A Quasi-Experimental Study on Effectiveness of Structured Teaching Program on Knowledge Regarding Mechanical Ventilator among Staff Nurses Working in Intensive Care Unit in Selected Hospitals of Jalandhar, Punjab,2012

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Abstract: _Background: Mechanical ventilation is a part of Advanced Life Support (ALS) which includes a set of life-saving protocols and skills that extend Basic Life Supportto further support the circulation and provide an open airway and adequate ventilation. As nurses daily deals with the mechanically ventilated patient so they must know that how to provide care to these patients. Methods: The present Quasi-Experimental research study undertaken to assess the knowledge regarding mechanical ventilator among staff nurses with sample size of 60 working in intensive care unit.Assessment of knowledge was done with the help of structured questionnaire. Results: Analysis showed that subjects had the pretest mean knowledge score of experimental group was 18.03 and posttest was 20.83 and the pretest mean knowledge score of control group was 20.46 and of posttest was 20.83 with t value of experimental group 3.249 and of control group was 0.2523 at 5% level of significance. There was a significant increase in knowledge in experimental group than the control group._

Keywords:-Mechanical ventilation,Basic life support,Staff nurses

1. Introduction

An intensive care unit (ICU) or critical care unit (CCU), is a special department of a hospital or health care facility that provides intensive treatment medicine.Intensive care units cater to patients with severe and life-threatening illnesses and injuries, which require constant, close monitoring and support from specialist equipment and medications in order to ensure normal bodily functions. They are staffed by highly trained doctors and nurses who specialise in caring for critically ill patients. ICUs are also distinguished from normal hospital wards by a higher staff-to-patient ratio and access to advanced medical resources and equipment that is not routinely available elsewhere.[1]

The advances in medical technology means we are living longer and surviving conditions that would have resulted in early death for many people a number of years ago. some of the advanced technology in the health care are cardiac pacing, defibrillation /cardio version, intensive care equipment for life support and emergency resuscitation, crash cart, intra aortic balloon pump, ventilator which assists with or controls pulmonary ventilation in patients who cannot breathe on their own.[2]

Rapid developments in intensive care medicine have made mechanical ventilation an essential method in the resuscitation and comprehensive treatment of critical care patients. About 80% of patients in intensive care units are reported to require mechanical ventilation, and nursing care of patients receiving mechanical ventilation has become increasingly important, including nurse-led weaning of ventilator patients. While hospitals in other countries may rely on trained respiratory care therapists to assess and care for mechanical ventilation systems, in the intensive care units of China, nursing staff especially trained in basic knowledge and techniques of intensive care medicine provide the main care for critically ill patients, including airway care for patients requiring mechanical ventilation.[3]

The use of mechanical ventilators is increasing day by day. They are used in critical care life threatening situations. In India a total of about 5,915 patients put daily on mechanical ventilator. The disease conditions on which the patient is kept on ventilator and their incidence are approx. 3.66% respiratory failure cases,52,861 cases of COPD,587,355 acute respiratory distress syndrome(ARDS),10,650 gulleinbarre syndrome,9.3 lakh cases of stroke,47.5 head injury cases occurs globally in one year. All of these medical conditions require use of mechanical ventilation as a life saving procedure.

Mechanical ventilation is a process by which gases are moved into and out of the lungs by means of a ventilator, a machine that delivers a flow of gas to a patient's airway. The indications for mechanical ventilation includes respiratory arrest, acute lung injury, critical illness and respiratory support following surgery.[4]

The goals of continuous mechanical ventilation are to maintain adequate ventilation, deliver precise concentrations of Fio_2, deliver adequate tidal volumes to obtain an adequate minute ventilation and oxygenation, lessen work of breathing in clients who cannot sustain adequate ventilation and prevent complications from underlying problem.[5]A critically ill patient presents a major challenge and consequent reward to nursing. The nurse should provide essential individualized care directed towards the survival of the patient. Each individual nurse is accountable to take appropriate measures to save the life of the patient under her care. The number of patients on mechanical ventilator is rapidly increasing. The

nursing staff have to assist or perform the various activities of living until the patient fully regains consciousness.[6]

The nurse coordinates efforts of the health care team, teaches and supports the client and the family, monitors the client's response to ventilation, intervenes to maintain oxygenation and ventilation and ensures that the client's complex needs are met.[6] In order to provide a better comprehensive care to the mechanically ventilated patient, the nurse should have good working knowledge of the mechanical ventilation and also have the practical skills to provide better care to those patients.[7]

As nurses daily deals with the mechanically ventilated patient so they must know that how to provide care to these patients Nurses in the ICU who are concerned for the patient must understand the path physiology of lungs, use of mechanical ventilation, weaning protocols, and the ability to interpret the clinical significance of diagnostic tests such as arterial blood gas analysis and radiographic findings. They must be able to identify complications of patients on mechanical ventilation and implement measures to prevent morbidities associated with therapy so optimal patient outcomes can be attained.[8]

Hypothesis
H_1- The post test mean knowledge score of experiment group will be significantly higher than post test mean knowledge scores of control group.
H_0- The post test mean knowledge score of experiment group will not be significantly higher than post test mean knowledge scores of control group.

