that the studied individuals showed knowledge deficits in some aspects of endotracheal suctioning, a fact that deserves investment regarding teaching and nursing [9].

II. Literature related to practice regarding endotracheal suctioning.

Somayeh Haghighat, AhmadReza Yazdannik (2015) conducted a prospective observational study to identify the practices of intensive care nurses using the closed suctioning system in Iran. The study was conduted on 40 samples using a 23 item structured checklist. The results were categorized into three sections: Pre-suctioning, suctioning, and post-suctioning practices. The result revealed that Pre-suctioning, suctioning, and post-suctioning practices mean scores were 7.5, 11.75, and 8.5, out of 16, 16, and 12, respectively. The total suctioning practice score was 27.75 out of 44. Most discrepancies were observed in the patients' assessment and preparation, infection control practices, and use of an appropriate catheter. Spearman correlation coefficient indicated statistically significant positive correlation between suctioning education period and working experience with suctioning practice score ($p < 0.0001$, $P=0.02$). Hence the study concluded that the critical care nurses do not fully adhere to the best practice recommendation in closed suctioning system. The study recommended that the standard guidelines on endotracheal suctioning practice must be included in the current education of critical care nurses [27].

Leddy Rossen, Wilinson JM (2015) conducted a study on endotracheal suctioning practices of nurses and respiratory therapists, Canada. A 24-question, self-administered survey was distributed to 180 participants (90 RNs and 90 RRTs) working in the ICU of six hospitals in Ontario. The survey addressed individual suctioning practices within the ICU. The findings of the study showed that the survey response rate was 96%. There were many similarities between the RRT and RN groups, with both reporting high use of normal saline instillation. Both groups observed side effects following normal saline instillation with suctioning including decreased oxygen saturation, patient agitation and increased volume of secretions. A significant number of participants from both the RN and RRT groups were unaware of the existence of suctioning and/or NSI protocols in the ICU. Some respondents reported that they routinely suctioned mechanically ventilated patients rather than as required. The study concluded that the RNs and RRTs continued to practice NSI despite evidence-based practice guidelines suggesting that this therapy may be detrimental to patients. Hence increased awareness of best practices with respect to endotracheal tube suctioning generally, and NSI specifically, must be the focus of professional education in both groups of ICU staff [28].

Rozina Khimani, Fauziya Ali, Salma Rattani and Sohail Awan (2015) conducted a study on Practices of Tracheal Suctioning Technique among Health Care Professionals. Employing literature review as the methodology, multiple databases were searched focusing on three phases of tracheal suctioning (a) the pre suctioning phase, (b) the suctioning phase, (c) the post suctioning phase and complications related to tracheal suctioning. The study concluded that to provide quality care, it is important that the evidence based practice guidelines should be followed strictly [29].

A structured, non-participatory, observational correlation study was conducted by Miia Jansson, Tero Ala-Kokko, Pekka Ylipalosaari and Helvi Kyngäs (2013) on evaluation of endotracheal-suctioning practices of critical-care nurses at Finland. The study was conducted using a 25-item best-practice information sheet. A total of 40 samples were taken. Result of the study showed that the quality of observed endotracheal suctioning practices were significantly lower than the required quality of care ($p<0.001$). The most significant discrepancies were observed in endotracheal suctioning practices related to infection-control practices. The study concluded that Critical-care nurses were currently not following current endotracheal suctioning recommendations. Significant discrepancies, which may constitute a risk factor for VAP by increasing microbial colonization of the lower airway, were identified. Educational interventions, clinical guidelines and adequate support needs to be provided to critical-care nurses to assess and improve their professional capabilities and current practice. Regular auditing and prompt feedback would be beneficial [8].

Sean Keheller and Tom Andrews (2008) conducted an observational study on the open-system endotracheal suctioning practices of critical care nurses. The study was conducted using a 20-item observational schedule on two adult intensive-care units to determine how critical care nurses (n = 45) perform endotracheal suctioning in their daily practice and to establish whether the current best practice recommendations for endotracheal suctioning are being adhered to. The study findings indicated that the participants varied in their endotracheal suctioning practices; did not adhere to best practice suctioning recommendations; and consequently provided lower-quality endotracheal suctioning treatment than expected. Significant discrepancies were observed in the participants' respiratory assessment techniques, hyperoxygenation and infection control practices, patient reassurance and the level of negative pressure used to clear secretions. The study concluded that the critical care nurses do not adhere to the best practice recommendations while performing endotracheal suctioning [12].

III. Literature related to knowledge and practice regarding endotracheal suctioning.

Ismet Eser, Gul Bulbul Maras and Elem Guler (2016) conducted a study on assessment of knowledge and practice of intensive care nurses for endotracheal suctioning in a teaching hospital in Western Turkey. The study was conducted as a cross-sectional and non-participant structured observational design. Data was collected using a 45-item structured and self-administered questionnaire and a 31-item observational checklist. The study sample included 72 nurses. The study findings showed that the nurses' mean scores of knowledge and practice were 23.79 and 12.88. Their level of knowledge was very good in 59.7%, good in 34.7%, and the level of practice was fair in 79.2% and good in 18.1%. The relationship between the type of unit and the nurses' knowledge scores were statistically significant ($p=0.013$). The correlation between the nurses' scores of knowledge and practice was not statistically significant ($r=0.220$; $p=0.063$). The study concluded that the knowledge level of most of the nurses were good and their practice level was fair [13].

Sruthy T Varghese, KT Moly (2016) conducted a descriptive exploratory study to assess the knowledge and skill of critical care nurses on endotracheal (ET) suctioning was conducted in the eight Intensive Care Units of AIMS, Kochi. The sampling technique used for the study was non-probability convenience (n = 50). The result revealed that majority 70% of the participants had an acceptable level of knowledge. Most of the participants (64%) had least acceptable level of knowledge on the actual suctioning event and 54% on post suctioning practice. The nurses who had an acceptable level of skill in performing ET suctioning were 56% whereas skill in practices before suctioning was least acceptable in 86% of the nurses. A significant difference ($P < 0.001$) was obtained between the current practice observed and the best recommended practice on ET suctioning. The elements of ET suctioning which were not followed by majority of the nurses include auscultation of chest (2%), post suctioning assessment (2%), wearing apron (6%), maintaining suction pressure (10%), reassuring the patient before (30%) and after suctioning (18%), hand washing before (42%) and after suctioning (28%), time of suction applied (36%), and maintaining the suction catheter's sterility (46%). Hence, the study concluded that even though nurses had an acceptable level of knowledge and skill, inadequacies exist in the practice of various phases of ET suctioning. Hence, training on ET suctioning should be focused specifically to those phases [7].

