DISSERTATION ON

ASSESS THE EFFECTIVENESS OF SPECIFIC NURSING INTERVENTIONS AMONG PATIENTS ON MECHANICAL VENTILATOR IN TOXICOLOGY UNIT AT RAJIV GANDHI GOVERNMENT GENERAL HOSPITAL, CHENNAI -03

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CERTIFICATE

This to certify that this dissertation titled **"Assess the effectiveness of specific nursing interventions among patients on mechanical ventilator in Toxicology Unit at Rajiv Gandhi Government General Hospital, Chennai -03"** is a bonafide work done by **Ms.V.K.R.Periyarselvi,** College of Nursing, Madras Medical College, Chennai-03 and submitted to The Tamilnadu Dr.M.G.R. Medical University, Chennai in partial fulfillment of the University rules and regulations towards the award of the degree of Master of Science in Nursing Branch -I, Medical Surgical Nursing under our guidance and supervision during the academic period from 2010 – 2012.

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ABSTRACT

Patients on mechanical ventilator pass through a period of physical stress are both physiologic and psychologic in its effects. Ventilator Associated Pneumonia is a major complication, which leads to increase the length of stay in the Intensive Care Unit and increases the mortality and morbidity rates. A Quasi- experimental, Pre-test Post- test Control group design study was conducted to assess the effectiveness of specific nursing interventions among patients on mechanical ventilator in Toxicology unit at Rajiv Gandhi Government General Hospital. Total 30 samples were selected by convenient sampling technique and allotted into experimental and control group. Pre intervention assessment was done for both groups. Specific nursing interventions, like head of the bed elevation 30-40 degree angle, closed tracheal suctioning, and maintenance of adequate endotracheal tube cuff pressure was provided for experimental group three times a day and based on the needs for three consecutive days. Samples in the control group received routine care as per Hospital protocols and physician's prescription and their vital parameters were assessed daily three times a day for three consecutive days. Post intervention assessment was done for both experimental and control group.

The health status was observed and assessed through observational check list. The results showed that majority(13) (80%) of them improved well and their conscious level, ventilator mode, O2 saturation% was improved, and the auscultation of the chest was clear in the experimental group, where as only(2) 20% of the sample's conscious level, ventilator mode and the O2 saturation% was improved in the control group. The association between auscultation of chest, ventilator mode and the level of conscious with clinical variables, less than three days of ventilation and not presence of co morbid disease are significant(P=0.001***). The results revealed that these specific nursing interventions, had a significant effect on the improvement of health status of the patients and it helps to prevent Ventilator Associated Pneumonia among patients on mechanical ventilator.

INDEX

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATION

S. No	ABBREVIATION	EXPANSION
1	ICU	Intensive Care Unit
2	IMCU	Intensive Medical Care Unit
3	VAP	Ventilator Associated Pneumonia
4	HOB	Head of the Bed
5	CTS / OTS	Closed Tracheal Suctioning / Open Tracheal Suctioning
6	ET T	Endo Tracheal Tube
7	SICU	Surgical Intensive Care Unit
8	CMV	Continuous Mandatory Ventilation
9	SIMV	Synchronized Intermittent Mandatory Ventilation
10	CPAP	Continuous Positive Airway Pressure
11	DBP	Diastolic Blood Pressure
12	SBP	Systolic Blood Pressure

CHAPTER-I

INTRODUCTION

The promotion of patient comfort through focused nursing interventions is an integral component of expert nursing care in the Intensive Care Unit. The nature of intensive care nursing brings an abundance of unique patient physiological and psychological challenges. A delicate balance is often struck between the skills required in the use of technical equipment and the caring role of the nurse who uses their ability to observe, safeguard, relate to their patients as valued people and provide care that is focused on comfort.

Patients on mechanical ventilator pass through a period of physical stress are both physiologic and psychologic in its effects. Patients may experience physiological problems like pneumothorax, barotraumas, ventilated associated pneumonia, sodium and water imbalance, problems related to neurological system, and gastrointestinal system etc. The humane appreciation of the patient's environment and the provision of comfort measures to alleviate and, where possible, normalize the patient's day to day routine go a long way to reducing the mechanically ventilated complications

Mechanical ventilation is a complex therapy that possesses major risks and it requires constant observation of the client and the nurse has to provide comprehensive nursing care. Mechanical ventilatory support requires proper functioning of equipment and assessment of the patient. The care of the mechanically ventilated patient is a fundamental component of a nurse's clinical practice in the intensive care unit. It is vital for intensive care nurses to deliver high quality care to the critically ill patient using relevant technologies but also incorporating psychosocial care measures (Urden, 2006). This balance is often one of the largest challenges faced by the nurses in the intensive care environment.

Ventilator-associated pneumonia is the most common hospital-acquired infection among patients receiving mechanical ventilation in an intensive care unit. Different initiatives for the prevention of ventilator-associated pneumonia have

been developed and recommended. Specific nursing interventions like maintaining head of the bed elevation 30-45 degree angle, closed tracheal suctioning and maintenance of adequate endotracheal tube cuff pressure.

The positioning and mobilization of the critically ill patient can be considered one of the most important tasks to reduce infections in the daily ICU nursing practice. Positioning a patient plays a distinctive role in the development of Ventilator Associated Pneumonia and it is important to understand that gastroesophageal reflux, pulmonary aspiration of oropharyngeal contents and probably even clearance of retained airways secretions can be highly affected by body positioning.

The Closed suctioning system maintains the connection with the mechanical ventilator during tracheal suctioning and is claimed to limit loss in lung volume and oxygenation. Cereda et al (2009) compared changes in lung volume, oxygenation, airway pressure, and hemodynamics during endotracheal suctioning performed with closed and open suctioning systems in a prospective, randomized study in 10 patients in the Intensive Care Unit. They performed 4 consecutive tracheal suctioning maneuvers—2 with closed suctioning and 2 with open suctioning—at 20-minute intervals. Loss in lung volume during open suctioning was significantly more frequent than during closed suctioning. During open suctioning, they observed a marked decrease in SaO_2, whereas during closed suctioning the change was only minor. During closed suctioning, ventilation was not interrupted. The authors concluded that avoiding suctioning-related lung volume loss can be helpful in patients with an increased tendency for alveolar collapse.

Mary Lou Sole et al (2009) conducted a study on assessment of Endo Tracheal tube cuff pressure to assess the accuracy and feasibility of continuous monitoring of cuff pressure, describe changes in cuff pressure over time, and identify clinical factors that influence cuff pressure. They suggested endotracheal tube cuff pressure must be maintained within a narrow therapeutic range to prevent complications and cuff pressure is measured and adjusted intermittently. They

concluded continuous monitoring of cuff pressure is feasible, accurate, and safe and cuff pressures vary widely among patients.

1.1 NEED FOR THE STUDY

The mechanically ventilated patients needs are multifold that includes all comprehensive nursing care. Caring patients on mechanical ventilators provide a challenge to the nurses of today. Caring patient on mechanical ventilation needs an extra skill and efficiency for the nurses. The patient's condition may worsen because of endotracheal intubation and improper positioning, sometimes due to respiratory infections.

The personal experience of the investigator found that the number of patients on mechanical ventilator was increasing in the intensive care units nowadays. It was found that many complications arise because of ventilator management as it is a complex therapy. The risk of iatrogenic pneumonia is highest in patients requiring mechanical ventilation. In addition to poor nutritional state, immobility, underlying diseases such as organ failure, immune suppression and other co-morbidity diseases make the patient more prone to infection.

In Rajiv Gandhi Government General Hospital, Toxicology Unit is a separate branch of Intensive Medical Care Unit. It is an important department where the patients who take poison are admitted and treated. Approximately 5-8 patients are admitted daily in Toxicology Unit with the diagnosis of some types of poisoning and snake bite. Approximately 2-3 patients are needed mechanical ventilation to stabilize the hemodynamic monitoring, hypoxia and other vital parameters. Like other Intensive Care Unit, the nurses in Toxicology unit should have the additional responsibility for taking care of patients on mechanical ventilators. The total number of admissions and mechanically ventilated patients are as follows.

S. No.	Year	No of admissions in Toxicology unit	No of patients connected to mechanical ventilator
1	2007	2070	32
2	2008	2287	34
3	2009	2530	26
4	2010	2679	32
5	2011	2745	43

The above statistics shows the patients admitted and connected to mechanical ventilator in Toxicology Unit.

During the clinical experience, the researcher observed that most of the patients were prone to ventilator associated complications like pneumothorax, barotraumas, water and sodium imbalance and ventilator associated pneumonia. Out of these complications Ventilator Associated Pneumonia is a major complication, which leads to increase the length of stay in the Intensive Care Unit and increases the mortality and morbidity rates. Hospital mortality of ventilated patients who develop Ventilator Associated Pneumonia is 46%, in comparison with the 32% of ventilated patients who do not develop Ventilator Associated Pneumonia. Thus the researcher felt that some specific nursing interventions like maintenance of head of the bed elevation 30-40 degree angle, closed tracheal suctioning, and maintenance of adequate endotracheal tube cuff pressure reduce the ventilator associated pneumonia and helps the patient for early weaning and speedy recovery. These interventions can be easily applied and it needs no special technique or equipment to administer. More over the specific nursing interventions are a non pharmacological modality in reducing respiratory complications like ventilator associated pneumonia. The literature review also provides an evidence and support that these specific nursing interventions are effective to reduce the

ventilator associated complications. So the researcher intended to conduct the study.

1.2 STATEMENT OF THE PROBLEM

Assess the effectiveness of specific nursing interventions among patients on mechanical ventilator in Toxicology unit at Rajiv Gandhi Government General Hospital, Chennai-03

1.3 OBJECTIVES

1. To assess the pre interventional health status of both experimental and control group patients.

2. To assess the post interventional health status of both experimental and control group patients.

3. To evaluate the effectiveness of specific nursing interventions among experimental group patients.

4. To associate the effectiveness of specific nursing interventions with selected demographic and clinical variables.

1.4 OPERATIONAL DEFINITIONS

Effectiveness

Effectiveness refers to the improvement in the patient's vital parameters, such as temperature, pulse, respiration, systolic blood pressure, diastolic blood pressure, heart rate, O2 saturation, level of consciousness, ventilator mode, and chest auscultation after giving the specific nursing interventions.

Specific nursing intervention

Series of intervention related to ventilator care that should be specifically implemented together so that it brings out significant better outcomes. The specific nursing interventions used for the purpose of this study are:

- Maintenance of head of the bed elevation 30-45 degree angle.
- Closed endotracheal suctioning.
- Maintenance of adequate endotracheal tube cuff pressure.

Mechanical Ventilator

Mechanical ventilator is an assistive device that assists a patient to breathe, provided that an endotracheal tube or tracheostomy is in place.

1.5 HYPOTHESIS

There is a significant difference in the level of vital parameters between the experimental and control group patients after the specific nursing interventions.

1.6 ASSUMPTION

Specific nursing interventions are effective to improve the health status of the patient.

1.7 DELIMITATIONS

- Study period is limited to one month duration.
- Study is conducted only in Toxicology unit, Rajiv Gandhi Government General Hospital, Chennai-03.

CHAPTER – II

REVIEW OF LITERATURE

A literature review is a very significant aspect in the process of research since a lot of literature reviews provides evidence and support for a point of view, argument and thesis. Other literatures were written as a background for different reports; like some articles convincing the readers in accepting changes in practice, other articles states a concept or strategy for readers or researchers to understand the topic.

A literature review according to Beanland et al (1999) is a "broad, scholarly, comprehensive, in-depth, systematic and critical review of scholarly publications, unpublished scholarly print material, audiovisual material and personal communication". The main purpose of a literature review is to impart the readers the ideas, information and knowledge that has been already authenticated regarding the chosen topic. The review of related literature must be guided by a general idea; it must also include the strengths and weaknesses of the topic.

The review of literature are presented under the following headings

- Literature related to closed endotracheal suctioning.
- Literature related to head of the bed elevation.
- Literature related to maintenance of adequate endotracheal cuff pressure.

2.1 LITERATURE RELATED TO CLOSED ENDOTRACHEAL SUCTIONING

Lorente. L, et al (2010) conducted a prospective and randomized study to evaluate the tracheal suctioning costs and incidence of ventilator-associated pneumonia using closed tracheal suction system without daily change vs open tracheal suction system. They concluded that closed tracheal suctioning system

without daily change is the optimal option for patients needing tracheal suction more than 4 days.

Subirana M, Solà I, Benito S. (2010) searched the bibliographies of relevant identified studies, and contacted authors and manufacturers. Results from 16 trials showed that suctioning with either closed or open tracheal suction systems did not have an effect on the risk of ventilator-associated pneumonia or mortality. More studies of high methodological quality are required, particularly to clarify the benefits and hazards of the closed tracheal suction system for different modes of ventilation and in different types of patients.

Eun-Sook Lee et al (2010) conducted an experimental study to examine the effects of a closed endotracheal suction system on oxygen saturation, ventilator associated pneumonia , and nursing efficacy in mechanically ventilated patients. Seventy mechanically ventilated patients were randomly divided into two groups; 32 for CES and 38 for open endotracheal suction system (OES) protocol. Twenty one nurses were also involved to examine the nurses' attitude of usefulness about CES. The study findings showed that SaO (2) was significantly different between CES and OES. The incidence of VAP in CES was lower than that of OES. CES prevented VAP, was cost effective, and a safe suctioning system. The study concluded that CES can be used with patients with sensitivity to hypoxygenation and with a high risk of VAP.

Mary Lou Sole et al (2009) did a descriptive, multisite survey of suctioning techniques and airway management practices, mainly about uses of closed-system suctioning devices on intubated adults, to describe institutional policies and procedures related to closed-system suctioning and airway management of intubated patients, and to compare practices of registered nurses and respiratory therapists. They concluded that the policies vary widely and do not always reflect current research. Consistent performance of practices such as wearing gloves for airway management and maintaining endotracheal cuff pressures must be evaluated. Collaborative, research-based policies and procedures must be developed and implemented to ensure best practices for intubated patients

Niël-Weise BS, et al (2009) The Dutch Working Party on Infection Prevention Publications was retrieved by a systematic search of Medline and the Cochrane Library for literature published before February 2006. The WIP recommends that there be no preferential use of either open or closed endotracheal suction systems to reduce the rate of VAP, but it elucidates that the quality of the evidence is low. Considerations other than prevention of VAP should determine the choice of the suction system. When closed systems are used, the WIP recommends changing the in-line suction catheters every 48 hours. In case of mechanical failure or soiling of the suction system, they may be changed more frequently.