Objectives
The objectives of the study were
1) To assess pre test knowledge regarding mechanical ventilator among staff nurses.
2) To develop and implement structured teaching program on mechanical ventilator to staff nurses.
3) To assess post test knowledge regarding mechanical ventilator among staff nurses.
4) To compare pre test and post test knowledge regarding mechanical ventilator among staff nurses.
5) To find association between knowledge regarding mechanical ventilator with selected Socio-demographic variables.

2. Conceptual Framework

In present study conceptual framework has been developed on the basis of concepts from Imogene theory of goal attainment.

3. Materials and Methods

Research Approach adopted was quantitative type using quasi experimental research design. The study was conducted among ICU Staff in five selected hospitals(SGL super specialityhospital,SGL charitable hospital,Chawla heart care hospital kept in experimental group and Satyam hospital and Shri Ram cardiac hospital as control group)of Jalandhar. Sample size was 60 with convenience sampling who meet the inclusion criteria using convenience sampling

technique. The tool is divided into two sections:- Section A:- Socio-demographic data such as Age, gender, professional qualification, professional experience, current clinical posting and in-service programme attended. Section B:- Structured questionnaire in which 30 items were prepared. GNM and B.Sc(N) staff nurses working in ICU and those who were willing to participate are included in the study.Tool was prepared by various level of literature and validated by experts of medical surgical nursing. Ethical permission was obtained from ethical and research committee of SGL Nursing College, Jalandhar, Punjab. After gaining approval, permission was taken from Medical and Nursing Suprintendant of selected hospitals to conduct research study. The Reliability of tool was obtained by split half method and correlation was done by Karl Pearson's coefficient of correlation. The reliability of tool was 0.82.the tool was administered to subjects and informed written consent was obtained. Confidentiality of information was maintained. Analysis and interpretation of data was done accordance with objectives by using descriptive and inferential statistics

4. Results

Table 1: Socio-demographic profile to assess the effectiveness of STP on knowledge regarding mechanical ventilator among staff nurses working at ICUs, **N=60**

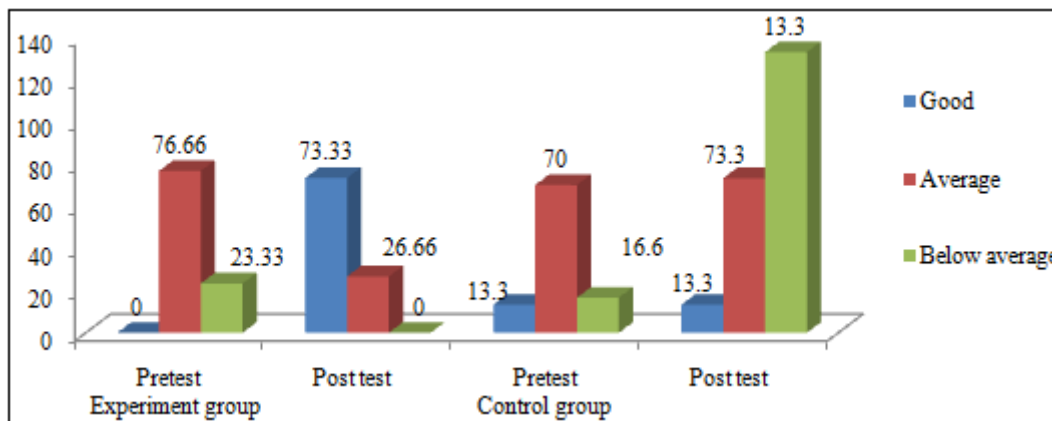| Socio-demographic variables	Experimental n=30		Control n=30	
	n	%	n	%
Age(in yrs)				
21-25	18	60.00	18	60.00
25-30	11	36.67	08	26.67
30-35	00	00.00	01	03.33
Above 35	01	03.33	03	10.00
Gender				
Male	04	13.33	05	16.67
Female	26	86.67	25	83.33
Qualification				
GNM	26	86.67	28	93.33
B.Sc (N)	04	13.33	02	06.67
B.Sc (PB)	00	00.00	00	00.00
Professional Experience				
0-2	16	53.33	19	63.33
2-6	12	40.00	06	20.00
6-8	00	00.00	02	06.67
Above 8	02	06.67	03	10.00
Current clinical Posting				
Medical ICU	07	23.33	13	43.34
Surgical ICU	04	13.33	04	13.33
Cardiac ICU	15	50.00	10	33.33
Neuro ICU	04	13.34	03	10.00
In-service programme attended				
Seminar	00	00.00	00	00.00
Workshop	03	10.00	04	13.33
Conference	04	13.33	02	06.67
None	23	76.67	24	80.00