Harjot Kaur, Hemant Kumar Saini and Kewal Krishan Gupta (2016) conducted a study on effectiveness of teaching intervention on knowledge and practices regarding endotracheal tube suctioning among the staff nurses, Punjab. A pre experimental one group pretest post-test research design was chosen for the study. The findings of the study revealed that the mean pretest knowledge score was 19.23and after teaching intervention the mean post-test knowledge score was 27.26. The mean pretest practice score of staff nurses was 6.91and after teaching intervention the mean post-test practice score was 10.54. Hence the study concluded that the teaching intervention brought about a significant change in the level of knowledge and practice of staff nurses regarding endotracheal tube suctioning [30].

Vinayaka AM and Sheela Bernet (2016) conducted a study to assess the Effectiveness of Structured Teaching Programme on Knowledge and Practice Regarding ET Tube Suctioning among Pediatric ICU Staff Nurses in Selected Hospital at Bangalore. In this study, quasi-experimental one group pretest post-test research design was adopted. Results showed that the pretest mean knowledge score was 18.60, post-test mean knowledge score was 29.40, and the pretest mean practice score was 22.07, post-test mean practice score was 26.93. The significance of the findings was obtained by using paired 't' test, the value of pretest and post-test of knowledge and practice was 12.565 ($P<0.001$) and 13.978 ($P<0.001$) respectively, emphasizing the significant improvement. The study also revealed that there was no association found between the mean pretest knowledge and practice score with selected baseline variables. The study concluded that there was a significant gain in knowledge and practice among pediatric ICU staff nurses following a structured teaching programme [31].

Raghda Elbokhary, Await Osama and Mugahed AL-khader (2015) conducted a descriptive cross-sectional study on assessment of knowledge and practice of ICU nurses regarding endotracheal suctioning for mechanically ventilated patients in Khartoum teaching hospital at Sudan. All nurses working in Khartoum teaching hospital ICU was included in the study. Results showed that majority of the nurses working in Khartoum teaching hospital (35.7%) had 1 year 2 months working experience, (85.7%) had poor knowledge level, (76.7%) had fair practice level, and there was no significant relationship between working experience & levels of knowledge & practice. The study concluded that the nurses had better practical level than knowledge level and they were not affected by nurse's length experience as there should be [14].

Shamna Majeed Abdul Majeed, Shambhavi (2015) conducted a study on effectiveness of planned teaching programme on knowledge and practice of endotracheal suctioning among staff nurses of Mangalore. The study design was pre experimental one group pre-test post- test design using purposive sampling technique to draw 30 staff nurse. After

collecting data, the planned teaching programme was administered to the subjects and on the 7th day a post-test was conducted using the same questionnaire and observational checklist. The study results revealed that the post-test analysis showed that there was a significant increase in the knowledge score. In the post-test, majority (100%) had good knowledge and none of them had inadequate knowledge on endotracheal suctioning. The post-test analysis showed there was a significant increase in the practice scores. In the post-test, majority (100%) had good level of practice of performing endotracheal suctioning. Significant association was found between work experience and the post-test level of knowledge (2=7.1, p≤0.05) and post-test practice (2=8.45, p≤0.05).The findings of the study proved that the planned teaching programme was an effective measure to improve the knowledge and practice of staff nurses regarding endotracheal suctioning [32].

Savita Sharma, Jyoti Sarin and Gurneet Kaur Bala (2014) conducted an experimental study with quasi experimental approach on Effectiveness of "endotracheal suctioning protocol" in terms of knowledge and practices of nursing personnel at Maharishi Markandeshwar Institute of Medical Science &Research Hospital, Mullana. The structured knowledge questionnaire and an observation checklist regarding endotracheal suctioning was developed and used for data collection and the endotracheal suctioning protocol was also developed and nurses were educated as per protocol. Pre and post-implementation data from 30 purposively selected ICU nursing personnel were taken. Findings of the study revealed that the mean post-implementation knowledge score and practice score of nursing personnel regarding endotracheal suctioning was significantly higher than the mean pre- implementation knowledge and practice score (p<0.001). Hence, the protocol was effective in enhancing the knowledge and improving the practices of nursing personnel regarding the endotracheal suctioning [33].

Akram Ansari, Negin Masoudi Alavi, Mohsen Adib-Hajbagheri and Mohammadreza Afazel (2012) conducted a descriptive cross sectional study on assessing gap between the knowledge and performance of nurses' working in intensive care units (ICU) regarding endotracheal suctioning at Shahid Beheshti Hospital, Iran. In this cross sectional study, knowledge and performance of 44 nurses working in three ICUs in Shahid Beheshti Hospital, Iran, was analyzed in three areas of prior, during and post suctioning, using a 26 item questionnaire and check list. Results showed that in the 8 items questions of prior suction the average score for knowledge and performance were 5.4 (±1.12) and 0.81 (±0.71) respectively and in the analysis of ten items during suctioning an average score of 7.7 (±1.09) and 4.6 (±0.75) were obtained for knowledge and performance respectively. In 8 items of post suction the average score of knowledge was 6.47 (±0.69) and that of performance was 3.86. In general, from 26 possible points, the average score of knowledge and performance were 19.59 and 8.75 respectively. The type of ICU and nurses' working experience were not significantly related to their knowledge and performance. On conclusion this study revealed that despite acceptable knowledge, nurses' performance in endotracheal suctioning was poor. This shows that education alone is not sufficient for observance of the standards [19].

Ozden Dilek and Selma Gorgulu R (2012) conducted a study on development of standard practice guidelines for open and closed system suctioning. Non-participant structured observational study. A total of 48 nurses who were employed in the cardiovascular surgery intensive care unit of a state hospital in Turkey were assessed. Questionnaires and nurse observation forms were used to assess the use of the open and closed system suctioning. The findings of the study revealed that there was a significant difference between the mean scores of the answers ('true', 'wrong' and 'I do not know') for the use of open and closed system suctioning before and after training. In addition, all steps of both suctioning procedures were carried out correctly during the third observation. The compliance of the nurses to the standard practice guidelines for open and closed suctioning and their knowledge levels on the subject were increased after training, while the implementation of standards was satisfactory. The study concluded that the development of open and closed system suctioning standard practice guidelines directly contributed to the enhancement of patient safety and the quality of nursing care [20].