Werner Rabitsch, et al (2008) conducted prospective, randomized study, they evaluated whether a closed suctioning (CS) system (TrachCare™) influences crossover contamination between bronchial system and gastric juices when compared with an open suctioning system (OS). They concluded, in contrast to the OS group, no cross-contaminations or VAP were seen in the CS group. $SpaO_2$ decreased significantly in the OS group compared with presuctioning values, unlike in the CS group. Whereas presuctioning values were comparable between groups, postsuctioning $SpaO_2$ was significantly higher in the CS group.

SA Harshbarger et al (2008) conducted a quasi experimental study on mechanically ventilated patients. They found that subjects ventilated in the assist-control mode and suctioned with a closed tracheal suction system did not experience significant changes in cardiovascular or acid-base parameters when suctioned without hyperoxygenation. Although most subjects did not become desaturated, four subjects experienced desaturation at one or more intervals. They suggested that to prevent desaturation, hyperoxygenation should be used before and after suctioning with a closed tracheal suction system.

2.2. LITERATURE RELATED TO HEAD OF THE BED ELEVATION

Drakulovic, et al (2010) performed a randomized trial to assess the frequency of clinically suspected and microbiologically confirmed nosocomial pneumonia in semirecumbent vs. supine position in 86 intubated patients. Thirty-four percent of patients in the supine position developed VAP compared with only 8% of patients in the semirecumbent group. Those patients in the supine position and receiving enteral nutrition had the highest frequency of VAP (50%). So the only modifiable risk factor for the development of VAP was elevation of HOB.

Dorothy Bird, MD et al (2010) demonstrated that initiation of the VAP bundle included, head of the bed elevation, which is associated with a significantly reduced incidence of VAP in patients in the SICU along with cost savings. Initiation of a VAP bundle protocol is an effective method for VAP reduction when compliance is maintained. Among the individual bundle elements, compliance with head of the bed elevation had the greatest impact on VAP reduction.

Zev Williams, et al (2010) conducted a prospective, single-center, multi-unit, two-phase study and 4-wk trial was performed. At the onset of the trial, nurses were reminded to maintain head-of-bed elevation >30 degrees. Over the subsequent 2 wks, head-of-bed elevations of 268 intubated patient beds were measured. The average head-of-bed elevation was 21.8 degrees on beds without the device and 30.9 degrees on beds with the device. When compliance is defined as a bed angle of ≥28 degrees, 23% of beds without the device were compliant while 71.5% of the beds with the device were compliant. Seventy-two percent of nurses surveyed (n = 32) found it to be an improvement over existing methods, 88% found it helpful, and 84% would like it routinely used. They concluded that the Angle Indicator improved the rates of adherence to bed-elevation guidelines, and hospital staff found it helpful.

Frank Lyerla, et al (2009) conducted a modified interrupted time series design to facilitate incorporating evidence-based practice by improving positioning of patients receiving mechanical ventilation and to identify patient and nurse

characteristics that predict use of the guideline. Data were collected on 43 patients and 33 nurses 3 separate times in a 12-bed intensive care unit at a medium-sized hospital. A total of 105 observations were recorded for analysis each time. The study findings revealed that the mean elevations of the head of the bed increased significantly from phase 1 (27.7°) to phase 2 (31.7°) and from phase 1 to phase 3 (31.1°). Elevations were higher for tube-fed patients than for patients without enteral tube feedings. Additionally, lower head-of-bed (HOB) elevations have been associated with higher rates of aspiration. Despite the evidence that HOB elevation (30°–45°) helps in preventing the aspiration in patients receiving mechanical ventilation, the intervention is underused.

Roy Jones, et al (2009) conducted systematic reviews to assess the clinical and cost effectiveness of prophylactic antibiotics, body position, kinetic bed therapy and care bundles for the prevention of ventilator associated pneumonia. Of the three RCTs, only one reported a statistically significant reduction in the incidence of VAP, using a semi recumbent body position of 45 degrees. They concluded, that semi recumbent patient position is of low-cost and practical intervention but, a backrest elevation of 45 degrees is not always achieved.

Van Nieuwenhoven, et al (2008) assessed the feasibility of semi recumbent position and found an average HOB elevation of 22.6 degrees after 1 week in their study population that had a targeted HOB elevation of 45 degrees.

Bonten, (2008) found that evidences support the semi-recumbent positioning of ventilated patients, with the head of the bed elevated from 30◦ to 45◦, to reduce the incidence of ventilated acquired pneumonia (VAP).

Hess (2008) presented a review of the evidence related to the use of rotational beds, prone position and semi recumbent position as procedures to prevent VAP. This review was not a systematic review and therefore does not meet the inclusion criteria for this systematic review. However, due to the paucity of evidence on body positions for the prevention of VAP, it is mentioned here in an endeavour to present a comprehensive review of use of body position in the prevention of VAP.

Dodek, et al (2007) conducted a study to find out the effectiveness of semi recumbent position for the prevention of VAP. The study recommended the use of semi-recumbent positioning, with a goal of 45 degrees, in patients without contra indications.

Bouza, et al (2007) reported on compliance with recommended strategies for the prevention of VAP. In this study, 66.5% (109) of patients were in a semi-recumbent body position.

Grap, et al (2007) reported on a non-experimental, longitudinal, descriptive study carried out to describe the relationship between backrest elevation and development on VAP. The study was carried out in a 12 bed ICU with about 1,000 admissions a year, of which about 50% require mechanical ventilation. Backrest elevation was measured continuously with a transducer system. Data were obtained from laboratory results and medical records from the start of mechanical ventilation up to 7 days. They concluded that the patients spent the majority of the time at backrest elevations less than 30º. Only the combination of early, low backrest elevation and severity of illness affected the incidence of ventilator associated pneumonia.

Amy Bowman, et al (2007) stated the Evidence-based clinical practice protocols, when implemented, have a benefit to patient care by minimizing variations in practice, and improving patient outcomes. Evidence based guidelines use empirical research findings along with other types of evidence to standardize practice patterns. The "best practice" goal is identified, and a practice standard is developed to help move practice toward that goal.

Torres, et al (2007) demonstrated that the semirecumbent position decreased rates of aspiration of gastric contents four-fold. In a randomized two-period crossover study, elevation of the head-of-bed of intubated patients is an effective method for reducing rates of aspiration pneumonia.

Kollef, et al (2006) used multivariate analysis for risk factors of developing aspiration pneumonia and found that head position <30 degrees in the first 24 hrs

of intubation was an independent risk factor for developing VAP. The other risk factors were organ system failure, age >60 yrs, and previous antibiotic use. Thus, at the time of intubation, the only modifiable risk factor for the development of aspiration pneumonia risk was head position.

Harold R. Collard, et al (2006) performed evidence based systematic review for prevention of ventilator associated pneumonia. After evaluation of potential benefits and risks, the authors recommend considering several specific interventions to reduce the incidence of ventilator-associated pneumonia: semi recumbent positioning in all eligible patients, sucralfate rather than H2-antagonists in patients at low to moderate risk for gastrointestinal tract bleeding, and aspiration of subglottic secretions and oscillating beds in select patient populations. They suggested semi-recumbent patient positioning is a low-cost, low risk approach to preventing ventilator-associated pneumonia, and all three trials suggested that it is effective. Semi-recumbent patient positioning should be considered in all eligible patients.

Reeve and Cook (2006) conducted a prospective multicentre observational study to determine the extent to which mechanically ventilated patients are nursed in the semi recumbent position. The study was conducted in four university-affiliated ICUs in Canada, caring for mixed medical/surgical patients. The authors observed that the most common body position was 15-30 degrees from the horizontal. The authors concluded that, although RCTs suggest that the supine position is associated with higher rates of VAP compared with the semi-recumbent position, few mechanically ventilated patients were nursed in a semi-recumbent position.

Helman, et al (2006) conducted a prospective, pre-, and post- intervention observational study, found that standardising the process of care via the addition of an order specifying head of bed position, significantly increased the number of patients who were placed in the semi recumbent position.

Cook, et al (2006) conducted a study to understand the perspective of ICU clinicians regarding the determinants and consequences of semi recumbency.

Ninety-three ICU clinicians, including bedside nurses, respiratory therapists, physiotherapists, nutritionists etc took part in the study. The study found that the participants readily acknowledged that most patients were not nursed in a semi recumbent position. The conclusions reached by the authors were that under-use of semi recumbent position was influenced by insufficient awareness of its benefit, real and perceived deterrents, poor agreement about implementation responsibility and lack of enabling and reinforcing strategies.

Carson, et al (2006) conducted a survey of nurses attending education seminars in the United States, to evaluate the extent to which nurses working in intensive care units implement best practices when managing adult patients receiving mechanical ventilation. The authors reported that 1,200 completed a 29-item questionnaire about the type and frequency of care provided. For the practice of elevation of the head of the bed to 30 to 45 degrees from horizontal, 34% of nurses reported maintaining that elevation for 75% of the day, and 52% reported maintaining that elevation for 100% of the day. In their one-day prevalence study of Major Heart Surgery (MHS) patients in ICUs,

The Centers for Disease Control and Prevention (CDC) published Guidelines for Preventing Aspiration Pneumonia and the 2003 CDC and the Healthcare Infection Control Practices Advisory Committee recommend elevating the HOB of a patient at high risk for aspiration at an angle of 30-45 degrees unless this is contraindicated. The Institute for Healthcare Improvement Safer Systems Saving Lives Campaign has made HOB elevation one of four components of the Ventilator Bundle for preventing nosocomial infections. Most recently, the 2006 Society for Critical Care Medicine Outcomes Task Force endorsed HOB elevation as a method to reduce aspiration pneumonia.

Kelleher S, Andrews T. (2010) conducted a study to investigate open system endotracheal suctioning (ETS) practices of critical care nurses. The findings indicate that participants varied in their ETS practices; did not adhere to best practice suctioning recommendations; and consequently provided lower-quality ETS treatment than expected. Significant discrepancies were observed in

the participants' respiratory assessment techniques, hyper oxygenation and infection control practices, patient reassurance and the level of negative pressure used to clear secretions.

Robert, E.(2010) enlisted the clinical indications for endotracheal suctioning which includes secretions in the ET tube, frequent or sustained coughing, adventitious breath sounds on auscultation (rhonchi or upper airways gurgles), de saturation related to airway secretions, increased peak airway pressures and sudden onset of respiratory distress when ever airway patency is questioned.

Bongand, F.S & Sue, D.Y (2010) stated that the intubated patient must be frequently suctioned because both the cough mechanism and the mucociliary clearance mechanism are impaired. The frequency of suctioning depends on the amount and nature of secretions. Although the artificial airway becomes rapidly colonized with bacteria, suctioning should be done using sterile technique to prevent introduction of additional organism.

Fitz Patrick, J.J & Wallance, M. (2009) suggested that endotracheal suctioning is a common nursing intervention to remove mucous and debris from the tracheaobronchial tree by the insertion of a suction catheter through the endotracheal tube and application of vacuum during catheter withdrawal to aspirate tracheal secretions. Endotracheal suctioning is usually performed every 1-2 hours or as needed to maintain airway patency and arterial oxygenation. The most significant clinical indicators to determine the need for endotracheal suctioning are colour of sputum, breath sounds, respiratory rate and pattern, coughing, presence of secretions in the tubing, saw toothed flow volume loops on the mechanical ventilator and blood oxygen levels to indicate need.

Scmelz & Joseph, O. (2009) did a study the role of adventitious lung sounds as an accurate indicator of the need for endotracheal suctioning in adult patients requiring mechanical ventilation and endotracheal intubatioin. Repeated measures of the subjects were analyzed; no coexistent pattern of lung sounds was identified prior to suctioning. Fine adventitious lung sounds were identified;

rhonchi, wheezes, crackles, type II rhonchi and coarse sounds. There was a 14% reduction in occurrence of adventitious lung sounds after suctioning. In addition coarse sounds decreased in duration after suctioning in most patients. There was also no relationship between importance of rhonchi and the actual rhonchi recorded.

Raymond, S.J. (2009) published a utilization paper that reviewed the body of published literature on the practice of normal saline instillation before endotracheal suctioning of mechanically ventilated adult patients. He conducted that normal saline instillation may decrease oxygen saturation values after suctioning and hence it should be discontinued as a routine or standard practice.

Ecklund & Ackerman (2008) described that suctioning of an artificial airway is a common procedure in critical care areas. Presently due to increasing patient activity, it has become more common in medical surgical areas as well. The purpose of endotracheal suctioning is to clear secretions from the airway to maintain a patent airway and to optimize ventilation and oxygenation. The use of an artificial airway diminishes a patient's natural ability to mobilize and clear secretions also. Since the purpose of the upper airway is to warm and moisten air and this is by passed by an artificial airway, the patient must rely upon proper humidification from the closed ventilator circuit. If sufficient moisture is not present in the system the gas will absorb water from the airway most likely from mucous which will then become dries and more tenacious.

AARC, (2008) stated that endotracheal suctioning is a component of tracheal hygiene therapy and mechanical ventilation, and involves the mechanical aspiration of pulmonary secretions from a patient with an artificial airway in place.

Stone and Turner, (2007) stated that endotracheal suctioning is a commonly performed procedure in critical care units which aims to decrease the pulmonary complications of ventilated patients.

Kelly, R.E., et al (2007) conducted a study to identify the effect of endotracheal suctioning were studied in 38 patients. Significant decline in arterial

oxygen tension and saturation was noted in all patients. A new double lumen suction catheter that simultaneously insufflates oxygen while suctioning was tested in there same patients and was found to prevent hypoxemia in all patients. They have recommended insufflations catheter to be added to the protocol of hyperventilation with 100% oxygen to help to prevent suction induced hypoxemia.

Directorate of Nursing Affairs Mannual, (2006) described that endotracheal tube suction is performed inorder to prevent the endotracheal tube blocking. When the ET tube is in situ, normal ciliary action is suppressed, tracheaobronchial secretions are increased and the patient is unable to cough.

