



RESEARCH ARTICLE

KNOWLEDGE OF NURSES ON CARE OF PATIENTS ON MECHANICAL VENTILATOR SUPPORT

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Manuscript Info

Manuscript History

Received: 14 March 2020

Final Accepted: 16 April 2020

Published: May 2020

Key words:-

Nurses, Knowledge, Mechanical Ventilator

Abstract

Introduction: A study to assess the knowledge of nurses regarding care of patients on mechanical ventilator support. The purpose of this study was to determine the knowledge of nurses working in tertiary level hospital about care of patients on mechanical ventilator. Nurses are taking care of a patient on ventilator. They should have adequate knowledge regarding ventilator care for maintaining adequate standards of care.

Objectives: The objective of this study was to assess the knowledge about care of patients on mechanical ventilator among nurses working in tertiary level hospital.

Method: A descriptive study of nurses in tertiary level of hospital was done by administering structured questionnaire. Hundred samples were selected by using convenience sampling. The duration of the study was from January- March 2019.

Results: In this study 20 item survey include specific questions about care of patient on ventilator. Study shows that 13% of nurses have very high knowledge, 73% have high knowledge 13% have average and 1% have low knowledge. The mean knowledge was 13.92+ (2.18).

Conclusion: This study shows that nurses have high knowledge regarding care of patient on ventilator support.

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Introduction:-

Mechanical Ventilators are special pumps that can support the ventilatory function of the respiratory system and improve oxygenation through the application of high flow oxygen content gas and positive pressure. The primary objectives of Mechanical ventilation is to decrease their work of breathing, relieve respiratory distress, rest the fatigued respiratory muscles, improve ventilation, stabilize the chest wall and restore the acid-base balance. Therefore, the most common reasons for instituting mechanical ventilation are acute respiratory failure with hypoxemia (Acute respiratory distress syndrome, heart failure with pulmonary edema, pneumonia, sepsis, and complications of surgery and trauma), which accounts for 65% of all ventilated cases, followed by the causes of hypercarbic ventilatory failure such as coma (5%), exacerbations of chronic obstructive pulmonary disease (13%) and neuromuscular diseases (5%).^[1]

Inappropriate and inaccurate ventilatory support strategy can result in increased mortality and complications. Pulmonary complications include barotrauma, oxygen toxicity, tracheal stenosis, and deconditioning of respiratory muscles. Even mechanical ventilation for airway support can be a source of infection.^[2]

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Nurses have an important role to play in patient safety by ensuring that patients receive the best care possible. Nurses must be knowledgeable about the function and limitations of ventilator modes, causes of respiratory distress and appropriate management in order to provide high quality patient centered care.^[3]

Usman Shah H B et al conducted a cross sectional survey at eight tertiary care public & private hospitals of Islamabad and Rawalpindi to assess the knowledge & practice of critical care health professionals on ventilator associated pneumonia .Study showed that the mean score of knowledge of doctors, nurses and respiratory therapists were 11.77 +3.84, 10.84+ 29 and 10.82+ 1.94 respectively^[4]

Nahla Shaaban Ali (2013) conducted a descriptive study to assess the knowledge and compliance with ventilator associated pneumonia bundle at Cairo among 45 Critical Care Nurses using convenience Sampling .The result of 20 item questionnaire revealed unsatisfactory knowledge score(mean 7.46 + 2.37)^[5]

Passang Chiki Sherpa et al(2014) conducted a study using descriptive survey design among 138 critical care providers using purposive sampling to assess knowledge on prevention of ventilator associated pneumonia. The study revealed that 55.8% of subjects have adequate knowledge on prevention of ventilator associated pneumonia^[6]

Caring for patients on mechanical ventilator has become an integral part of the nursing care in critical care or general medical-surgical units, extended care facilities and at home. The nurses, physicians and the respiratory therapist must possess good knowledge and understand each patient's specific pulmonary need and work together to set realistic goals.