Nishamol. Y. N (2011) conducted a descriptive study on assessment of the knowledge and practice of endotracheal suctioning among neuro nurses in Neuro medical ICU in Sree Chitra Tirunal Institute for Medical Sciences and Technology ,Trivandrum. 30 Neuro Nurses including both permanent and temporary were selected using Convenience sampling technique as the study sample. An observational checklist was maintained in order to record the steps of the procedure and the knowledge assessed by using questionnaire. Result of the study showed that the knowledge score of staff nurses with less ICU experience ranged from 10 to 14 with a mean of 12.06 (1.48).The knowledge of staff nurses with more ICU experience ranged from 11 to 14 with a mean of 12.08 (1.19). There was no statistically significant difference in the mean knowledge score of both group. Thirty endotracheal suctioning episodes of 19 staff nurses both permanent and temporary were observed during all three shifts. However there was no statistically difference in the mean practice score of both groups. Based on the findings of the study, it was concluded that Neuro nurses had average knowledge regarding ET suctioning but in practice they were not practicing some critical care elements [10].

Marzie Kargar, Zahra Hadian Shirazi, Mitra Edraki, Narges Pishva, Hale Ghaem and Abdul Hameed Chohedri (2006) conducted a study on the effects of ETT Suctioning education on the Knowledge and Performance of Intensive Care Nurses, Iran. An experimental interventional study with a sample size of 50 nurses were taken for the study. Using systematic random allocation, they were divided into study and control groups. Data collection was done by a test with 30 points to evaluate knowledge and a check list with 47 points to evaluate performance. After random allocation, the subjects' knowledge was evaluated. Then, ETT suctioning education was given to the test group and NICU infection control education was given to the controls. Two days and two months after the intervention, the subjects were re-evaluated. The results were compared. Results of the study revealed that Man-Whitney test showed that the level of knowledge between the two groups at the beginning of the study had no significant difference (p = 0.71), while the average score in the two groups 2 days and 2 months after the intervention (education) had significant difference (p = 0.001). There was a significant difference 2 days and 2 months after intervention (p 0.001) in the performance. Hence the study concluded that education significantly increases the level of knowledge and degree of performance of endotracheal tube suctioning, however, with the passage of time, the levels fall, necessitating the need for continued education in this matter [34].

Summary

This chapter dealt with review of research and non- research literature related to knowledge and practices of nursing personnel regarding endotracheal tube suctioning. Literature review enlightened the investigator in developing tools and identifying areas which need to be covered.

CHAPTER III
Research Methodology

The methodology of research indicates the general pattern for organizing the procedure of gathering valid and reliable data for an investigation. The methodology of research represents the research approach, research design, setting of the study, population, sample, sample size, sampling technique, development of the tool, pilot study, data collection procedure and the plan of data analysis in details. Research methodology provides a framework for the planning, implementation and analysis of a study.

Research approach
In the present study, a survey research approach was adopted.

Research design
In the present study, descriptive survey research design was used.

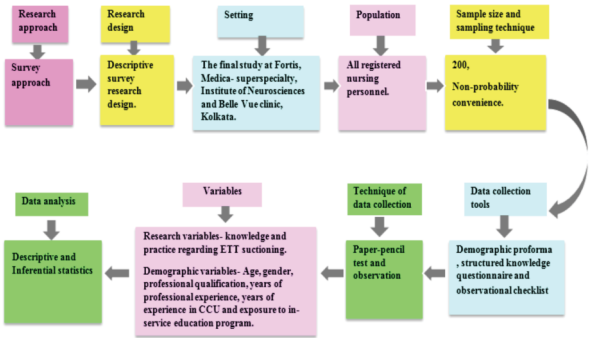

Figure 2 Schematic presentation of the research methodology

Variable
Research variables
- Knowledge of the nursing personnel regarding ETT suctioning.
- Practices of the nursing personnel regarding ETT suctioning.

Demographic variables
- Age (in years).
- Gender.
- Professional qualification.
- Years of professional experience.
- Years of experience in C.C.U.
- Exposure to in-service education program.

Settings
Present study was conducted at Fortis hospital, Medica-Superspecialty hospital, Belle Vue clinic and Institute of Neurosciences, Kolkata.

The reasons for selecting the setting were-
- availability of study sample.
- feasibility of conducting the study in terms of time and distance.
- expectation of getting easy administrative approval and cooperation from different levels.

Population
In the present study, population comprised of all registered nursing personnel working in critical care units.

Sample
Registered nursing personnel working in critical care units of selected private hospitals, Kolkata.

Inclusion criteria includes nursing personnel
- who were available at the time of data collection.
- who were willing to participate in the study.
- who can speak and write in English.

Sample size
In the present study, sample size was 200 nursing personnel working in CCU.

Sampling technique
Non-probability convenience sampling technique was adopted for the present study.

Data collection tools and techniques
The most important and crucial aspect of any investigation is the collection of appropriate information which provides necessary data for the study.

Table 1 Data collection tools and techniques

Tool No	Name of the tool	Variables to be measured	Techniques/methods
I	Structured Questionnaire	Demographic characteristics	Paper-pencil test
II	Structured knowledge questionnaire	Knowledge of nursing personnel on ETT suctioning	Paper-pencil test
III	Observational checklist	Practices of nursing personnel during ETT suctioning	Observation

Development of the tools
Following steps were adopted to select the items and preparation of the tools
- Relevant literature was reviewed from published and unpublished research studies.
- Discussion with guide and co-guide was done for development of the tools.
- A blueprint for the knowledge questionnaire was prepared (presented in table 2).
- Necessary corrections were made as per suggestion of guide and co-guide.
- First draft of the structured knowledge questionnaire and observation checklist was prepared and were given to guide and co-guide for final checking.
- Second draft of the tools were made.
- Knowledge questionnaire and observation checklist along with answer key and scoring sheet was given to nine experts for establishing its content validity.
- Necessary modifications were incorporated in the tools as per the suggestions of the experts.
- Final draft of the tools were prepared.
- Reliability of tools was done and computed.

Table 2 Blueprint of the knowledge questionnaire

Areas of content	Knowledge (60%)	Comprehension (30%)	Application (10%)	No of item
Review of anatomy and physiology related to respiratory system	4 (1, 2, 3, 4)	–	–	4
Meaning and concept regarding endotracheal suctioning	7 (5, 7, 16, 10, 23, 19, 24)	5 (6, 9,18,20, 17)	1 (11)	13
Indication of endotracheal suctioning	1 (12)	–	–	1
Contraindication of endotracheal suctioning	1 (13)	–	–	1
Types and duration of suctioning	2 (8, 14)	–	–	2

Nurses responsibility	1 (15)	–	2 (21, 22)	3
Complications	1 (25)	3 (26, 27, 28)	–	4
Total no. of questions	17	8	3	28
Percentage	60%	30%	10%	100%

Description of the tools

Tool I

It comprised of six items on demographic characteristics of the nursing personnel viz. age, gender, professional qualification, years of professional experience, years of experience in CCU, and exposure to in-service education programme.