2.3 LITERATURE RELATED TO MAINTENANCE OF ADEQUATE ET TUBE CUFF PRESSURE

Mary Lou Sole, et al (2009) conducted a study on assessment of Endo Tracheal tube cuff pressure to assess the accuracy and feasibility of continuous monitoring of cuff pressure, describe changes in cuff pressure over time, and identify clinical factors that influence cuff pressure. They suggested endotracheal tube cuff pressure must be maintained within a narrow therapeutic range to prevent complications and cuff pressure is measured and adjusted intermittently. They concluded continuous monitoring of cuff pressure is feasible, accurate, and safe and cuff pressures vary widely among patients.

Luis Aurelio Díaz, et al (2009) conducted a review on non-pharmacologic measures, which are cheaper and are mostly easy to implement, given the importance of dissemination to improving the consequences of VAP. Among the strategies to prevent VAP are a program of strict infection control that includes education of the healthcare team, proper disinfection of hands, the use of barrier methods and a microbiological surveillance protocol.

Ferrer, et al. (2008) noted in their study that "stagnant oropharyngeal secretions above the cuff can easily gain access to the lower airway when pressure of cuff decreases spontaneously or there is a temporal deflation of the cuff"

Rello, et al (2006) noted that low intracuff pressure may be a risk factor for ventilator-associated pneumonia. His data demonstrated a benefit for maintaining cuff pressure in the endotrachael tube above 20 mm Hg. The study findings indicated that continuous aspiration of subglottic secretions, low cuff pressures were associated with a higher risk of ventilator-associated pneumonia.

CONCEPTUAL FRAME WORK

Conceptual frame work is an interrelated concepts or abstractions assembled together in a rational scheme by virtue of their relevance to a common theme. Conceptualization is a process of forming ideas which are utilized and forms in the conceptual framework for the development of research design. It provides certain frame of reference for clinical practice. These models represent conceptualizations of the nursing process and the nature of nurse client relationships. It helps the researcher to know what kind of data to be collected and gives direction to an entire research process.

The conceptual framework for this study was developed on the basis of J.W.Kenny's Open System Model. Open system model serves as a model for reviewing people as interacting with the environments. Open system model is a set of related definitions, assumptions and prepositions which deals with reality as an integrated hierarchy. System model focuses each system as a whole, but pays particular attention to the interaction of its part or subsystems. A system is a group of elements that interact with one another in order to achieve a goal. A system is a dynamic network of interconnecting elements. A change in only one of the elements must produce change in all the others.

The major concepts of the study are:

INPUT

Input is the matter, energy and transformation that enter the system. In the present study, the input is the characteristics of the subjects like demographic data, clinical data, vital parameters such as temperature, pulse rate, heart rate, respiratory rate, systolic blood pressure, diastolic blood pressure, O2 saturation, auscultation of chest, level of conscious, ventilator mode, presence of co-morbid diseases, duration of ventilation, indication for ventilation, and medical diagnosis.

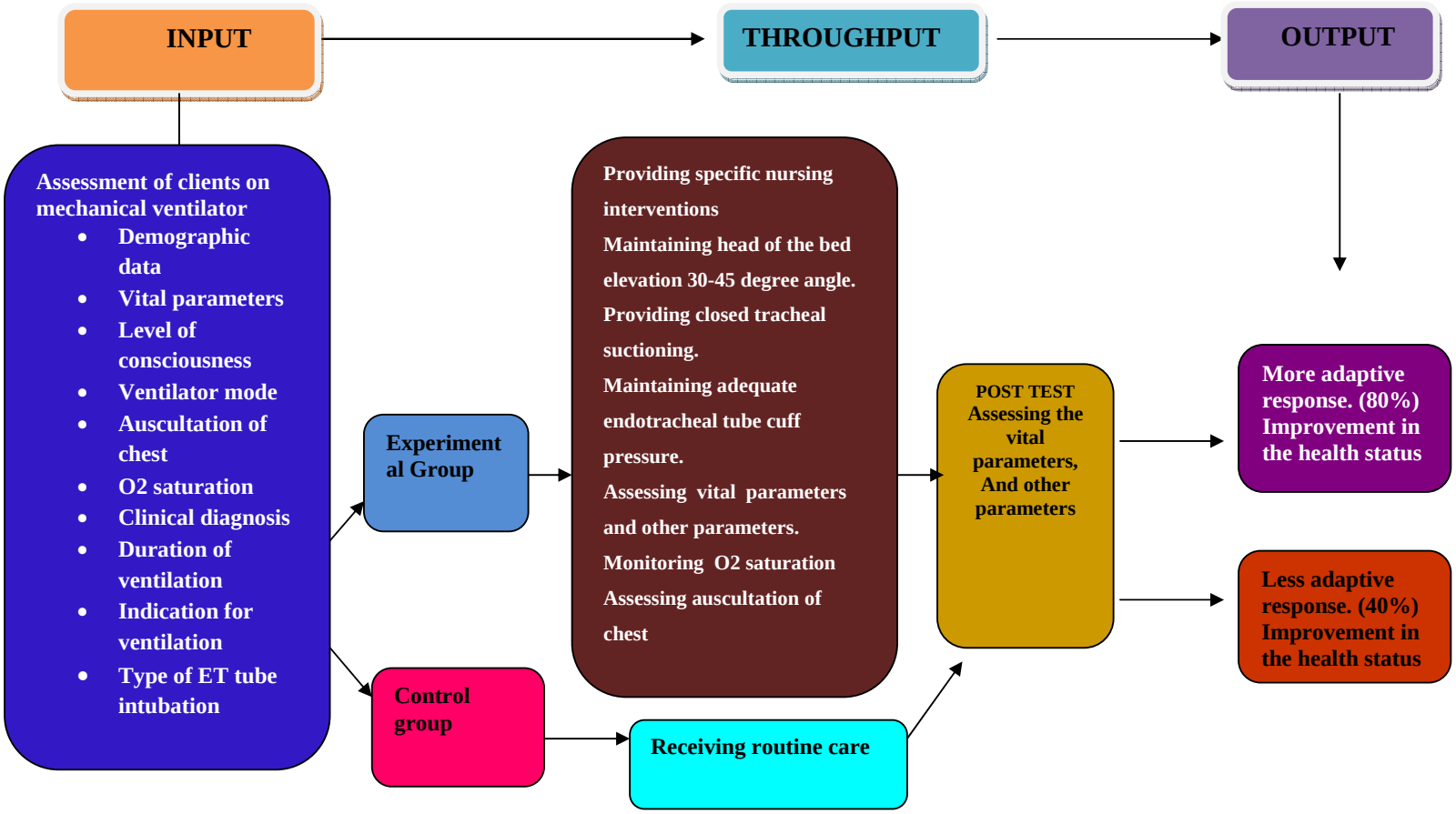
THROUGHPUT

Throughput is the use of biologic, psychologic and socio-cultural sub systems to transform the inputs. Throughput for this study was the specific nursing interventions along with other interventions for the subjects in the experimental group.

OUTPUT

Output is the return of matter, energy and information to the environment in the form of both physical and psychosocial behavior. The expected outcome was obtained by assessing the vital parameters and other health status in the experimental and control group. Throughput was considered in times of differences in the level of vital parameters between the experimental and control group.

Fig-1 Modified Conceptual Framework of J.W.Kennys Open System Model



CHAPTER- III

RESEARCH METHODOLOGY

Methodology is the most important part of research study, which enables the researcher to form blueprint of the research undertaken. Research methodology involves the systematic procedure by which the researcher starts from the time of initial identification of the problem to its final conclusion.

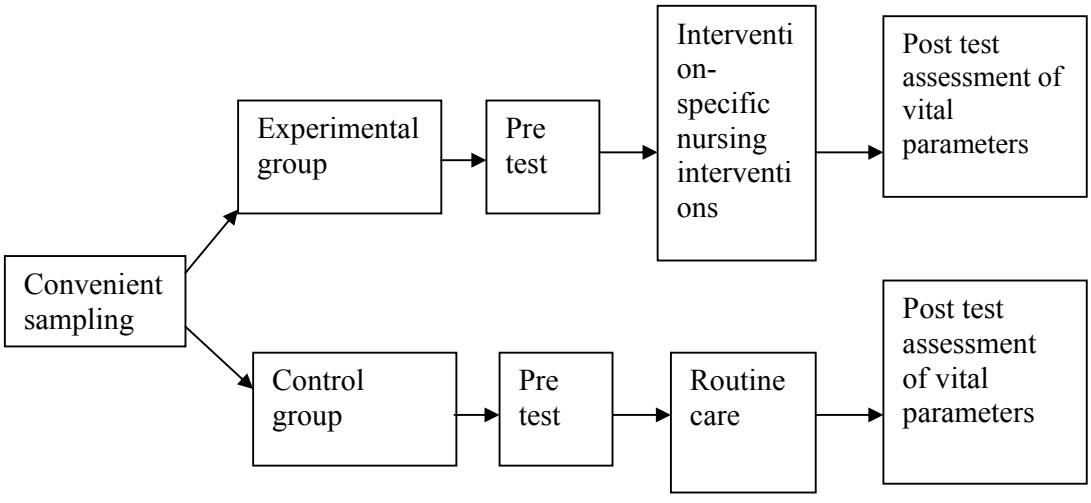
This chapter deals with the brief description of the different steps undertaken by the investigator for the study. It includes the research approach, research design, and variables, setting of the study, population, sample and sampling techniques, development of tool, description of tool, data collection procedure and plan for data analysis.

3.1 RESEARCH APPROACH

Quantitative research approach was used.

3.2 RESEARCH DESIGN

Quasi experimental research design was used to evaluate the effectiveness of specific nursing interventions on patients who have connected with mechanical ventilator.



Experimental group

Patients on mechanical ventilator receive specific nursing interventions along with other interventions.

Control group

Patients on mechanical ventilator receive routine care.

3.3 VARIABLES

Independent variable : Specific nursing interventions.

Dependent variable : Vital parameters

3.4 SETTING OF THE STUDY

Research setting refers to the physical location and condition where data collection takes place in the study. The research was conducted in Toxicology Unit, Rajiv Gandhi Government General Hospital at Chennai-3. Toxicology Unit consists of bed strength of 15. Each day minimum 1 or 2 patients are on mechanical ventilation.

3.5 POPULATION

The population for this study consists of Patients who were admitted in the toxicology unit with endotracheal intubation on mechanical ventilator during the time of data collection.

3.6 SAMPLE

The sample consists of patients who fulfill the inclusion criteria are selected from the Toxicology Unit, Rajiv Gandhi Government General Hospital, Chennai-3.

3.7 SAMPLE SIZE

The sample size for the study is 30 adult patients on mechanical ventilator in toxicology unit and who fulfilled the inclusion criteria with 15 samples in experimental group and 15 samples in control group.

3.8 SAMPLING TECHNIQUE

The samples are selected by convenient sampling technique. Basic details are collected each day from the mechanically ventilated patients and those who fulfill the inclusion criteria were selected and allotted in to experimental and control group.

3.9 CRITERIA FOR SAMPLE SELECTION

Inclusion criteria

- Patients with endotracheal intubation and connected to mechanical ventilator age from 21 years
- Adult patients both male and female.
- Patients with clear chest on auscultation.

Exclusion criteria

- Patients with associated lung disease.
- Patient's relatives who are not willing for the study.
- Patients who were participated in the pilot study.

3.10 DEVELOPMENT AND DESCRIPTION OF INSTRUMENTS

The tools were developed after a detail review of literature and experts opinions from the medical and nursing field.

The tool comprises of

Section -A

Demographic Variables: which includes age in years, sex, religion, educational status, occupation, income, marital status and residential area.

Section –B

Clinical profile: which includes medical diagnosis, indication for mechanical ventilation, duration of ventilation, type of endotracheal tube intubation and presence of co-morbid diseases.

Section – C

Observational check list: It consists of vital parameters before and after specific nursing interventions to know the effects of specific nursing interventions and improvement of

patient's condition. It comprises of temperature, pulse, respiration, systolic blood pressure, diastolic blood pressure, heart rate, oxygen saturation, auscultation of chest, ventilator mode and level of consciousness

3.11 CONTENT VALIDITY

The instruments were developed based on the review of literature and the content validity was established by nursing experts with minimum corrections.

3.12 PILOT STUDY

Formal permission was obtained from the professor and Head of the Department, Department of Internal Medicine, Rajiv Gandhi Government General Hospital, Chennai-3. Pilot study was conducted in Toxicology Unit at Rajiv Gandhi Government General Hospital, Chennai for 5 days before conducting the actual main study. Totally 6 patients have been selected, among that 3 were allotted to the experimental group and 3 were allotted to the control group. Specific nursing interventions were provided to the experimental group using this tool and routine care was given to the control group patients by the staff nurses. Analysis of the study shows that the experimental group patient's health status was improved when compared to control group. The study was practically feasible for the investigator.

3.13 RELIABLITY OF THE TOOL

After pilot study, reliability of the tool was assessed by using interrater method. Vital parameters assessment score reliability was assessed using interrater method and its correlation coefficient value is 0.85. This correlation coefficient is very high and it is good tool for assessing effectiveness of specific nursing interventions among patients on mechanical ventilator in Toxicology unit.

3.14 DATA COLLECTION PROCEDURE

Initially formal permission was obtained from the Director, Institute of Internal Medicine, Rajiv Gandhi Government General Hospital, Chennai-3 for conducting the study. The main study was conducted from 29-8-11to 29-9-11.

A brief introduction about the study was given to the relatives and informed consent was obtained from the relatives. Relatives were assured that the data will be kept confidential.

As described in the sample selection procedure, convenient sampling method was followed for selecting the samples. After selecting the study samples they are allotted in to experimental and control group. Along with ward routine care specific nursing interventions were provided to the patients in the experimental group. Head of the bed was elevated to 30 degree angle and it was measured with the help of protractor unless contraindicated. Closed endotracheal suctioning tube was introduced with strict aseptic precautions and suctioning was done when ever needed. Endotracheal tube cuff was inflated with syringe. The pressure was measured by the palpation of pilot balloon and checking the air leak by the auscultation with stethoscope. Vital parameters were checked before starting the intervention, and three times a day that is morning, afternoon, and evening and after intervention for three days to know the successful effectiveness of specific nursing intervention. Samples in the control group received routine care as per hospital protocols and physician's prescription and their vital parameters were assessed daily three times a day for three consecutive days.