The movement towards research and evidence-based practice in health care demands that the best available evidence is applied to practice. At the same time, the changes in role boundaries mean that nurses are assuming increased responsibility, especially in relation to decision making.

Mechanical ventilation is termed 'invasive' if it involves any instrument inside the trachea through the mouth, such as an endotracheal tube or a tracheostomy tube. The two main types of mechanical ventilation include positive pressure ventilation where air is pushed into the lungs through the airways and negative pressure ventilation where air is, in essence, sucked into the lungs by stimulating movement of the chest.

Although Mechanical ventilator is an essential life saving device which maintains ventilation and oxygenation, it can cause numerous complications. A sound knowledge regarding care of a patient on mechanical ventilator and patients' clinical status enables clinicians to fine-tune ventilator settings to maximize the benefits of ventilator support while minimizing complications. Critical care nurses play a crucial role in improving the effectiveness of mechanical ventilation, preventing harm, and optimizing patient outcome.

All the nurses should have adequate knowledge regarding care of patients on mechanical ventilator to improve standards of nursing care as well as to maximize clientele satisfaction and benefits.

Statement of the Problem:

A study to assess the knowledge of Nurses regarding care of patients on mechanical ventilator in a tertiary level hospital at Kolkata.

Aim:

To assess the knowledge level of nurses regarding the care of mechanical ventilator patients for better clinical practices.

Objectives:-

The objectives of the study are

To assess the level of knowledge of nurses regarding care of patients on mechanical ventilator.

Materials & Methods:-**Setting Of the study:****Pilot study:**

The pilot study was conducted after clearance from ethical committee.. It was done at a selected hospital of Kolkata, which was different from main study centre.

Main study:

Main study was conducted at selected tertiary hospital of Kolkata among 100 nurses who are directly involved in patient care. The researchers selected this hospital because of the proximity as well as the authorities were willing to grant permission to conduct the study.

Populataion:

For the purpose of the study the target population identified were nurses working in tertiary level hospital of Kolkata. The accessible population were nurses present in selected hospital during the time of data collection and fulfilling the inclusion criteria for selection as samples. The population was easily accessible to the investigators as hospital authorities were ready to give permission.

Sampling Technique:

Convenience sampling technique was used for the study considering the limited period and availability of sample. It is more flexible, less time consuming appropriate and judgmentally representative for the study with a sample size of 100.

Inclusion Criteria:

Nurses

1. Who are presently posted at the tertiary level hospital.
2. Who are directly involved in patient care & available during the data collection period.

Exclusion Criteria

Nurses

1. Who are in Administrative posts
2. Who are posted as instructors/tutors at College of Nursing

Research Variables:

Research variables under the study was knowledge status of nurses on care of patients on ventilatory support.

Tool:

As the purpose of the study was to assess the knowledge of nurses on care of patients on ventilatory support, it was considered to use structured questionnaire for sociodemographic variables and structured questionnaire to assess the knowledge of nurses on care of patients on ventilator support. The content and construct validity of the Socio demographic questionnaire & knowledge questionnaire was validated by 5 experts in the field of Anesthesia & Critical Care, Medicine & Nursing.

The data collection tool has two sections

Section A:

Socio demographic data consisted of 7 items which was used to collect information about age, professional qualification, years of service, posting in last year, type of posting in last five years, whether undergone ICU update course and years of experience in ICU.

Section B:

Knowledge questionnaire

Knowledge questionnaire containing 20 items assessing the different aspects of care of patients on ventilator support is included. The questions could comprehensively cover all knowledge aspect on care of patient on ventilator support.

The maximum score of knowledge questions is 20..

Feasibility and suitability of tool was determined during the try out period by assessing the ability of nurses to understand and answer questions. The testing was carried out among 10 nurses. The tool was clear and feasible for administration to registered nurse.

The reliability of measuring instrument is a major criteria for assessing its quality and adequacy. The most widely used method for evaluating internal consistency is Cronbach's alpha. Co efficient of reliability 'r' for the test was calculated and the result was 0.7 which was considered to be significant.