Tool II

The structured knowledge questionnaire regarding endotracheal suctioning was developed to assess the existing knowledge of nursing personnel regarding endotracheal suctioning. Total number of questions were 28, each question had '3' alternatives. There was only one correct response. Each correct response carried '1' mark and incorrect answer carried '0' mark. Maximum possible score for the structured knowledge questionnaire was 28.

Gradation of scoring

Excellent= (≥23) ≥80
Very good = (20-22) 70-79%
Good = (17-19) 60-69%
Fair = (14-16) 50-59%
Poor = (<14) <50%

Tool III

Structured observational checklist was developed to assess the practices of nursing personnel during endotracheal suctioning. It included 38 essential steps of endotracheal suctioning. Each correct step carried '1' mark and no mark was allotted for non-performance or incorrect step.

Gradation of Scoring

Excellent practice= (≥31) ≥80
Very good practice= (27-30) 70-79%
Good practice= (23-26) 60-69%
Fair practice = (19-22) 50-59%
Poor practice = (<19) <50%

Validity

The tool was given with a covering letter to nine experts for ascertaining their appropriateness, adequacy and relevance. Experts were chosen on the basis of their clinical expertise, experiences and interest in the area. The experts included nine from different nursing colleges of Medical – Surgical department and those working in clinical area to ensure content validity of the tool. According to the expert's opinion and suggestion necessary modifications were made with the help of guide and co-guide. Languages of the tools were simple and understandable and could be used for the nursing personnel.

Linguistic validation

Linguistic validation in English was done for all the tools by English language experts.

Pre testing of the tools

The pretesting of the tools was done in the critical care unit of Calcutta Medical Research Institute (CMRI), Kolkata after getting proper administrative permission from the Chief Executive Officer (CEO) and Nursing Director. It was done on 20 nursing personnel using validated structured knowledge questionnaire and observational checklist. The pretesting of the tool was done to

- Identify the clarity and feasibility of the items for data collection
- Determine the time taken to answer the questionnaire
- Assess the acceptability of items from the participants

The pre testing indicated that the study was feasible and the items were clear. The total time taken was about 40-45 minutes

No difficulty was found during administration of the tools which means the tools were clear and unambiguous. Hence, there was no need for modification of the structured knowledge questionnaire and the steps of the observational checklist.

Reliability

The tools were administered to 20 nursing personnel to find out the reliability. The reliability of structured knowledge questionnaire was calculated using split half technique followed by Spearman Brown prophecy formula and the reliability coefficient was found r= 0.92, so it can be interpreted that the structured knowledge questionnaire was reliable and had internal consistency.

Reliability of the observation checklist was established by inter-rater reliability, on the basis of agreement and disagreement percentage, 'r' value was calculated which was found to be 0.84 indicating that the observational checklist was reliable and had internal consistency, hence there was no need for modification of the tools. These tools were finalized for data collection.

Ethical consideration

Ethical permission

- Ethical permission was taken from Ethical Committee, IPGME&R, S.S.K.M Hospital, Kolkata.
- Informed consent was taken from the study participants.

Administrative permission

Administrative permission was taken from-

- The Principal of West Bengal Government College of Nursing, S.S.K.M Hospital campus.
- Joint Director of the Health Sciences (J.D.H.S) Swasthya Bhavan, Salt Lake, Kolkata-91.
- The Director and Chief Executive Officer of Fortis Hospital, Belle Vue Clinic, Medica-superspecialty Hospital and Institute of Neurosciences, Kolkata.
- The Nursing Director of Fortis Hospital, Belle Vue Clinic, Medica-superspecialty Hospital and Institute of Neurosciences, Kolkata.
- The Head of the Department of Critical Care Unit of Fortis Hospital, Belle Vue Clinic, Medica-superspecialty Hospital and Institute of Neurosciences, Kolkata.

Pilot study

The pilot study is miniature trial run of the methodology planned for the final research study. It helps to refine or modify the research methodology and plan for appropriate use of resources with sound beforehand information about the main study parameters. Pilot study was conducted from 21/09/16 to 24/09/16 at Ruby General Hospital, Kolkata. All the formalities were fulfilled before conducting the pilot study. After obtaining formal administrative permission, the investigator proceeded for data collection. Pilot study indicated that the study was feasible.

Final data collection procedure

Final study was conducted at the critical care units of Fortis hospital, Medica-Superspecialty hospital, Belle Vue clinic and Institute of Neurosciences, Kolkata after taking formal permission of the Chief Executive Officer and Nursing Director from respective institute before the final data collection period. The data was collected for a period of one month i.e. from 08/11/16 to 03/12/16. 200 nursing personnel's were selected according to sampling criteria.

The data collection was done in the following manner.

- The investigator introduced herself to the participant's and each of the participants was approached personally for inclusion in the study.
- During the initial meeting a detailed explanation was given about the purpose of the study, data collection and also study benefits.
- Initially the investigator had to spend considerable amount of time to gain confidence and cooperation from the participants. Later on, they clarified their doubts and were willing to participate in the study.
- Formal written consent was obtained from the participants for participating in the research study.
- Anonymity and confidentiality of their responses were assured.
- The related question might have prompted immediate changes in practices. So each participant was observed first for practices related to endotracheal suctioning for 15 minutes with the help of observation checklist followed by assessment of their knowledge with the help of structured knowledge questionnaire.
- Participants were requested not to discuss about the questions to the next shift nursing personnel.
- Data was collected according to their shifting duty.
- For the selection of the participants as the sample, researcher had to depend on convenience sampling technique as the participants had shifting duty and could not be spared according to the wish of the researcher.
- Any quarries about the question were discussed after the end of the session.

Problem faced during data collection

No such problem was faced by the investigator during data collection. All the head of the department were very cooperative. They gave constant support. Nursing personnel were also very cooperative and sincere. They were friendly during the data collection.

Plan for data analysis

The obtained data will be analyzed using descriptive and inferential statistics under the following sections.

Section I

Findings related to demographic characteristics of nursing personnel.

Section II

Findings related to existing knowledge of nursing personnel regarding ETT suctioning.

Section III

Findings related to practices of nursing personnel regarding ETT suctioning.

Section IV

Findings related to relationship between existing knowledge and practices of nursing personnel regarding ETT suctioning and their statistical significance.