3.15 PLANS FOR DATA ANALYSIS

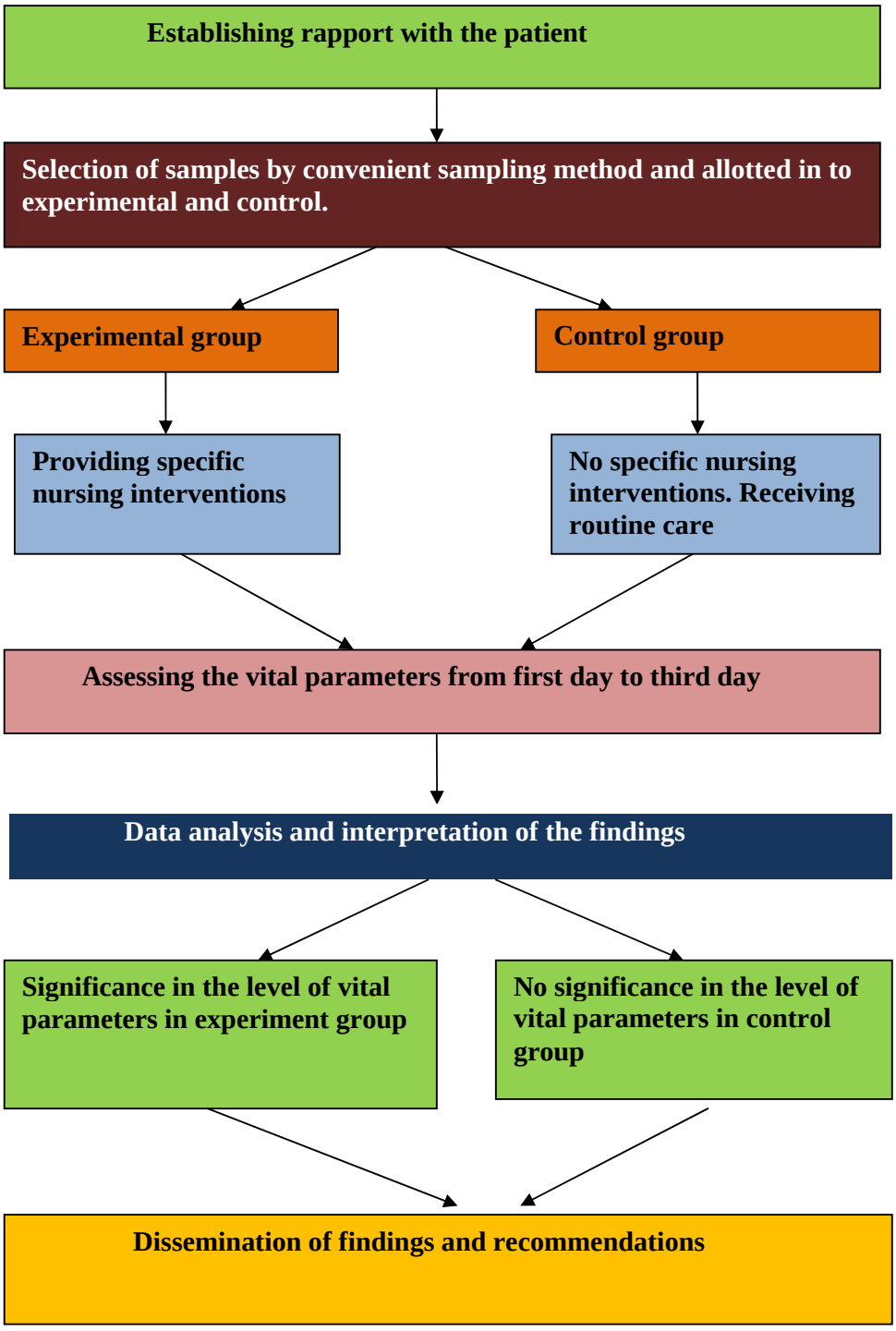
All the collected data were analyzed using both descriptive and inferential statistics. The interpretations and findings were presented in tables and figures.

- Demographic variables and clinical variables in categories were given in frequencies with their percentages.
- Vital parameters score was given in mean and standard deviation.
- Association between demographic variables and level of vital parameter score was analyzed using Yates corrected chi-square test/Fisher exact test.
- Difference between groups score was analyzed using student's independent t-test

3.16 PROTECTION OF HUMAN RIGHTS

Formal ethical clearance was obtained from the Ethical Committee before starting the study. All the relatives of the patients were explained about the study and informed consent was obtained from the relatives. Relatives were given assurance that all the data collected will be kept confidential.

Fig-2 SCHEMATIC REPRESENTATION OF THE STUDY DESIGN



CHAPTER- IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from the 3sample of 30 subjects who were on mechanical ventilator.

ORGANIZATION OF DATA

Section A Distribution of demographic and clinical data

Section B Mean and standard deviation score of pre interventional status between experimental and control group.

Section C Mean and standard deviation score of post interventional status between experiment and control group.

Section D Comparison of the effectiveness of specific nursing intervention between experimental and control group.

Section E Association between the effectiveness of interventions with selected demographic variables in experimental and control group

SECTION- A

TABLE 1: DEMOGRAPHIC PROFILE

Demographic variables		Group			
		Experiment		Control	
		N	%	N	%
Age	21 -30 yrs	7	46.7%	5	33.3%
	31 -40 yrs	4	26.7%	3	20.0%
	41 -50 yrs	2	13.3%	3	20.0%
	>50 yrs	2	13.3%	4	26.7%
Sex	Male	11	73.3%	13	86.7%
	Female	4	26.7%	2	13.3%
Education	Uneducated	0	0.0%	2	13.3%
	Primary education	7	46.7%	4	26.7%
	High school	5	33.3%	7	46.7%
	Higher secondary	2	13.3%	1	6.7%
	Graduate	1	6.7%	1	6.7%
Occupation	Private	3	20.0%	5	33.3%
	Self employed	1	6.7%	3	20.0%
	Skilled worker	5	33.3%	3	20.0%
	Un employed	6	40.0%	4	26.7%
Income	Rs. 2001 – 3000	9	60.0%	9	60.0%
	Rs. 3001 – 5000	5	33.3%	3	20.0%
	Rs. 5001 – 10000	1	6.7%	3	20.0%

Demographic variables		Group			
		Experiment		Control	
		N	%	N	%
Religion	Hindu	11	73.3%	11	73.3%
	Muslim	2	13.3%	1	6.7%
	Christian	2	13.3%	3	20.0%
Marital status	Married	9	60.0%	13	86.7%
	Un married	6	40.0%	2	13.3%
Residence area	Urban	7	46.7%	5	33.3%
	Rural	8	53.3%	10	66.7%

The above table shows that

- Majority (46.7%) of the patients were between the age group of 21- 30 years in the experimental group and (33.3%) in the control group.
- Majority (73.3%) of them were male in experimental group and (86.7) in the control group and remaining (26.7%) were female in experimental group and (13.3%) were in control group.
- Majority (60.0%) of them had income at the range of 2001-3000 in both experimental and control group.
- Majority (53.3%&66.7%) of them belonged to rural area in both experimental and control groups.

TABLE 2: CLINICAL VARIABLES

Clinical variables		Group			
		Experiment		Control	
		N	%	N	%
Medical Diagnosis	Poisoning	11	73.3%	12	80.0%
	Snake bite	4	26.7%	3	20.0%
Indication for Ventilation	Hypoxia	10	66.7%	7	46.7%
	Apnea	1	6.7%	1	6.7%
	Unstable Hemodynamic Monitoring	4	26.7%	7	46.7%
Duration of Ventilation	One day	10	66.7%	7	46.7%
	Two days	5	33.3%	7	46.7%
	>Three days			1	6.7%
Types of ET tube intubation	Orotracheal	15	100.0%	14	93.3%
	Tracheostomy			1	6.7%
Co-morbid diseases	Nil	12	80.0%	10	66.7%
	Hypertension	1	6.7%	1	6.7%
	Diabetes Mellitus	1	6.7%	2	13.3%
	HT + DM	1	6.7%	2	13.3%

The above table shows that Majorities (73.3%&80.0%) of the patients were diagnosed as poisoning in both experimental and control groups. Majority (66.7%) of them indicated for mechanical ventilation was hypoxia in experimental group and 46.7% were indicated for hypoxia in control group. Majority (66.7%) of them were in the one day in duration of ventilation in experimental group, where as (46.7%) of them were in the control group.

SECTION-B

TABLE 3: PRE INTERVENTIONAL STATUS BETWEEN EXPERIMENT AND CONTROL GROUPS

Vital parameters	Experiment		Control		Student independent t-test
	Mean	SD	Mean	SD	
Temperature	98.44	.15	98.44	0.15	t=0.00 P=1.00 DF=28
Pulse rate	99.80	23.66	110.00	27.27	t=1.09 P=0.28 DF=28
Respiratory rate	14.53	1.36	14.60	1.06	t=0.15 P=0.88 DF=28
Systolic blood pressure	121.33	13.02	120.67	21.54	t=0.10 P=0.92 DF=28
Diastolic blood pressure	78.67	10.60	76.67	10.47	t=0.52 P=0.61 DF=28
Heart rate	102.67	23.49	112.40	27.88	t=1.03 P=0.31 DF=28
O2 saturation %	91.53	6.58	91.73	3.90	t=0.10 P=0.92 DF=28

Vital parameters		Group				Yates corrected chi square test
		Experiment		Control		
		N	%	N	%	
Auscultation of chest	Clear	15	100.0%	15	100.0%	$\chi 2$=0.00 P=1.00 DF=1
	Not clear	0	0.0%	0	0.0%	
Level of conscious	Conscious	0	0.0%	0	0.0%	$\chi 2$=1.2 P=0.27 DF=1
	Semiconscious	8	53.3%	6	40.0%	
	Un conscious	6	40.0%	9	60.0%	
Ventilator mode	CMV	10	66.7%	13	86.7%	$\chi 2$=1.67P=0.19 DF=1
	SIMV	5	33.3%	2	13.3%	
	CPAP	0	0.0%	0	0.0%	

Table No 3 shows the Mean value and standard deviation of heart rate and pulse rate (112.49&27.88) is higher in control group than experimental group. Overall mean and standard deviation value are not statistically significant difference between experiment and control groups. The percentage of unconsciousness (60%) and ventilator mode (86.7%) is higher in control group. But overall there is no statistically significant difference between experiment and control groups.

SECTION-C

TABLE NO.4: POST INTERVENTIONAL STATUS BETWEEN EXPERIMENT AND CONTROL GROUPS

Vital parameters	Experiment		Control		Student independent t-test
	Mean	SD	Mean	SD	
Temperature	98.51	.41	101.09	1.06	t=1.47 P=0.15 DF=28
Pulse rate	86.80	8.31	104.40	16.60	t=3.67 P=0.00*** DF=28
Respiratory rate	15.93	.26	15.40	1.06	t=1.90 P=0.07 DF=28
Systolic blood pressure	120.67	7.99	128.00	20.77	t=1.27 P=0.21 DF=28
Diastolic blood pressure	79.33	5.94	83.33	13.97	t=1.02 P=0.31 DF=28
Heart rate	90.13	9.15	106.80	17.80	t=3.32 P=0.003** DF=28
O2 saturation %	98.93	.26	94.27	3.08	t=5.54 P=0.001** * DF=28

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.4a shows that when compared to control group there is a significant improvement in the pulse rate, heart rate which is reduced and O2 saturation is improved, which is statistically significant (P=0.003**,P=0.001***&P=0.00***)