Table 1.depicts that majority of staff nurses were found in age group 21-25years (60%). Most of the staff nurses were female (86.67%) in experimental and (83.33%) in control group, qualified as GNM (86.67%) in experimental and (93.33%) in control group with 0-2 years experience (53.33%) in experimental and 63.33% in control group. 50 % of staff nurses were working in Cardiac ICU in experimental

and 43.34% is from medical ICU. Majority of the staff 76.67% and 80 %had not attended any in-service programme in experimental and control group respectively.

Table 2: Comparison of pretest and post test mean knowledge score regarding mechanical ventilator among staff nurses working at ICUs

Group	n	Knowledge Score				t
		Pretest		Post test		
		Mean	SD	Mean	SD	
Experimental	30	18.03	2.88	20.83	3.73	3.249^{S*}
Control	30	20.46	4.402	20.73	3.94	0.2523^{NS}

*Significant at p<0.05level NS-

Non Significant

Table 2 .depict that the pretest mean knowledge score of experimental group was 18.03 and the posttest mean knowledge score was 20.83 whereas, the pretest mean knowledge score of control group was 20.46 and the posttest mean knowledge score was 20.73 with calculated t value 3.249 of experimental and 0.2523 of control group at p<0.05level which was found to be significant in experimental and non significant in control group. Hence, the research hypothesis $(H_1)$was accepted and H_0 was rejected.

Thus, it showed that there was a significant change in knowledge of pretest as well as posttest of the staff nurses regarding mechanical ventilator in experimental group and no significant change in control group

5. Discussion

The study was conducted to assess knowledge and practice of staff nurses regarding mechanical ventilator. The findings of present study shows that in pretest the23(76.66%) had average knowledge, no one is having good knowledge and 07 (23.33%) had poor knowledge in experimental group whereas 21(70%) had average knowledge, 05(16.66%) had poor knowledge followed by 04(13.33%) had good knowledge in control group.

In posttest, majority of staff nurses 22(73.33%) had good knowledge,08 (26.66%) had average knowledge and none in below average knowledge of experimental group whereas 22(73.33%) had average knowledge and same level i.e. 04(13.33%) had good and below average knowledge in post test of control group.The result shows that mean pretest knowledge score of experimental group was 18.03 and control group was 20.46 with t value was found to be 3.249 and mean post test knowledge score of experimental group was 20.8 and control group was 20.73 with t value 0.2523 of control group at p<0.05level. The difference of pretest mean knowledge score of staff nurses in control group was non-significant but was statistically significant in experimental group. There was no significant association of socio demographic variables with the knowledge of staff nurses.

The findings of present study are supported by study conducted byArunkumarjindal to assess knowledge of staff nurses regarding ventilator care in selected hospitals of Mangalore shows that the 40% of staff nurses had good knowledge; equal number (40%) had poor knowledge whereas only 20% had average knowledge.

6. Conclusion

In the present studypost test mean knowledge score of experimental group (20.83) was found to be higher than pretest mean knowledge score(18.03) and t value was found to be 3.249 whereas, the pretest mean knowledge score of control group was 20.46 and the posttest mean knowledge score was 20.73 with t value 0.2523 of control group at p<0.05level. The majority of sample 23(76.66%) in pretest knowledge score were found in average score in experimental group , but after the implementation of structured teaching programme the majority of sample 22(73.33%) had good knowledge score. In the present study, H_1 was accepted (tcal 3.329 > t able 1.960) in experimental group whereas it is t_{cal} 0.2523<t_{table}1.960 in control group so the difference of posttest mean knowledge score of experimental group was statistically significant at p<0.05So, it was concluded that structured teaching had significant impact on knowledge of staff nurses regarding mechanical ventilator.

7. Recommendations

Based on findings of study the following recommendations have been made for further study.
- A large scale study can be carried out to generalize the findings
- A comparative study can be conducted on knowledge and skills of nurses in government and private hospitals.

- A similar study can be conducted by true experimental approach.

8. Acknowledgement

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