Section V

Findings related to association between existing knowledge of nursing personnel regarding ETT suctioning with selected demographic variables.

Section VI

Findings related to association between practice of nursing personnel regarding ETT suctioning with selected demographic variables.

Summary

This chapter mainly dealt with the research approach, research design, research variables, setting of the study, population, sample, sample size, sampling technique, development of the tools, validity and reliability of the tools, pretesting of the tools, pilot study, problem faced during data collection and the plan for data analysis.

CHAPTER IV

Analysis and interpretation of Data

This chapter dealt with analysis and interpretation of the data collected to assess, compare the relationship and to find out the association between the knowledge and practices of nursing personnel regarding endotracheal suctioning.

Analysis and interpretation of the data collected were based on the objectives of the study. Both descriptive and inferential statistics were used to analyze the data.

Objectives of the study

1. To assess the existing knowledge of the nursing personnel regarding ETT suctioning.
2. To identify the practices of the nursing personnel regarding ETT suctioning.
3. To find out the relationship between existing knowledge and practice regarding ETT suctioning.
4. To find out the association between existing knowledge and practice with the selected demographic variables.

Organization and presentation of the study findings

The obtained data was analyzed, using descriptive and inferential statistics under the following sections.

Section I

Findings related to demographic characteristics of nursing personnel.

Section II

Findings related to existing knowledge of nursing personnel regarding ETT suctioning.

Section III

Findings related to practices of nursing personnel regarding ETT suctioning.

Section IV

Findings related to relationship between existing knowledge and practices of nursing personnel regarding ETT suctioning and their statistical significance.

Section V

Findings related to association between existing knowledge of nursing personnel regarding ETT suctioning with selected demographic variables.

Section VI

Findings related to association between practice of nursing personnel regarding ETT suctioning with selected demographic variables.

Section I Findings related to demographic characteristics of nursing personnel. n=200

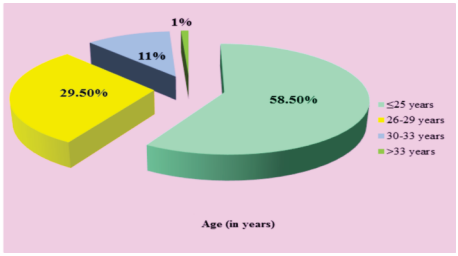

Figure 3 Pie diagram showing percentage distribution of nursing personnel according to their age (in years).

The data presented in figure 3 shows that maximum (58.50%) of nursing personnel were in the age group of 25years and below, compared to 29.50%, 11% and 1% nursing personnel in the age group of 26-29 years, 30-33 years and more than 33 years respectively. n= 200

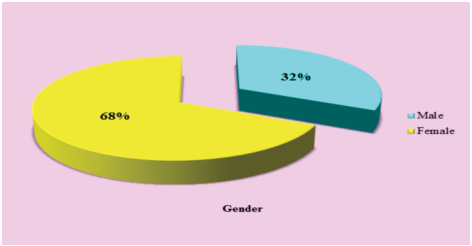

Figure 4 Pie diagram showing percentage distribution of

nursing personnel according to their gender.

The data presented in figure 4 shows that majority, 68% of nursing personnel were female when compared to 32% of nursing personnel were male. n= 200

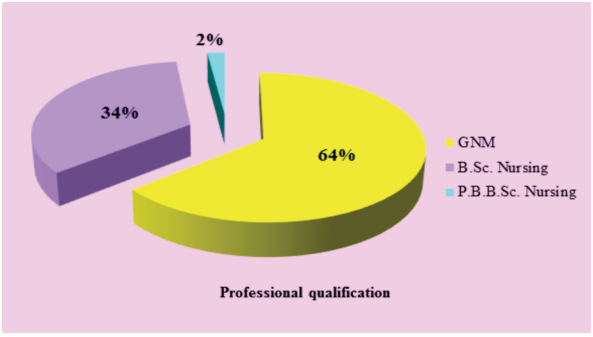

Figure 5 Pie diagram showing percentage distribution of nursing personnel according to their professional qualification.

The data presented in figure 5 reveals that majority, 64% of nursing personnel were professionally qualified as G.N.M, followed by 34% and 2% of nursing personnel who were professionally qualified as B.Sc. Nursing and P. B. B.Sc. Nursing respectively. n= 200

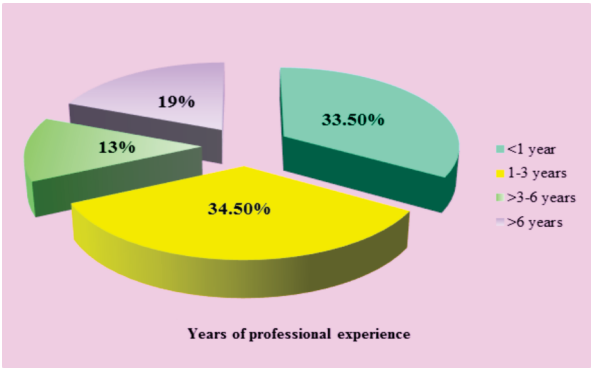

Figure 6 Pie diagram showing percentage distribution of nursing personnel according to their years of professional experience.

The data presented in figure 6 shows that majority, 34.50% of nursing personnel had 1-3 years of experience as a professional nurse, compared to 33.50%, 19% and 13% nursing personnel had <1 year, >6 years and >3-6 years of experience respectively as a professional nurse. n=200

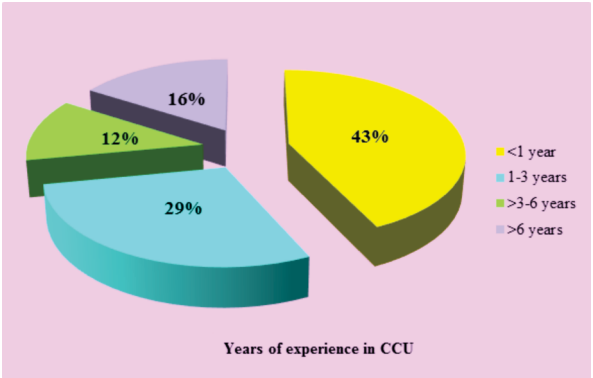

Figure 7 Pie diagram showing percentage distribution of nursing personnel according to their years of experience in CCU.