Ethical consideration:

Ethics is concerned with determining what is good or valuable for individuals or group of individuals and for society at large. This research study has been approved by the ethical committee of institution. Written consent was taken from participants after explaining the details of the study, they were explained about the confidentiality of the information.

Pilot Study:

The pilot study was done after obtaining the institutional ethical clearance and permission from the Nursing Superintendent. The pilot study was conducted among 10 registered nurses in a selected hospital of Kolkata on 1 Mar 2019 as per inclusion criteria. The registered nurses were selected from hospital where the main research will not be conducted to avoid contamination of the sample. Pilot study helped in ensuring availability and accessibility of adequate samples and deciding the venue for administering tool and feasibility of the study. The time taken for administration of tool was approximately 20 minutes.

Finding of the pilot study:

The purpose of the study was to establish the feasibility of conducting the study, familiarizing with the administration of the tool, analyze the stability of the tool improving the tool if required and to decide the plan for analysis. The study was found to be feasible and the investigator took care of difficulties faced during pilot study.

1. The pilot study helped the investigator to decide about the relevant changes in demographic details.
2. The investigator could rearrange certain questions which required notification.
3. The tool was found to be satisfactory in terms of clarity and ease of administration.

As the study was found to be feasible the investigator proceeded for final study.

Methods of data collection:

The data was collected by using structured questionnaires on socio demographic variables & knowledge on care of patients on ventilator support. The data for final study was collected on 6 Mar 19. A formal permission was obtained from head of Institution. The inclusion criteria and exclusion criteria were explained to authorities. Notice was given to registered nurses regarding the study as well as venue and time. All registered nurses who were willing for study were assembled in a common hall. Adequate spacing was ensured in between each participants to avoid discussions. 82 nurses were present in the hall and consent was taken. On 7 Mar 2019 questionnaire was administered to night duties and sample size reached to 100. After 20 minutes of administration, the questionnaire were collected, ensuring that each registered nurse had completed the answers of all the questions.

Data analysis procedure:

Data was analyzed using descriptive statistics.

Table 1:- Data analysis procedure.

SN	DATA ANALYSIS	METHOD	REMARKS
1	Descriptive Statistics	Frequency, Percentage Mean	Social Demographic variables Knowledge on care of patients on ventilator support

Results:-

The finding of the study were analyzed and arranged under the following sections.

1. Distribution of sample according to Socio demographic data.
2. Distribution of sample according to Knowledge score.

The socio demographic variables assessed were age, professional qualification, years of services, area of posting in last one year, type of posting, whether undergone any ICU update courses, years of working experience in ICU.

Table 2:- Distribution of sample according to age group.

S.No	Age group	Frequency(f)/ Percentage(%)
1)	20-30years	41
2)	30 year 1 day to 40years	36
3)	40years 1 day to 50 years	20
4)	50year 1 day and above	03
	Total	100

Table 2 shows that 41% of the participants are in age group 20-30 years, 36% are in 30years 1day to 40 years, 20 % are in 40years 1day to 50 and 3% are in 50years 1day and above.