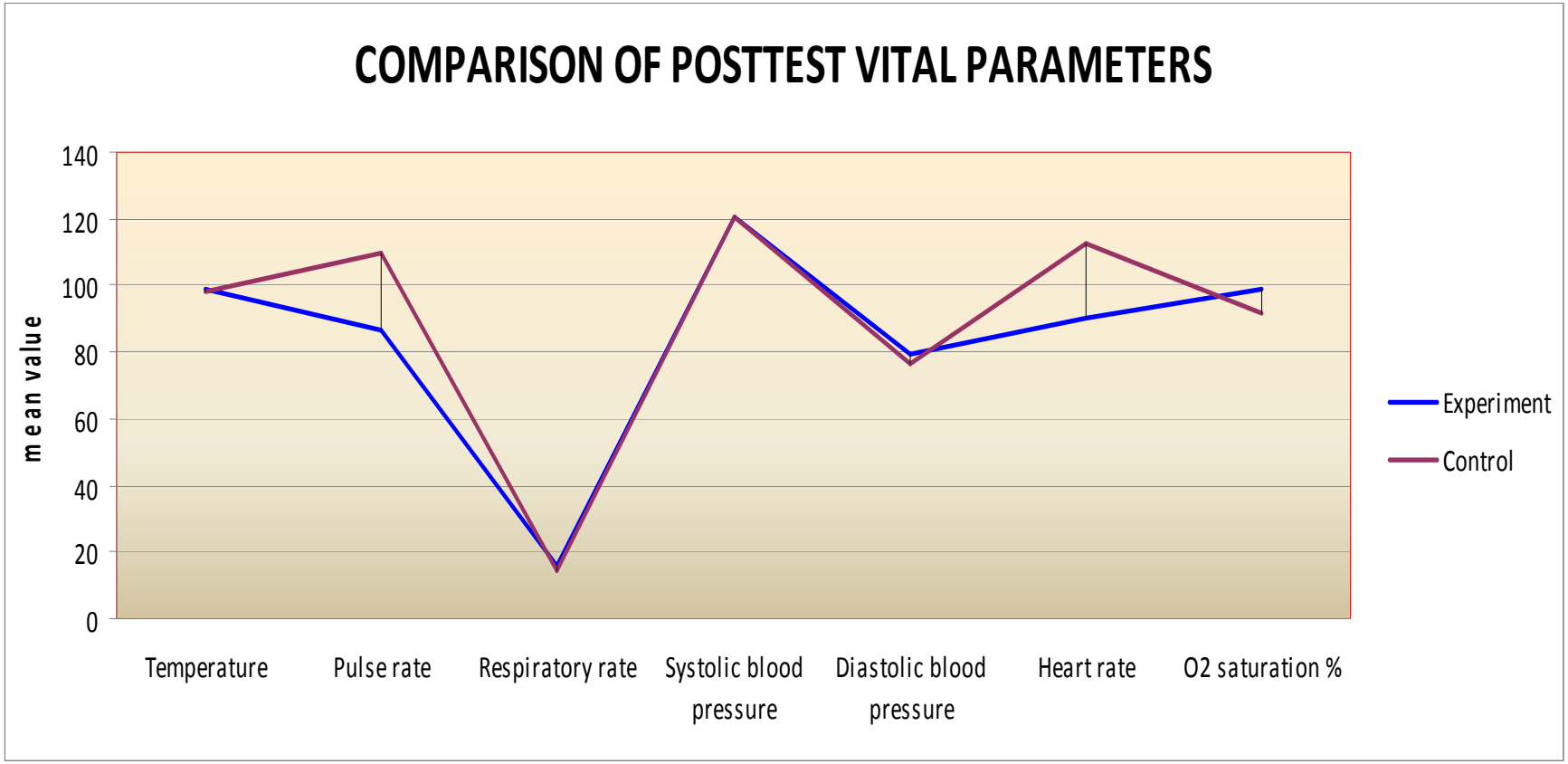


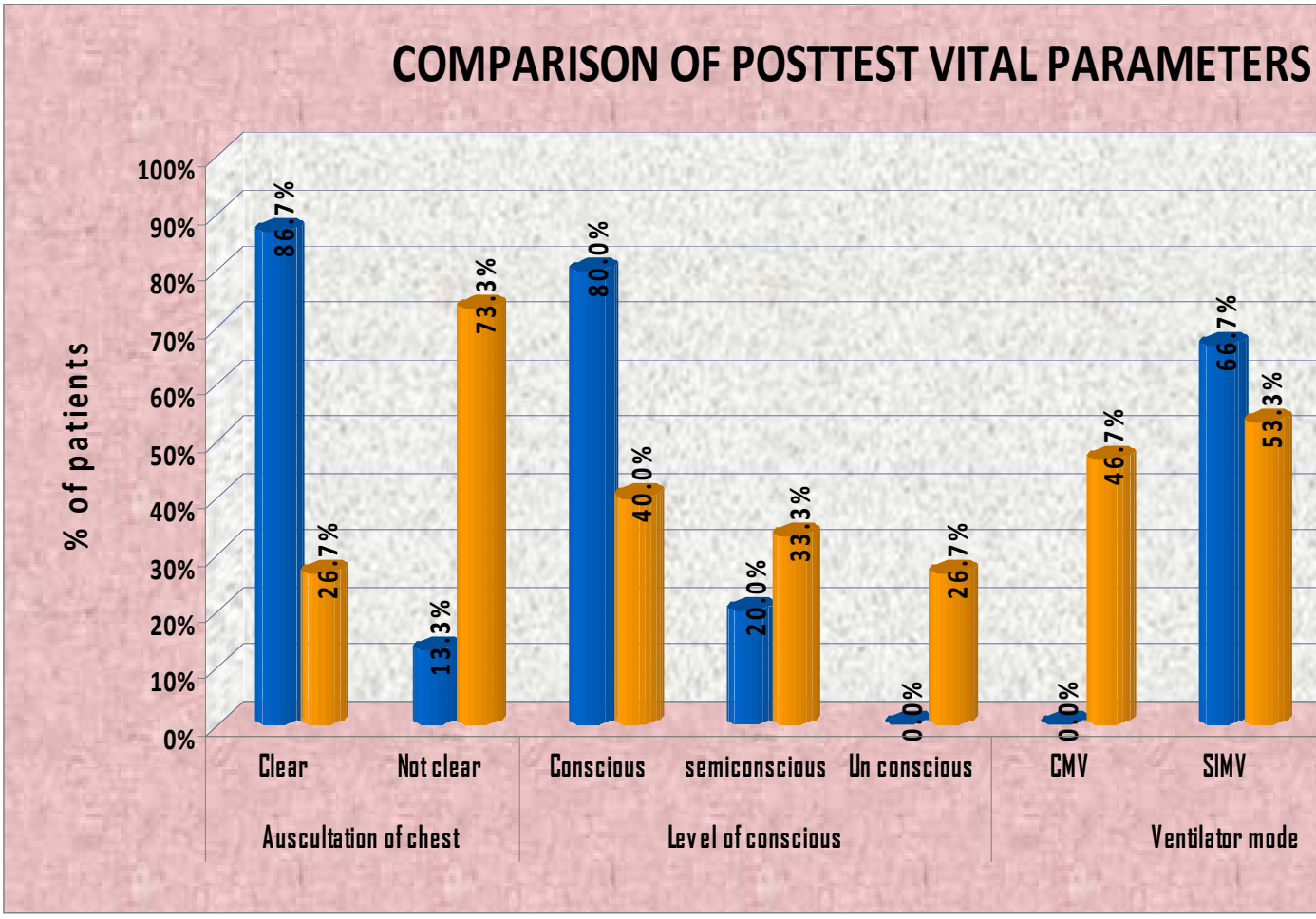
Fig-11 shows that the mean value of pulse rate and heart rate is higher in control group than in experimental group

TABLE 4: POST INTERVENTIONAL STATUS BETWEEN EXPERIMENT AND CONTROL GROUPS

		Group				Yates corrected chi-square test
		Experiment		Control		
		N	%	N	%	
Auscultation of chest	Clear	13	86.7%	4	26.7%	$\chi 2=11.00$ P=0.001*** DF=1
	Not clear	2	13.3%	11	73.3%	
Level of conscious	Conscious	12	80.0%	6	40.0%	$\chi 2=7.14$ P=0.02* DF=1
	semiconscious	3	20.0%	5	33.3%	
	Un conscious	0	0.0%	4	26.7%	
Ventilator mode	CMV	0	0.0%	7	46.7%	$\chi 2=12.22$ P=0.01* DF=1
	SIMV	10	66.7%	8	53.3%	
	CPAP	5	33.3%	0	0.0%	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.4b depicts that when compared to control group of patients there is a significant improvement in auscultation of chest, level of consciousness, and ventilator mode in experimental group, which is statistically significant.(P=0.02*,P=0.01*&P=0.001***respectively)



12 shows that 86.7% of the patients chest auscultation findings was clear in experimental group and 73.3% of the patien auscultation was not clear.80% of the experimental group patients become conscious and on CPAP mode.

SECTION-D

TABLE 5: COMPARISON OF TEMPERATURE

		Group				Student independent t-test
		Experiment		Control		
		Mean	SD	Mean	SD	
Pretest	Pretest	98.44	.15	98.44	.15	t=0.00 P=1.00 DF=28
Day1	I time	98.44	.15	98.44	.15	t=0.00 P=1.00 DF=28
	II time	98.57	.67	98.40	.00	t=1.00 P=0.32 DF=28
	III time	98.48	.21	98.81	.76	t=1.62 P=0.11 DF=28
Day2	I time	98.83	.67	99.32	1.02	t=1.56 P=0.13 DF=28
	II time	98.63	.35	99.07	.64	t=1.35 P=0.19 DF=28
	III time	98.61	.68	99.36	.82	t=1.92 P=0.07 DF=28
Day3	I time	98.51	.41	100.64	1.57	t=1.68 P=0.10 DF=28
	II time	98.44	.15	99.75	1.22	t=1.97P=0.05* DF=28
	III time	98.51	.41	101.09	1.06	t=1.97P=0.05* DF=28

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.5 predicts that when compared to the control group the temperature elevation is not high from first day to third day in experimental group, which is statistically significant.(P=0.05*)

TABLE 6: COMPARISON OF PULSE RATE

		Group				Student independent t-test
		Experiment		Control		
		Mean	SD	Mean	SD	
Pretest	pretest	105.80	18.10	109.33	25.72	t=0.43 P=0.66 DF=28
Day1	I time	102.53	19.57	110.00	27.27	t=0.86 P=0.39 DF=28
	II time	102.07	19.39	110.53	23.19	t=1.08 P=0.28 DF=28
	III time	102.53	19.46	109.87	18.35	t=1.06 P=0.29 DF=28
Day2	I time	97.60	13.44	104.80	16.90	t=1.29 P=0.21 DF=28
	II time	96.27	10.95	102.53	12.13	t=1.48 P=0.14 DF=28
	III time	95.73	10.50	102.93	16.87	t=1.40 P=0.17 DF=28
Day3	I time	90.40	10.29	105.73	18.17	t=2.84 P=0.004** DF=28
	II time	89.87	9.05	104.67	17.13	t=2.96 P=0.006** DF=28
	III time	86.80	8.31	104.40	16.60	t=3.67 P=0.00*** DF=28

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.6 reveals that when compared to the control group the pulse rate in experimental group is significantly reduced from first day to 3rd day, which is statistically significant .(P=0.006**,P=0.004**&P=0.00***respectively)

TABLE 10: COMPARISON OF HEART RATE

		Group				Student independent t-test
		Experiment		Control		
		Mean	SD	Mean	SD	
Pretest	pretest	102.80	25.51	112.40	27.88	t=0.98 P=0.33 DF=28
Day1	I time	102.67	23.49	111.60	25.97	t=0.99 P=0.33 DF=28
	II time	101.87	19.95	112.27	22.83	t=0.32 P=0.19 DF=28
	III time	103.73	19.33	111.20	19.05	t=1.07 P=0.29 DF=28
Day2	I time	98.93	12.98	105.47	15.77	t=1.23 P=0.22 DF=28
	II time	97.20	10.28	104.93	12.04	t=1.87 P=0.07 DF=28
	III time	96.13	10.60	104.40	16.99	t=1.59 P=0.12 DF=28
Day3	I time	91.87	9.66	110.27	20.04	t=3.20 P=0.003** DF=28
	II time	91.33	8.47	106.67	17.85	t=3.01 P=0.006** DF=28
	III time	90.13	9.15	106.80	17.80	t=3.32 P=0.003** DF=28

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.10 shows that when compared to the control group the heart rate in experimental group is significantly reduced from first day to the third day, which is statistically significant.(P=0.006**&P=0.003**respectively)

TABLE 11: COMPARISON OF O2 SATURATION %

		Group				Student independent t-test
		Experiment		Control		
		Mean	SD	Mean	SD	
Pretest	Pretest	91.47	6.51	91.73	3.90	t=0.30 P=0.89 DF=28
Day1	I time	91.53	6.58	91.53	3.94	t=0.00 P=1.00 DF=28
	II time	94.67	4.24	93.00	3.32	t=1.20 P=0.24 DF=28
	III time	95.80	3.28	94.20	2.43	t=1.52 P=0.14 DF=28
Day2	I time	97.80	1.57	94.80	2.62	t=3.80 P=0.001*** DF=28
	II time	98.13	.92	94.80	3.14	t=3.94 P=0.001*** DF=28
	III time	98.07	2.31	94.93	2.63	t=3.46 P=0.002** DF=28
Day3	I time	98.80	.56	94.80	2.78	t=5.45 P=0.001*** DF=28
	II time	98.87	.35	94.53	3.04	t=5.47 P=0.001*** DF=28
	III time	98.93	.26	94.27	3.08	t=5.54 P=0.001*** DF=28

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.11 depicts that when compared to control group, the level of O2 saturation% in experimental group is progressively improved from first day to third day, which is statistically significant. (P=0.002**&P=0.001***respectively)

TABLE 12 : COMPARISON OF AUSCULTATION OF CHEST

			Group				Yates corrected chi-square test
			Experiment		Control		
			N	%	N	%	
Pretest	Pretest	Clear	15	100.0%	15	100.0%	$\chi 2$=0.00 P=1.00 DF=1
		Not clear	0	0.0%	0	0.0%	
Day1	I time	Clear	15	100.0%	15	100.0%	$\chi 2$=0.00 P=1.00 DF=1
		Not clear	0	0.0%	0	0.0%	
	II time	Clear	15	100.0%	15	100.0%	$\chi 2$=0.00 P=1.00 DF=1
		Not clear	0	0.0%	0	0.0%	
	III time	Clear	15	100.0%	15	100.0%	$\chi 2$=0.00 P=1.00 DF=1
		Not clear	0	0.0%	0	0.0%	
Day2	I time	Clear	15	100.0%	11	73.3%	$\chi 2$=4.61 P=0.03* DF=1
		Not clear			4	26.7%	
	II time	Clear	14	93.3%	7	46.7%	$\chi 2$=7.77P=0.005** DF=1
		Not clear	1	6.7%	8	53.3%	
	III time	Clear	14	93.3%	5	33.3%	$\chi 2$=11.62P=0.001*** DF=1
		Not clear	1	6.7%	10	66.7%	
Day3	I time	Clear	13	86.7%	4	26.7%	$\chi 2$=11.00 P=0.001*** DF=1
		Not clear	2	13.3%	11	73.3%	
	II time	Clear	13	86.7%	4	26.7%	$\chi 2$=11.00P=0.001*** DF=1
		Not clear	2	13.3%	11	73.3%	
	III time	Clear	13	86.7%	4	26.7%	$\chi 2$=11.00P=0.001*** DF=1
		Not clear	2	13.3%	11	73.3%	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.12 shows that when compared to control group, the auscultation of chest in the experimental group is clear from first day to third day, which is statistically significant.(P=0.03*,P=0.005**&P=0.001***respectively)

TABLE 13: COMPARISON OF LEVEL OF CONSCIOUS

			Group				Yates corrected chi-square test
			Experiment		Control		
			N	%	N	%	
	Pretest	Conscious	0	0.0%	0	0.0%	$\chi 2=0.53$ P=0.46 DF=1
		Semiconscious	8	53.3%	6	40.0%	
		Un conscious	7	46.7%	9	60.0%	
DAY1	I time	Conscious	0	0.0%	0	0.0%	$\chi 2=0.53$ P=0.46 DF=1
		Semiconscious	9	60.0%	7	46.7%	
		Un conscious	6	40.0%	8	53.3%	
		Conscious	1	6.7%	0	0.0%	$\chi 2=1.94$ P=0.38 DF=2
	II time	Semiconscious	9	60.0%	7	46.7%	
		Un conscious	5	33.3%	8	53.3%	
	III time	Conscious	5	33.3%	1	6.7%	$\chi 2=7.41$ P=0.02* DF=2
		semiconscious	9	60.0%	7	46.7%	
		Un conscious	1	6.7%	7	46.7%	
DAY2	I time	Conscious	10	66.7%	1	6.7%	$\chi 2=14.69$ P=0.001*** DF=2
		semiconscious	5	33.3%	7	46.7%	
		Un conscious	0	0.0%	7	46.7%	
		Conscious	11	73.3%	1	6.7%	$\chi 2=15.66$ P=0.001*** DF=2
	II time	semiconscious	4	26.7%	8	53.3%	
		Un conscious	0	0.0%	6	40.0%	
	III time	Conscious	11	73.3%	3	20.0%	$\chi 2=10.39$ P=0.006** DF=2
		semiconscious	4	26.7%	7	46.7%	
		Un conscious	0	0.0%	5	33.3%	