The data presented in figure 7 depicts that majority, 43% of nursing personnel had <1 year of experience in CCU compared to 29%, 16%, 12% of nursing personnel who had 1-3 years, >6 years and >3-6 years of experience in CCU respectively. n=200

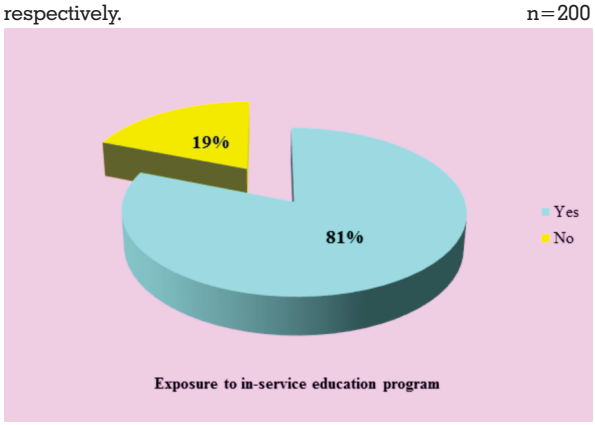

Figure 8 Pie diagram showing the percentage distribution of nursing personnel according to their exposure to in-service education program.

The data presented in figure 8 shows that majority, 81% of nursing personnel had exposure to in-service education program and remaining 19% of nursing personnel had no exposure to in-service education program.

Section II Findings related to existing knowledge of nursing personnel regarding ETT suctioning.

Table 3 Frequency and percentage distribution of nursing personnel according to their knowledge score regarding ETT suctioning. n=200

Level of knowledge	Frequency	Percentage (%)
Excellent (≥80%)	14	7
Very good (70-79%)	59	29.5
Good (60-69%)	73	36.5
Fair (50-59%)	42	21
Poor (<50%)	12	6

Maximum possible score=28
Minimum possible score=0

Table 3 reveals the frequency and percentage distribution of nursing personnel according to their knowledge score regarding ETT suctioning. It is evident from the result that maximum, 36.5% of nursing personnel had good knowledge, followed by 29.5% had very good knowledge, 21% had fair knowledge, 7% had excellent knowledge and 6% nursing personnel had poor knowledge regarding ETT suctioning.

Table 4 Distribution of range, mean, median and standard deviation of knowledge score of nursing personnel regarding ETT suctioning. n=200

Variables	Range	Mean	Median	Standard Deviation
Knowledge	10-24	18.23	18	1.71

Maximum possible score=28
Minimum possible score=0

Table 4 reveals the distribution of range, mean, median and standard deviation of knowledge score of the participants regarding ETT suctioning. It is evident from the result that knowledge score of nursing personnel varied from 10-24 out of total 28 score, mean of knowledge score was 18.23, median was 18 and standard deviation was 1.71, which indicates some dispersion of knowledge scores among the nursing personnel related to ETT suctioning.

Table 5 Area wise distribution of mean and mean percentage of knowledge score of nursing personnel regarding ETT suctioning. n=200

Areas	Maximum possible score	Mean	Mean percentage (%)	Rank

Review of anatomy and physiology related to respiratory system	04	2.75	68.75	3rd
Meaning and concept of ETT suctioning	13	8.27	63.61	4th
Indication of ETT suctioning	01	0.44	44.50	7th
Contraindication of ETT suctioning	01	0.47	47.50	6th
Types and duration of suctioning	02	1.51	75.75	2nd
Nurses responsibility	03	2.27	75.83	1st
Complications	04	2.52	63	5th

Maximum possible score=28
Minimum possible score=0

Table 5 shows domain wise distribution of mean and mean percentage of knowledge score of the nursing personnel regarding ETT suctioning. Result showed that among the seven areas of knowledge regarding ETT suctioning, nursing personnel obtained maximum 75.83%(1st) score in the area of nurses responsibility, followed by 75.75% (2nd) in the area of types and duration of suctioning, 68.75% (3rd) in review of anatomy and physiology related to respiratory system, 63.61% (4th) in meaning and concept of ETT suctioning, 63% (5th) in complications due to inadequate suctioning, 47.50% (6th) in contraindication of ETT suctioning and 44.50% (7th) in the area of indication of ETT suctioning.

Section III Findings related to practices of nursing personnel regarding ETT suctioning.

Table 6 Frequency and percentage distribution of nursing personnel according to their practice score. n=200

Practice score	Frequency	Percentage (%)
Excellent (≥80%)	13	6
Very good (70-79%)	43	21
Good (60-69%)	58	31
Fair (50-59%)	70	33
Poor (<50%)	16	9

Maximum possible score=38
Minimum possible=0

Table 6 shows the frequency and percentage distribution of nursing personnel according to their practice score. The findings revealed that majority 33% of nursing personnel had fair practice, followed by 31% had good level of practice, 21% had very good practice, 9% had poor practice and 6% nursing personnel showed excellent level of practice regarding ETT suctioning.

Table 7 Distribution of range, mean, median and standard deviation of practice score obtained by nursing personnel regarding ETT suctioning. n=200

Variable	Range	Mean	Median	Standard Deviation
Practice	15-34	23.7	23	4.13

Maximum possible score=38
Minimum possible score=0

Table 7 reveals the distribution of range, mean, median and standard deviation of practice score obtained by the nursing personnel regarding ETT suctioning. The findings revealed that practice score obtained by the nursing personnel ranged from 15-34 out of total 38 score, mean of practice scores was 23.7, median was 23 and Standard Deviation was 4.13, which indicates a wide dispersion in practice score among the nursing personnel regarding ETT suctioning.

Table 8 Area wise distribution of mean and mean percentage of practice score of nursing personnel regarding ETT suctioning. n=200

Areas	Maximum possible score	Mean	Mean percentage (%)	Rank
Preparatory phase of nursing activity	12	6.73	56.08	2nd
Performance phase of nursing activity	21	15.36	73.14	1st
Termination phase of nursing activity	5	1.58	31.60	3rd

Maximum possible score=38
Minimum possible score=0

Table 8 reveals the area wise distribution of mean, mean percentage of practice score of nursing personnel regarding ETT suctioning. It shows that among the three areas of ETT suctioning, nursing personnel obtained maximum 73.14% (1st) in the area of performance phase of nursing activity, followed by 56.08% (2nd) in the area of preparatory phase of nursing activity and 31.60% (3rd) in the area of termination phase of nursing activity.

Section IV Findings related to relationship between existing knowledge and practice of nursing personnel regarding ETT suctioning and their statistical significance.