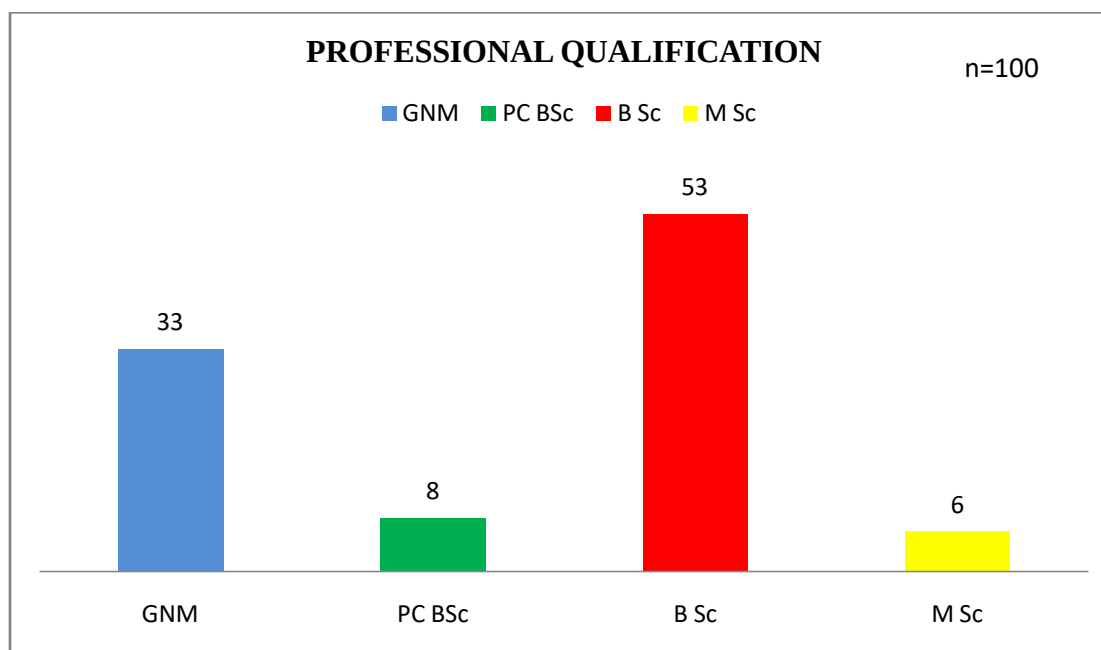


Figure 1:- Distribution of sample according to professional qualification.

Figure 1 shows that 33% of the subjects are GNM, 8% are PC BSc, 53% BSc(N) and 6% are MSc(N).

The finding showed that 64% of subjects are having <10 years of services, 16% are having 10-20 years of service, 19% are having 20-30 years of services and 6% are having >30 years of services.

Socio demographic details showed that 64% of subjects are posted in intensive care unit, 16% are in acute care wards, 19% are in sub acute wards and 01% in others department.

50% of sample posted in tertiary care hospital in last five year, 34% other than tertiary care hospital, 02% in training hospital, 14% in training and clinical posting.

83% of sample have not done any ICU course and 17% have done any ICU course.

49% of sample have <1 year of working experience in ICU, 28% have 1 to 5 year experience, 17% have >5 year and 06% have no working experience in ICU.

Section II:**Table 3:-** Knowledge level as per score.

S.NO	SCORES	LEVEL
1)	0-4	Poor
2)	5-8	Low
3)	9-12	Average
4)	13-16	High
5)	17-20	Very high