			Group				Yates corrected chi-square test
			Experiment		Control		
			N	%	N	%	
DAY3	I time	Conscious	12	80.0%	6	40.0%	$\chi 2$=7.14 P=0.02* DF=2
		semiconscious	3	20.0%	4	26.7%	
		Un conscious	0	0.0%	5	33.3%	
		Conscious	12	80.0%	6	40.0%	
	II time	semiconscious	3	20.0%	4	26.7%	$\chi 2$=7.14 P=0.02* DF=2
		Un conscious	0	0.0%	5	33.3%	
	III time	Conscious	12	80.0%	6	40.0%	
		semiconscious	3	20.0%	5	33.3%	$\chi 2$=7.14 P=0.02* DF=2
		Un conscious	0	0.0%	4	26.7%	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.13 depicts that when compared to control group, the level of conscious in the experimental group is improved progressively from unconscious to conscious, which is statistically significant. (P=0.02*, P=0.006**&P=0.001***respectively)

TABLE 14: COMPARISON OF VENTILATOR MODE

			Group				Yates corrected chi square test
			Experiment		Control		
			n	%	N	%	
Pretest	Pretest	CMV	13	86.7%	13	86.7%	$\chi 2$=0.00 P=1.00 DF=1
		SIMV	2	13.3%	2	13.3%	
		CPAP	0	0.0%	0	0.0%	
DAY1	I time	CMV	13	86.7%	13	86.7%	$\chi 2$=0.00 P=1.00 DF=1
		SIMV	2	13.3%	2	13.3%	
		CPAP	0	0.0%	0	0.0%	
		CMV	13	86.7%	13	86.7%	$\chi 2$=0.00 P=1.00 DF=1
	II time	SIMV	2	13.3%	2	13.3%	
		CPAP	0	0.0%	0	0.0%	
	III time	CMV	12	80.0%	13	86.7%	$\chi 2$=0.24 P=0.62 DF=1
		SIMV	3	20.0%	2	13.3%	
		CPAP	0	0.0%	0	0.0%	
DAY2	I time	CMV	8	53.3%	12	80.0%	$\chi 2$=2.40 P=0.12 DF=1
		SIMV	7	46.7%	3	20.0%	
		CPAP	0	0.0%	0	0.0%	
		CMV	5	33.3%	12	80.0%	$\chi 2$=6.65 P=0.01*** DF=1
	II time	SIMV	10	66.7%	3	20.0%	
		CPAP	0	0.0%	0	0.0%	
	III time	CMV	3	20.0%	10	66.7%	$\chi 2$=7.01 P=0.03* DF=2
		SIMV	11	73.3%	5	33.3%	
		CPAP	1	6.7%	0	0.0%	
DAY3	I time	CMV	3	20.0%	9	60.0%	$\chi 2$=6.01 P=0.05* DF=2
		SIMV	11	73.3%	6	40.0%	
		CPAP	1	6.7%	0	0.0%	
		CMV	2	13.3%	7	46.7%	$\chi 2$=7.77 P=0.02* DF=2
	II time	SIMV	8	53.3%	8	53.3%	
		CPAP	5	33.3%	0	0.0%	
	III time	CMV	0	0.0%	7	46.7%	$\chi 2$=12.22 P=0.01** DF=2
		SIMV	10	66.7%	8	53.3%	
		CPAP	5	33.3%	0	0.0%	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table No.14 shows that when compared to the control group, the ventilator mode in the experimental group is progressively changed and improved from day one to day three, which is statistically significant.(P=0.05*&P=0.01***respectively

SECTION-E

TABLE 15: ASSOCIATION BETWEEN THE AUSCULTATION OF CHEST AND DEMOGRAPHIC VARIABLES.

		Auscultation of chest				Total	Fisher Exact test
		Clear		Not clear			
		n	%	n	%		
Age	21 -40 yrs	9	81.8%	2	18.2%	11	P= 0.54 DF=1
	>40 yrs	4	100.0%	0	0.0%	4	
Sex	Male	9	81.8%	2	18.2%	11	P= 0.54 DF=1
	Female	4	100.0%	0	0.0%	4	
Education	Uneducated /primary	5	71.4%	2	28.6%	7	P= 0.20 DF=1
	High/HSc/UG	8	100.0%	0	0.0%	8	
Occupation	Employed	7	77.8%	2	22.2%	9	P= 0.34 DF=1
	Un employed	6	100.0%	0	0.0%	6	
Income	Rs. 2001 – 3000	7	77.8%	2	22.2%	9	P= 0.34 DF=1
	> Rs. 3000	6	100.0%	0	0.0%	6	
Religion	Hindu	9	81.8%	2	18.2%	11	P= 0.54 DF=1
	Muslim/Xian	4	100.0%	0	0.0%	4	
Marital status	Married	8	88.9%	1	11.1%	9	P= 0.66 DF=1
	Un married	5	83.3%	1	16.7%	6	
Residence area	Urban	6	85.7%	1	14.3%	7	P= 0.73 DF=1
	Rural	7	87.5%	1	12.5%	8	
Medical Diagnosis	Poisoning	10	90.9%	1	9.1%	11	P= 0.47 DF=1
	Snake bite	3	75.0%	1	25.0%	4	
Indication for Ventilation	Hypoxia	8	80.0%	2	20.0%	10	P= 0.42 DF=1
	Others	5	100.0%	0	0.0%	5	

		Auscultation of chest				Total	Fisher Exact test
		Clear		Not clear			
		n	%	n	%		
Duration for Ventilation Type	One day	10	100.0%	0	0.0%	10	P= 0.03* DF=1
	>One days	3	60.0%	2	40.0%	5	
Co-morbid diseases	No	12	100.0%	0	0.0%	12	P= 0.02* DF=1
	Yes	1	33.3%	2	66.7%	3	

* significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table no 15 shows that the association between Auscultation of chest and their demographic variables more than ventilation days, co-morbid patients are having significantly high not clear chest.(P=0.003*&P=0.02*respectively)

TABLE 16: ASSOCIATION BETWEEN LEVEL OF CONSCIOUS AND DEMOGRAPHIC VARIABLES

		Level of conscious				Total	Fisher Exact test
		Conscious		semiconscious			
		N	%	N	%		
Age	21 -40 yrs	8	72.7%	3	27.3%	11	P= 0.36 DF=1
	>40 yrs	4	100.0%	0	0.0%	4	
Sex	Male	9	81.8%	2	18.2%	11	P= 0.63 DF=1
	Female	3	75.0%	1	25.0%	4	
Education	Uneducated /primary	6	85.7%	1	14.3%	7	P= 0.55 DF=1
	High/HSc/UG	6	75.0%	2	25.0%	8	
Occupation	Employed	7	77.8%	2	22.2%	9	P= 0.66 DF=1
	Un employed	5	83.3%	1	16.7%	6	
Income	Rs. 2001 – 3000	7	77.8%	2	22.2%	9	P= 0.66 DF=1
	> Rs. 3000	5	83.3%	1	16.7%	6	
Religion	Hindu	9	81.8%	2	18.2%	11	P= 0.64 DF=1
	Muslim/Xian	3	75.0%	1	25.0%	4	
Marital status	Married	7	77.8%	2	22.2%	9	P= 0.65 DF=1
	Un married	5	83.3%	1	16.7%	6	
Residence area	Urban	5	71.4%	2	28.6%	7	P= 0.44 DF=1
	Rural	7	87.5%	1	12.5%	8	
Medical Diagnosis	Poisoning	9	81.8%	2	18.2%	11	P= 0.63 DF=1
	Snake bite	3	75.0%	1	25.0%	4	

		Level of conscious				Total	Fisher Exact test
		Conscious		semiconscious			
		N	%	N	%		
Indication for Ventilation	Hypoxia	7	70.0%	3	30.0%	10	P= 0.26 DF=1
	Others	5	100.0%	0	0.0%	5	
Duration for Ventilation Type	One day	10	100.0%	0	0.0%	10	P= 0.02* DF=1
	>One days	2	40.0%	3	60.0%	5	
Co-morbid diseases	No	12	100.0%	0	0.0%	12	P= 0.03* DF=1
	Yes	1	33.3%	2	66.7%	3	

*significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table no 16 shows that the association between level of conscious and their demographic variables more than ventilation days, co-morbid patients are had significantly high not clear chest. (P=0.02*&P=0.03*respectively)

TABLE 17: ASSOCIATION BETWEEN LEVEL OF VENTILATOR MODE AND DEMOGRAPHIC VARIABLES

		Level of Ventilator mode				Total	Fisher Exact test
		SIMV		CPAP			
		N	%	N	%		
Age	21 -40 yrs	7	63.6%	4	36.4%	11	P= 0.59 DF=1
	>40 yrs	3	75.0%	1	25.0%	4	
Sex	Male	8	72.7%	3	27.3%	11	P= 0.41 DF=1
	Female	2	50.0%	2	50.0%	4	
Education	Uneducated /primary	6	85.7%	1	14.3%	7	P= 0.18 DF=1
	High/HSc/UG	4	50.0%	4	50.0%	8	
Occupation	Employed	8	88.9%	1	11.1%	9	P= 0.08 DF=1
	Un employed	2	33.3%	4	66.7%	6	
Income	Rs. 2001 – 3000	5	55.6%	4	44.4%	9	P= 0.29 DF=1
	> Rs. 3000	5	83.3%	1	16.7%	6	
Religion	Hindu	7	63.6%	4	36.4%	11	P= 0.59 DF=1
	Muslim/Xian	3	75.0%	1	25.0%	4	
Marital status	Married	7	77.8%	2	22.2%	9	P= 0.29 DF=1
	Un married	3	50.0%	3	50.0%	6	
Residence area	Urban	4	57.1%	3	42.9%	7	P= 0.42 DF=1
	Rural	6	75.0%	2	25.0%	8	
Medical Diagnosis	Poisoning	7	63.6%	4	36.4%	11	P= 0.59 DF=1
	Snake bite	3	75.0%	1	25.0%	4	

		Level of Ventilator mode				Total	Fisher Exact test
		SIMV		CPAP			
		N	%	N	%		
Indication for Ventilation	Hypoxia	9	90.0%	1	10.0%	10	P= 0.02* DF=1
	Others	1	20.0%	4	80.0%	5	
Duration for Ventilation Type	One day	5	50.0%	5	50.0%	10	P= 0.05* DF=1
	>One days	5	100.0%	0	0.0%	5	
Co-morbid diseases	No	8	66.7%	4	33.3%	12	P= 0.73 DF=1
	Yes	2	66.7%	1	33.3%	3	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table no 17 shows that the association between level of ventilator mode and their demographic variable, more than one day ventilation days, and other indication for ventilation are significant.(P=0.02*%P=0.05*respectively)

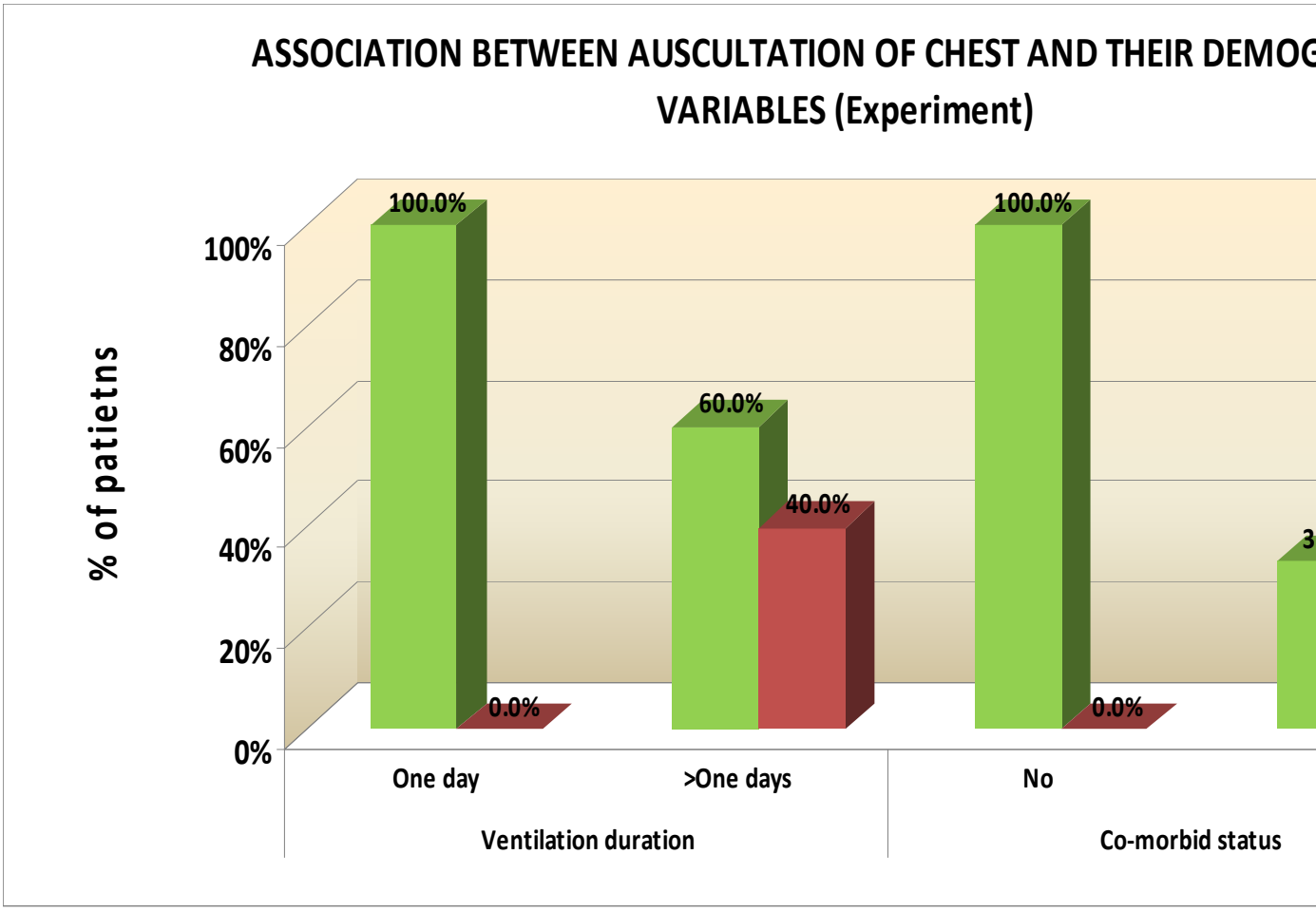


Fig-13 depicts that majority (100%) of patients auscultation of chest findings was clear in the first day of ventilation ar jority(100%) were not had co-morbid diseases. Where as 66.7% of the patients with co-morbid diseases had infection an chest auscultation was not clear.