Table 9 Correlation Coefficient and its significance between existing knowledge and practice score of nursing personnel regarding ETT suctioning. n=200

Variables	'r' value	't' value
Knowledge score and practice score	0.40	6.14*

't' df (198)=1.96, p<0.001

Data presented in table 9 shows that 'r' value computed between knowledge and practice score of the nursing personnel regarding ETT suctioning was 0.40 df (198) which revealed moderately positive correlation between the two variables, which was found statistically significant as evident from 't' value [t=6.14, df (198) at 0.001 level of significance]. Hence it might be inferred that knowledge and practice of the nursing personnel regarding ETT suctioning were dependent on each other.

Section V Findings related to association between existing knowledge with the selected demographic variables of nursing personnel regarding ETT suctioning.

Table 10 Chi square test showing association between existing knowledge with age (in years), gender and professional qualification. n=200

Knowledge score			
Demographic variables	<Median	≥Median	$\chi 2$
Age in years			4.96*
≤25	52	65	
>25	24	59	
Gender			1.82
Female	56	80	
Male	20	44	
Professional qualification			0.004
Diploma in nursing	49	79	
Degree in nursing	28	44	

χ^2 df (1)= 3.84, p<0.05

Table 10 shows the association between existing knowledge with age (in years), gender and professional qualification. The findings revealed that the chi square value computed for age (in years) was (χ^2= 4.96) which was more than the table value, hence association between existing knowledge and age (in years) was found statistically significant at 0.05 level of significance with df (1).

Statistically significant association was not found between existing knowledge score and gender and professional qualification of nursing personnel.

Table 11 Chi square test showing association between existing knowledge with years of professional experience, years of experience in CCU and exposure to in-service education program. n=200

Knowledge score			
Demographic variables	< Median	≥Median	χ2
Years of professional experience			14.80*
≤3	64	72	
>3	12	52	
Years of experience in CCU			18.56*
≤3	68	76	
>3	8	48	
Exposure to in service education program			0.03
Yes	62	100	
No	14	24	

χ^2df (1)= 10.83, p<0.001

Table 11 shows the association between existing knowledge with years of professional experience, years of experience in CCU and exposure to in-service education program. The findings revealed that the association between existing knowledge and years of professional experience was found statistically significant (χ^2=14.80) at 0.001 level of significance with df (1).

Similarly the findings showed that association between existing knowledge and years of experience in CCU was found statistically significant (χ^2=18.56) at 0.001 level of significance with df (1).

Statistically significant association was not found between existing knowledge and exposure to in-service education program.

Section VI Findings related to association between practice with the selected demographic variables of the nursing personnel regarding ETT suctioning.

Table 12 Chi square test showing association between practice with age (in years), gender and professional qualification. n=200

Practice score			
Demographic variables	<Median	≥Median	χ2
Age (in years)			6.63*
≤25	58	59	
>25	26	57	
Gender			0.78
Female	60	76	
Male	24	40	
Professional qualification			0.27
Diploma in nursing	52	76	
Degree in nursing	32	40	

χ^2df (1)= 3.84, p<0.05

Table 12 shows the association between practice with age (in years), gender and professional qualification. The findings revealed that the chi square value computed for age (in years) was more than the table value, hence association between practice and age (in years) was found statistically significant (χ^2= 6.63) at 0.05 level of significance with df(1).

Statistically significant association was not found between practice and gender and professional qualification of nursing personnel.

Table 13 Chi square test showing association between practice with years of professional experience, years of experience in CCU and exposure to in-service education program. n=200

Practice score			
Demographic variables	< Median	≥Median	χ2
Years of professional experience			2.04
≤3	70	66	
>3	26	38	
Years of experience in CCU			7.16*
≤3	60	84	
>3	12	44	
Exposure to in service education program			13.78*
Yes	112	50	
No	14	24	

χ^2df (1)= 6.64, p<0.01

Table 13 shows the association between practice with years of professional experience, years of experience in CCU and exposure to in-service education program. The findings revealed that the association between practice and years of experience in CCU was found statistically significant (χ^2=7.16) at 0.01 level of significance with df(1).

Similarly the findings showed that association between practice and exposure to in-service education program was found statistically significant (χ^2=13.78) at 0.01 level of significance with df (1).

Statistically significant association was not found between practice and years of professional qualification of nursing personnel.

Summary

This chapter dealt with analysis and interpretation of data collected from 200 nursing personnel working in Critical Care Unit of four different private hospitals, Kolkata, West Bengal.

The next chapter will present major findings, discussion in relation to other studies, conclusions, implications, limitations and recommendations of the study.

CHAPTER- V

Discussion

This chapter presents major findings of the study, discussion in relation with the findings of the other studies, conclusion, implications of the study in the field of nursing education, nursing administration, nursing practice, nursing research, limitations of the study and recommendations for future research.

Major findings of the study

Findings related to demographic characteristics of nursing personnel.

- Majority, 58.5% of the nursing personnel belonged to the age group of ≤25 years of age.
- Majority, 68% of the nursing personnel were females.
- Majority, 64% of the nursing personnel were professional qualified as GNM.

- Majority, 34.50% of the nursing personnel working in CCU had 1-3 years of professional experience.
- Majority, 43% of the nursing personnel had <1 year of experience in critical care unit.
- Most, 81% of the nursing personnel had exposure to in-service education program.

Findings related to existing knowledge of nursing personnel regarding endotracheal suctioning.

- The data showed that 36.5% of the nursing personnel had good knowledge, followed by 29.5% had very good knowledge, 21% had fair knowledge, 7% had excellent knowledge and 6% had poor knowledge regarding ETT suctioning.
- Mean, median and standard deviation of the knowledge score were 18.23, 18, and 1.71, which indicates some dispersion of the knowledge score among the nursing personnel regarding ETT suctioning.
- Nursing personnel obtained maximum (75.83%) score in the area of nurses responsibility, followed by 75.75% in the area of types and duration of suctioning, 68.75% in review of anatomy and physiology related to respiratory system, 63.61% in meaning and concept of endotracheal suctioning, 63% in complications , 47.50% in contraindication of endotracheal suctioning and 44.50 in indication of endotracheal suctioning.

Findings related to identification of practices of nursing personnel during endotracheal suctioning.

- The data showed that 33% of the nursing personnel had fair practice followed by 31% had good practice, 21% had very good practice, 9% had poor practice and 6% showed excellent level of practice regarding ETT suctioning.
- Mean, median and standard deviation of the practice score were 23.7, 23, and 4.13, which indicates wide dispersion in practice score among the nursing personnel regarding ETT suctioning.
- Nursing personnel obtained maximum (73.14%) score in the area of performance phase of nursing activity followed by 56.08% in the area of preparatory phase, 31.60% in the area of termination phase of nursing activity.

Findings related to relationship between existing knowledge and practice score of nursing personnel regarding endotracheal suctioning.