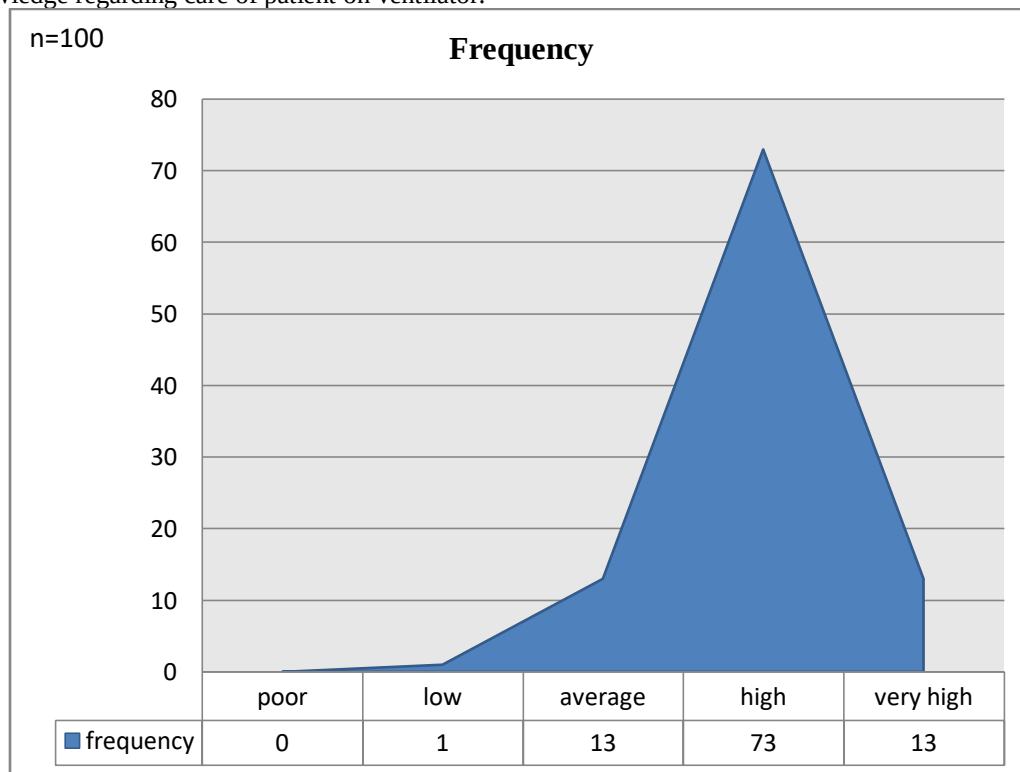
Knowledge of nurses regarding care of patients on ventilator support was assessed by using validated self structured questionnaire containing 20 questions. Thus scores were categorized into different levels. The maximum score in level of knowledge score is 20. The score between 0-4 is considered as poor level of knowledge, 5-8 is considered as low knowledge, 9-12 considered as average knowledge, 13-16 considered as high knowledge and 17-20 considered as very high knowledge.

Table 4:- Distribution of sample according to knowledge score.

S.NO	SCORES	LEVEL	FREQUENCY(100) (f)
1)	0-4	Poor	Nil
2)	5-8	Low	01
3)	9-12	Average	13
4)	13-16	High	73
5)	17-20	Very high	13

The interpretation of data shows that no nurses have poor knowledge,

01 % have low knowledge, 13% have average knowledge, 73% have high knowledge and 13% of nurses have very high knowledge regarding care of patient on ventilator.

**Figure 2:-** Distribution of sample according to knowledge score.

Mean:

The data represents that maximum of nurses i.e. 73% have high knowledge regarding the care of patients on ventilator support. The mean knowledge score of nurses on care of patients of ventilator support assessed using 20 questionnaire is 13.92 $\pm$ (2.18).

Discussion:-

A study was conducted by Passing Chiki Sherpa et.al (2014) on the knowledge of Critical care provider on Prevention of Ventilator associated Pneumonia among 138 nurses. The study showed that 44.2% had inadequate knowledge while lower prevalence was seen in this present study where 01% of the nurses has low/inadequate knowledge on care of patients on ventilator^[6]

In this study, 73% participants have high knowledge about care of patients on ventilator. This finding is supported by study conducted in American University of Beirut by Mohammad F among the 69 critical care providers in 2010. The study findings showed adequate knowledge on prevention of VAP with knowledge score (78.1%).^[7]

In a study conducted by Aurang Zeb et.al (2018) on nurses Knowledge regarding Prevention of Ventilator Associated Pneumonia in Tertiary care hospital in Peshawar, the study revealed that 80% have average knowledge, 5% have excellent knowledge, while 7 % have poor knowledge about ventilator acquired pneumonia prevention. This finding is in concordance with the present study where 73% have high knowledge, 13% have excellent knowledge and 1% have low knowledge.^[8]

Recommendations:-

Keeping in mind the findings and limitations of the study, the following recommendations were made for further research.

1. Similar studies would be repeated in other wards of the Hospital.
2. Similar study can be done by increasing the size of the Samples.
3. Large scale study may be conducted with long time duration in different phases.

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