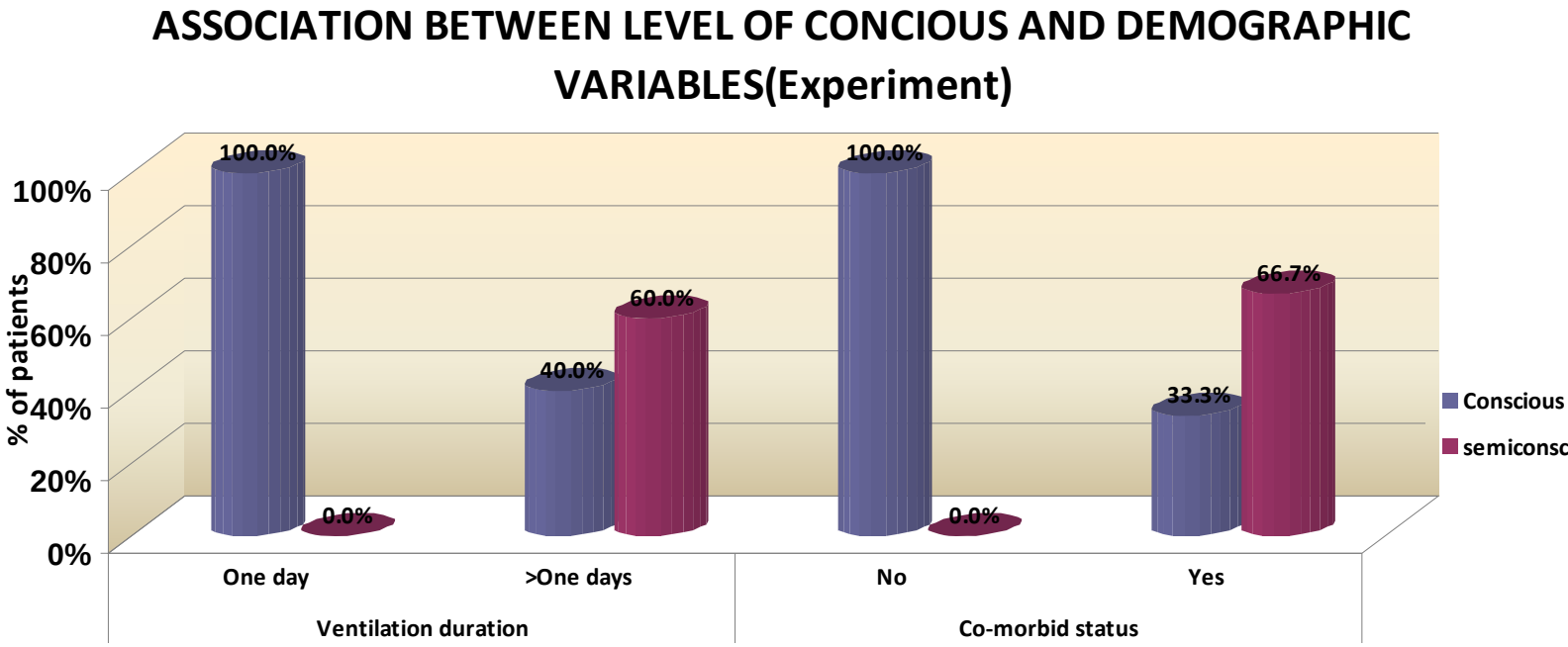
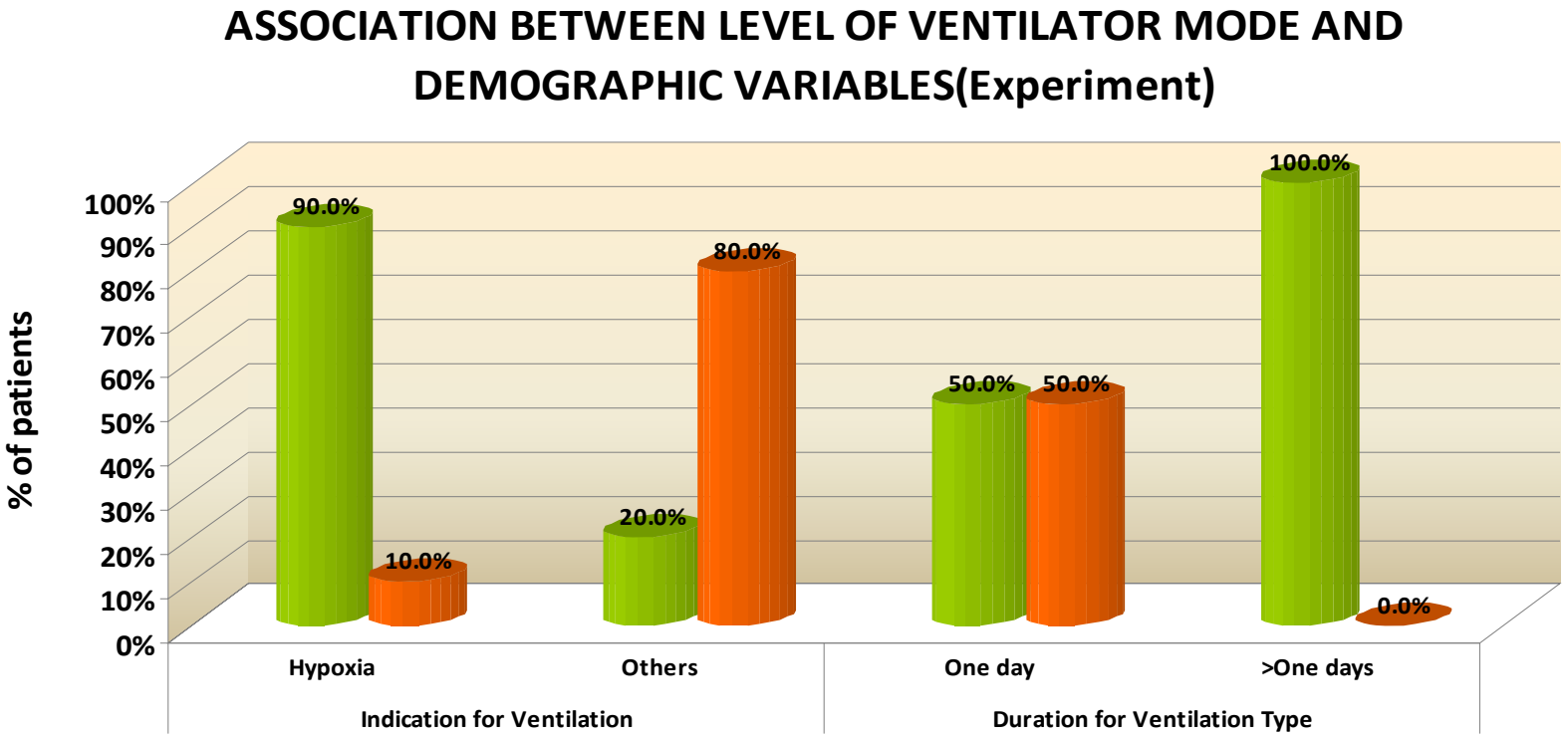


Fig-14 depicts that 100% of the subjects were conscious on first day and no co-morbid diseases. 60.0% of the subjects w semiconscious and the duration of ventilation was more than one day and they had co-morbid diseases.



13 shows that 90% of patients were on SIMV mode and their indication for ventilation was hypoxia in experimental gro

the duration of ventilation was one day.

CHAPTER- V

DISCUSSION

This chapter deals with the discussion of the data analyzed based on the objectives of the study. The main aim of the study is to assess the effectiveness of specific nursing interventions among mechanically ventilator patients in toxicology unit, Rajiv Gandhi Government General Hospital, Chennai.

Samples were selected by convenient sampling and allotted into experimental and control group and their health status was assessed using vital parameters observational check list. The results had been discussed according to the objective, conceptual frame work and related literature.

CHARACTERISTICS OF DEMOGRAPHIC VARIABLES

The demographic characteristics of 30 samples who participated in the study were 7(46.7%) of the samples were between the age group of 21- 30 years in the experimental group and 5(33.3%) in the control group. The distribution of sex showed that 11(73.3%) of them were male in experimental group and (86.7) in the control group whereas remaining 4(26.7%) were female in experimental group and 2(13.3%) were in control group. Majority 7(46.7%) of the samples were completed primary education in experimental group and high school in control group. Majority 6(46%) of them were unemployed in experimental group and majority 5 (33.3%) of them were private in control group. Regarding family income majority 9 (60.0%) of them were at the range of 2001-3000 in both experimental and control group. Majority 9&13 (60%&86%) of them married in both experimental and control groups. Majority 11(70%) of the samples belonged to Hindu religion in both experimental and control groups. Majority 8&10 (53.3%&66.7%) of them belonged to rural area in both experimental and control groups.

The first objective of the study was to assess the pre interventional health status of both experimental and control group.

It represents the health status of the patients on mechanical ventilator in both experimental and control group. Each client was assessed with information of demographic variable. They were observed and assessed using self structured general health status and vital parameters observational check list. It is evident that after assessing the day wise health status of both in experimental and control group, most of the vital parameters are same in both on the first day. Whereas in ventilator mode, 66.7% of the samples were on CMV mode on first day in experimental group, and 86.7% of the samples were on CMV mode in control group. In the level of conscious, 53.3% of the samples were semiconscious, and 40% were unconscious on first day in the experimental group, whereas 40% of the samples were semiconscious and 60% of the samples were unconscious on the first day in the control group. The above findings showed that the pre interventional health status was almost same between both groups.

The second objective of the study was to assess the post interventional status of both experimental and control group.

It represents the effectiveness of specific nursing interventions in the experimental group. Each day clients were treated based on nursing intervention protocol. The health status was observed and assessed through observational check list. Regarding temperature elevation there was no elevation from first day to third day in experimental group, which is statistically significant (P=0.05*). The mean and SD value of pulse rate and heart rate were high (99.80, 23.66 &102.67, 23.49) on day-1 and it was reduced to 86.80, 8.31 &90.13, 9.15 on day-3, which is statistically significant(P=0.00***&P=0.003**), and the mean and SD value of O2 saturation was low(91.53&6.58) on first day and it become improved on third day(98.93&0.26) which is statistically significant (P=0.001***) .

Regarding auscultation of chest, level of conscious and ventilator mode, there was a significant difference in the improvement between day-1 and day-3, which is statistically significant (P=0.001***, P=0.02*&P=0.01*respectively).

This result is consistent with the study conducted by **Amy Bowman, et al (2007)** stated the Evidence-based clinical practice protocols, when implemented, have a benefit to patient care by minimizing variations in practice, and improving patient outcomes.

Evidence based guidelines use empirical research findings along with other types of evidence to standardize practice patterns. The “best practice” goal is identified, and a practice standard is developed to help more practice toward that goal.

The third objective of the study was to evaluate the effectiveness of specific nursing interventions among experimental group.

When comparing the status of vital parameters between experimental and control group. On the first day there is no significant difference in the vital parameters between both groups. Whereas from the second day onwards there was a significant difference in temperature, pulse rate, heart rate, O2 saturation, auscultation of chest, level of conscious and ventilator mode in the experimental group. But in the control group the above mentioned parameter values are still in persistence, there is no significant difference.

On the third day there was a significant difference in temperature in the experimental group, the mean and SD were 98.44&.15, which is statistically significant (P=0.05*). Where as in the control group the mean and SD of the temperature is 101.09&1.06 respectively. The same way in the experimental group the mean and SD of the pulse rate and heart rate was 86.80&8.31and 90.13&9.15 and the O2 saturation% was 98.93&.26, which is statistically significant (P=0.00***,P=0.003**&P=0.001*** respectively).

When compared to the auscultation of chest, level of conscious and the ventilator mode in the experimental group has no difference on the first day between experimental and control group. From the second day onwards there was a significant difference between experimental and control group. Regarding the auscultation of chest 86.7% were clear in the experimental group, where as only 26.7% were clear in the control group on the third day. The difference was large and it is statistically significant. (P=0.001***).

In the same way the level of conscious and the ventilator mode in the experimental group, 80.0% were conscious and 33.3% were on CPAP mode on the third day. Where as in the control group 40% were conscious and 0% were on CPAP mode. The difference was large and it is statistically significant. (P=0.02*&P=0.001**respectively)

This study was supported by **Harold R. Collard, et al (2006)** performed evidence based on systematic review for prevention of ventilator associated pneumonia. After evaluation of potential benefits and risks, the authors recommend considering several specific interventions to reduce the incidence of ventilator-associated pneumonia: semi recumbent positioning in all eligible patients, sucralfate rather than H2-antagonists in patients at low to moderate risk for gastrointestinal tract bleeding, and aspiration of subglottic secretions and oscillating beds for selected patient's population. They suggested semi-recumbent patient positioning is a low-cost, low risk approach in preventing ventilator-associated pneumonia, and all three trials suggested that, it is effective .Semi-recumbent patient positioning should be considered in all eligible patients.

The fourth objective is to associate the effectiveness of specific nursing interventions with selected demographic and clinical variables.