- There was a statistically significant moderately positive correlation between the existing knowledge and practice of nursing personnel regarding ETT suctioning at 0.05 level of significance.

Findings related to association between existing knowledge of nursing personnel regarding ETT suctioning with selected demographic variables.

- There was a statistically significant association between existing knowledge and age (in years) at 0.05 level of significance.
- There was a statistically significant association between existing knowledge and years of professional experience at 0.001 level of significance.
- There was also a statistically significant association between existing knowledge and years of experience in CCU at 0.001 level of significance.

Findings related to association between practices of nursing personnel regarding ETT suctioning with selected demographic variables.

- There was a statistically significant association between practice and age (in years) at 0.05 level of significance.
- There was a statistically significant association between practice and years of experience in CCU at 0.01 level of significance.
- There was also a statistically significant association between practice and exposure to in service education program at 0.01 level of significance.

Discussion in relation to other studies

In this section, major findings of the study have been discussed with reference to the results found in other studies.

Findings related to assessment of existing knowledge of the nursing personnel regarding ETT suctioning.

The findings of the present study revealed that majority 36.5% of the nursing personnel had good knowledge, followed by 29.5% had very good knowledge, 21% had fair knowledge, 7% had excellent knowledge and 6% had poor knowledge regarding ETT suctioning. The findings of this study were consistent with the study conducted by Alessandra Negro, Roberta Ranzani, Mariagrazia Villa and Duilio Manara (2014) among 379 nurses and they found that majority (58%) nurses scored good knowledge regarding endotracheal suctioning and only 2.5% of the nurses gave fully correct answers [26].

Another study conducted by Oleci Pereira Frota, Marisa Dias Rolan Loureiro1, Adriano Menis Ferreira1 (2011) stated that the knowledge of majority (73.2%) of the nursing professionals were qualified as fair but worryingly, it was considered poor in five areas with differing results among the professional categories [9].

Findings related to assessment of practices of the nursing personnel regarding ETT suctioning.

The findings of the present study revealed that 6% of the nursing personnel showed excellent level of practice followed by 21% had very good practice, 31% had good practice, majority 33% had fair practice and 9% had poor practice and regarding ETT suctioning. The findings of this study were consistent with the study conducted by Somayeh Haghighat, AhmadReza Yazdannik (2015) which stated that the total suctioning practice score was 27.75 out of 44 which was fair practice. Most discrepancies were observed in the patients' assessment and preparation, infection control practices, and use of an appropriate catheter [27].

The findings of this study were also consistent with the study conducted by Miia Jansson, Tero Ala-Kokko, Pekka Ylipalosaari and Helvi Kyngäs (2013) which stated that the quality of observed ETS practices was significantly lower than the required quality of care ($p<0.001$). The most significant discrepancies were observed in endotracheal suctioning practices related to infection-control practices [8].

Findings related to assessment of existing knowledge and practice of the nursing personnel regarding endotracheal suctioning.

The findings of the present study revealed that majority 36.5% of the nursing personnel had good knowledge and maximum 33% of the nursing personnel had fair level of practice regarding ETT suctioning. The findings of this study were consistent with the study conducted by Ismet Eser, Gul Bulbul Maras and Elem Guler (2016) which stated that the nurses' mean scores of knowledge and practice were 23.79 ± 3.83 and 12.88 ± 2.53. 59.7% of the nurses had very good knowledge and 34.7% had good knowledge. 79.2% of the nurses had fair level of practice and 18.1% had good practice. The relationship between the type of unit and the nurses' knowledge scores was statistically significant ($p=0.013$) [13].

The findings of this study were contradictory with the study conducted by Raghda Elbokhary, Await Osama and Mugahed AL-khader (2015) which stated that nurses had better practical level than knowledge level with (85.7%) of the nurses had poor knowledge level and (76.7%) of the nurses had fair practice level and there was no significant relationship between working experience & levels of knowledge & practice [14].

CONCLUSION

From the findings of present study, it was concluded that majority of the nursing personnel had good knowledge and fair level of practice regarding ETT suctioning as determined by structured knowledge questionnaire and observational checklist. The findings of the study also showed that there was statistically significant moderately positive correlation between the existing knowledge and practices of the nursing personnel regarding ETT suctioning. There was statistically significant association between existing knowledge with age (in years), years of professional experience and years of experience in CCU and there was also statistically significant association was found between practice with age (in years), years of experience in CCU and exposure to in-service education program.

Implications of the study

The findings of the study have the following implications for nursing education, nursing administration, nursing practice and nursing research.

Nursing Education

Education is the key to development of excellence in endotracheal suctioning practices of nursing personnel. The findings will enable the nursing educators to provide more precise education to the nursing students regarding endotracheal suctioning and also improve their skill by taking the opportunity and practicing it during their clinical duty to render quality care to the patient.

Nursing Administration

The findings will enable the nurse administrators to organize and conduct in-service training programme, workshops, seminars related to suctioning procedures that can help the nurses to keep pace with the changed theories and practices and enable them to provide quality practices with updated knowledge regarding endotracheal suctioning.

Nursing Practice

All institutions should have updated protocols or guidelines related to suctioning procedures in the critical care units. Best practices can only be achieved by the establishment of training courses for the nurses especially for the new comers. Staff nurses practices should also be appraised on regular basis for improvement of skills.

Nursing Research

In order to maintain a dynamic and more demanding and safe health care system, health services need to promote research based endotracheal suctioning practices and use of evaluation methods to measure outcomes regarding endotracheal suctioning. Research has a significant and vital role in nursing in terms of quality and cost effectiveness. The publication of research findings is essential to make nurse educator, nurse administrator, and nurse practitioner, aware about the current situation of the practices of nursing personnel regarding endotracheal suctioning. This will be helpful for nurses to have research based evidence for their practices. This will help directly or indirectly for uplifting nursing profession.

Limitations

The present study was limited to

- small number (200) of respondents that limit generalization of study findings.
- selected hospitals of Kolkata only.

Recommendations

Keeping in view the findings of the present study the following recommendations were suggested

- A similar study can be replicated on large sample for generalization.
- A comparative study can be conducted between government and private hospitals regarding practice of ETT suctioning.
- An experimental study can be conducted to see the effectiveness of a planned teaching programme regarding ETT suctioning.
- An analytical study can be conducted to find out the factors related to poor practice of ETT suctioning.

Summary

This chapter mainly dealt with the major findings of the study, discussion with other studies, implications in nursing practice, nursing education, nursing administration and nursing research, limitation of the study and further recommendation of the study.

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