The association between sample's auscultation of chest and the clinical variables in the control group showed significantly associated with more than one day ventilation, presence of co- morbid disease and not clear chest. Where as in the experimental group the clinical variables less than one day duration of ventilation and no co-morbid disease were associated with clear chest and more are benefited than in control group. Statistical significance was analyzed using Fisher exact test.

The result was consistent with the study conducted by **SA Harshbarger et al (2008)** conducted a quasi experimental study on mechanically ventilated patients. They found that samples ventilated in the assist-control mode and suctioned with a closed tracheal suction system did not experience significant changes in cardiovascular or acid-base parameters when suctioned without hyperoxygenation. Although most samples did not become desaturated, four samples experienced desaturation at one or more intervals. They suggested that to prevent desaturation, hyperoxygenation should be used before and after suctioning with a closed tracheal suction system.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATION AND LIMITATIONS

This chapter deals with the summary, conclusion, implications, recommendation and limitations of the study.

6.1 SUMMARY

Intubation, with subsequent mechanical ventilation, is a common life-saving intervention in the emergency department. Approximately one fourth to one half of critically ill patients require mechanical ventilation. Although lifesaving, mechanical ventilation can present a variety of significant risks including those related to airway management practices, development of ventilator associated pneumonia and complications from sedation. Several nursing interventions include head of the bed elevation > 30 degree, closed endotracheal suctioning, strict aseptic techniques while suctioning and maintenance of adequate ET tube cuff pressure are performed in the intensive care unit to prevent infections like ventilator associated pneumonia(VAP) among mechanically ventilated patients. These interventions may benefit patients when used along with other interventions.

So the investigator undertook the study "Assess the effectiveness of specific nursing interventions among patients on mechanical ventilator in Toxicology unit at Rajiv Gandhi Government General Hospital, Chennai-03"

The objectives of the study are

1. To assess the pre interventional status of both experimental and control group patients.

2. To evaluate the intervention among experimental group patients.

3. To compare post test findings in control and experimental group patients.

4. To associate the effectiveness of care with selected demographic variables.

The study was based on the assumption that specific nursing interventions are effective to improve the patient condition and prevent ventilator associated pneumonia.

The research hypothesis formulated was

H1- There is a significant difference in the level of vital parameters between the experimental and control group patients after the specific nursing interventions.

The variables of the study were

Independent variable : specific nursing interventions.

Dependent variable : vital parameters

The review of literature was done from primary and secondary sources that formed the basis for the formulation of problem selection, development of the tools, developing the theoretical frame work, selecting research methodology and about components and method of specific nursing interventions.

The conceptual frame work for the study was based on J.W.Kenny,s open system model theory and it provided a comprehensive frame work for achieving the objectives of the study. The research design selected for this study was Quasi experimental design.

The study was conducted in Toxicology Unit, Department of Internal Medicine, Rajiv Gandhi Government General Hospital, Chennai-03.

The tool consists of demographic data, clinical data and vital parameters observational check list. The tool was validated by experts in the Medical and Surgical Nursing field and Head of the Department of Internal Medicine.

The pilot study was conducted after getting formal permission from the Director, Institute of Internal Medicine, Rajiv Gandhi Government General Hospital, Chennai-3. Pilot study was conducted in Toxicology Unit at Rajiv Gandhi Government General Hospital, Chennai for 5 days before conducting the actual main study. It was to check the feasibility and use of the instrument and see whether any modifications are needed to be done before the actual implementation of the study.

Totally 6 patients have been selected, among that 3 were allotted to the experimental group and 3 were allotted to the control group. Specific nursing interventions were given to the experimental group using this tool and routine care was given to the control group patients by the staff nurses. Analysis of the study shows the positive effects of specific nursing interventions when compared to control group. The study was practically feasible for the investigator. The samples who were selected and observed for the pilot study were not included in the main study.

The main study was conducted from the period of 29-8-11 to 29-9-11, in the department of Internal Medicine, Rajiv Gandhi Government General Hospital, Chennai-3 among 30 mechanically ventilated patients. Simple random sampling-lottery method was adopted. The data collected was analyzed by using both descriptive and inferential statistics.

6.2 MAJOR FINDINGS OF THE STUDY

- Majority (46.7%) of the samples were between the age group of 21- 30 years in the experimental group and (33.3%) in the control group.
- Majority (73.3%) of them were male in experimental group and (86.7) in the control group and remaining (26.7%) were female in experimental group and (13.3%) were in control group.
- Majority (46.7%) of the samples were completed primary education in experimental group and high school in control group.
- Majority (46%) of them were unemployed in experimental group and majority of (33.3%) were private in control group.
- Majority (60.0%) of them were had income at the range of 2001-3000 in both experimental and control group.
- Majority (60%&86%) of them married in both experimental and control groups.
- Majority (70%) belongs to Hindu religion in both experimental and control groups.

- Majority (53.3%&66.7%) of them were belongs to rural area both experimental group and experimental groups.
- Majority (73.3%&80.0%) of the samples were diagnosed as poisoning in both experimental and control groups.
- Majority (66.7%) of them indicated for mechanical ventilation was hypoxia in experimental group and 46.7% were indicated for hypoxia and unstable hemodynamic monitoring in control group.
- Majority (66.7%) of them were in the first day of duration in experimental group, where as (46.7%) of them were in the first and second day of duration.
- Majority (100%) of them were intubated through orotracheal in experimental group and (93.3%) were intubated in control group.
- Majority (80%) of them had no co- morbid diseases both in experimental and control groups.

The results showed that there was a significant difference between experimental and control group on selected vital parameters and health status. Majority (80%) of them improved well and their conscious level, ventilator mode, O2 saturation% were improved, and the auscultation of the chest was clear in the experimental group, where as only 40% were conscious and their ventilator mode and the O2 saturation% were not improved in the control group. Statistical significance (P=0.001) was calculated using Yates corrected chi-square test.

The association between subject's auscultation of chest and the clinical variables showed significant association with more than one day ventilation, presence of co- morbid disease had high significant with not clear chest. where as less than one day duration of ventilation and no co-morbid disease patients were more benefited than others. Statistical significance was analyzed using Fisher exact test.

6.3 CONCLUSION

The present study assessed the effectiveness of specific nursing intervention among patients on mechanical ventilator. The results revealed that specific nursing

interventions had a significant effect on the improvement of health status and to prevent Ventilator Associated Pneumonia among patients on mechanical ventilator.

6.4 IMPLICATIONS

The investigator had drawn the following implications for the study, which are necessary in the field of Nursing Practice, Nursing Education, Nursing Administration and Nursing Research.

NURSING PRACTICE

- Nurses play a vital role in the Intensive care Unit, since most of the patients are critically ill and on the mechanical ventilator.
- Nurses must have adequate knowledge regarding the ventilator associated complications and its prevention.
- Nurses should possess the skill of assessing the patient on ventilator and ventilator management.
- Continuing Nursing Education to be conducted to all nurses to update their knowledge and practice.
- Especially in the ICU, most of the patients are in an unconscious state or they may not be able to communicate, so the nurses should follow the strict protocol of some specific nursing interventions in order to prevent complications and to reduce mortality and morbidity and length of stay in the ICU.
- Specific nursing intervention protocol to be emphasized
- Therefore the specific nursing interventions were provided to prevent ventilator associated complications.

NURSING EDUCATION

- ♣ Nurses must have strong body of knowledge regarding the mechanical ventilator; ventilator associated complications and its prevention and management, before implementing this type of nursing interventions.

- ♣ Nursing students should be exposed to clinical areas and learn regarding these interventions.

- ♣ The basic nursing curriculum must be modified to adopt these internationally proved interventions.

NURSING ADMINISTRATION

- The nurse administrator must supervise the staff nurses and identify the problem faced by them and help them to find out solutions for the particular problem.

- Nurse administrators play a vital role in updating the knowledge level of staff nurses by arranging in-service education programme and conferences.

- Nurse administrators must allocate resources for conducting various staff development programme and should provide opportunity for the nurses to attend national and international conferences.

NURSING RESEARCH

- Nursing research play a vital role in the clinical practice.

- Nurse researcher should encourage clinical nurse to conduct various research activities in their concerned field and motivate them to apply the findings and results in the clinical settings.

- Nurse researcher must make necessary arrangement to make use of the available resources, guidance and give a constant support to the clinical nurse who undertake research activities.

6.5 RECOMMENDATIONS

The investigator recommends the following suggestions for further research.

- The same study can be conducted in different settings
- The study can be replicated with large sample size to generalize the findings.
- The study can be conducted including other specific nursing interventions.
- The study can be conducted with any one of the intervention individually to reduce the ventilator associated complications.
- The study can be conducted to assess the knowledge and practice of the nurses regarding specific nursing interventions in reducing ventilator associated complications.

6.6 LIMITATIONS OF THE STUDY

- Some samples were dropped out during the study due to death.
- The investigator could get more of abroad studies than Indian studies to support the present study.
- The investigator found difficulty to stick over the time schedule due to Doctor's rounds and staffs routine work.

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SPECIFIC NURSING INTERVENTIONS

CLOSED ENDOTRACHEAL SUCTIONING PROCEDURE

Introduction

The patient should be assessed routinely to determine a need for suctioning, but the patient should not be suctioned routinely. The closed suctioning maintains the oxygenation and ventilation during suctioning and exposure to the patient's secretions is reduced.

General Measures

- Gather all equipments.

- Wash hands and wear sterile gloves.
- Monitor patient's cardiopulmonary status before, during and after the procedure.
- Turn on suction and set vaccum to 100-120 mm Hg.
- Pause ventilator alarms.

Closed suction Technique

- Connect the suction tubing to the closed suction port.
- Hyperoxygenate the patient for 30 seconds by increasing FIO2 to 100% on the ventilator settings
- With suction off gently and quickly insert the catheter, when resistant met pull back catheter ½ inch.
- Apply continuous or intermittent suction. Rotate the catheter between the dominant thumb and fore finger and withdraw the catheter over 10 seconds or less.
- Hyperoxygenate for 30 seconds.
- Reset FIO2 and ventilator alarms.
- Reassess the patient for signs of effective suctioning.

MAINTANACE OF ADEQUATE ENDOTRACHEAL TUBE CUFF PRESSURE

Introduction

The cuff is an inflatable, pliable sleeve encircling the outer wall of the Endotracheal tube. The cuff is inflated with air, and the pressure in the cuff is measured and monitored. To ensure adequate tracheal perfusion, cuff pressure should be maintained at 20- 25 mm Hg.

Technique for measurement

There are two types of techniques to measure and record the cuff pressure after intubation.

Minimal occluding volume technique

Minimal leak technique

Steps for minimal occluding volume technique

Place the stethoscope over the trachea and inflate the cuff by adding air until no air leak is heard at peak inspiratory pressure.

Steps for minimal leak technique

Place the stethoscope over the trachea and deflate the cuff by removing a small amount of air until air leak is heard at peak inspiratory pressure.

Other technique

Another technique is, the palpation method, involves subjective estimation of cuff inflation based on gentle palpation of the pilot balloon.

MAITENANCE OF HEAD OF THE BED ELEVATION 30-45 DEGREE ANGLE

Introduction

Patient's Head of the bed was elevated 30-45 degree unless contraindicated. It was measured with the help of protractor and the same degree was monitored by the simple device called Angle indicator. The measurement was checked three times a day that is morning, afternoon, and evening for three days.

Procedure for monitoring Head of the bed elevation 30-45 degree angle

- The Angle Indicator consists of a piece of glossy photographic printer paper cut into a pie-slice wedge.
- The base of the paper has a stripe of green and then red.

- A silk suture hangs from the apex of the wedge to its base and a steel nut is tied at the distal end of the suture.
- The angle indicator is placed on the side rail of the hospital bed such that when the bed is elevated to 30 degrees, the weight hangs at the junction between red and green.
- When the bed is elevated >30 degrees, the weight hangs in the green zone, and when the elevation is <30 degrees, the weight hangs in the red zone.
- This device was designed to show in the clearest and most easily seen and interpreted way whether the Head of the Bed was adequately elevated.

SECTION -A

DEMOGRAPHIC DATA

Sample no:

1. Age

a) 21 - 30 years [ ]

b) 31 - 40 years [ ]

c) 41 - 50 years [ ]

d) More than 50 years [ ]

2. Sex

a) Male [ ]

b) Female [ ]

3. Religion

a) Hindu [ ]

b) Muslim [ ]

c) Christian [ ]

d) Others [ ]

4. Educational status

a) Uneducated [ ]

b) Primary education [ ]

c) secondary school [ ]

d) Higher secondary [ ]

e) Graduate [ ]

5. Occupation

a) Government [ ]

b) Private [ ]

c) Self employed [ ]

d) Skilled worker [ ]

e) Un employed [ ]

6. Income

a) 2001- 3000 [ ]

b) 3001- 5000 [ ]

c) 5001- 10000 [ ]

d) >10000 [ ]

7. Marital status

a) Married [ ]

b) Unmarried [ ]

8. Residential area

a) Urban [ ]

b) Rural [ ]

SECTION-B

CLINICAL PROFILE

1. Medical diagnosis

a) Poisoning [ ]

b) Snake bite [ ]

c) Others [ ]

2. Indication for Mechanical Ventilation

a) Hypoxia [ ]

b) Cheyne Stoke Respiration [ ]

c) Apnea [ ]

d) Unstable Hemodynamic status [ ]

3. Duration of Ventilation

a) 1 day [ ]

b) 2 days [ ]

c) 3 days [ ]

d) >3 days [ ]

4. Types of endotracheal tube intubation

a) Orotracheal [ ]

b) Nasotracheal [ ]

c) Tracheostomy [ ]

5. Presence of co- morbid diseases

a) Hypertention [ ]

b) Diabetese Mellitus [ ]

c) Hypertention&Diabetese Mellitus [ ]

d) Others [ ]

Section -C **VITAL PARAMETERS OBSERVATIONAL CHECK LIST**

Sample no: **Experimental group**

S .no		Before interve ntion	Intervention									After interventio n
	Vital parameters		Day -1			Day -2			Day -3			
			8	12	4	8	12	4	8	12	4	
1	Temperature											
2	Pulse rate											
3	Respiratory rate											
4	Systolic blood pressure											
5	Diastolic blood pressure											
6	Heart rate											
7	O2 saturation %											
8	Auscultation of chest											
9	Level of conscious											
10	Ventilator mode											