Original Article

Effectiveness Of Structured Teaching Programme On Knowledge Regarding Weaning And Extubation Criteria Of Patient's On Mechanical Ventilator Among Staff Nurses Working In Intensive Care Units In Selected Hospitals: A Pre-Experimental Study.

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Abstract

Background: Mechanical Ventilator is integral life support instrumentation within the critical care. About 10–12% of the ICU patients are going to be reintubated among 72 hours of extubation and literatures suggests that regarding 40–90% of those patients present with laryngeal edema during laryngoscopy. It's vital for every qualified nurse operating in critical care atmosphere to perceive indications and utilization of mechanical ventilation.

Objective: 1) To assess the pre-test knowledge regarding Weaning and Extubation criteria of patient's on Mechanical Ventilator among Staff Nurses.
2) To assess the post-test knowledge regarding Weaning and Extubation criteria of patient's on Mechanical Ventilator among Staff Nurses.
3) To evaluate the effectiveness of structured teaching program on knowledge regarding Weaning and Extubation criteria of patient's on Mechanical Ventilator among Staff Nurses.
4) To associate post-test knowledge score with selected demographic variable.

Methodology: Quantitative research approach, a pre experimental one group pre test and post test research design were used to accomplished a stated objective. It was conducted over 75 staff nurses working in intensive care units by using Non probability purposive sampling technique. A self-administered questionnaire was used for data collection on knowledge regarding weaning and extubation criteria.

Result: The analysis was done with the help of inferential and descriptive statistics. Analysis reveals that the pretest knowledge score was 10.28 $\pm$ 4.07 and post test knowledge scores was 21.78 $\pm$ 3.47 that reveals improvement in knowledge after administration of structured teaching programme. The tabulated value for n=75-1 i.e., 74 degrees of freedom was 1.98. The calculated 't' value was 36.33 which was highly significant at 0.05 level. Thus, the H_1 is accepted.

Conclusion: The study result shows that after intervention on knowledge regarding weaning and extubation criteria among staff nurses were improved significantly.

Key words: structured teaching programme, mechanical ventilator, weaning, extubation, weaning and extubation criteria, intensive care unit, staff nurses.

INTRODUCTION

Respiratory system's major operate is gas exchange, during which air enters the body on inhalation (inspiration), travels throughout the respiratory passages, exchanging Oxygen for dioxide at the tissue level, and dioxide is expelled on exhalation (expiration). Ventilation consists of two parts- inspiration and expiration. Every of those may be describe as being either quiet, the method at rest, or forced. Boyle's law states that the degree and pressure of a gas measure reciprocally proportional. If the degree will increase, it's pressure can will increase. The movement of air in ventilation

happens as a result of the pressure gradient procedure when the volume of the lungs increases or decreases. Oxygen therapy is the administration of oxygen at a concentration bigger than it found in environmental atmosphere. Average level, concertation of oxygen in air is 21%. The goal of oxygen therapy is to supply adequate transport of oxygen within the blood whereas decreasing the work of respiratory and reducing stress on the heart muscle. Numerous treatment modalities are used to treat the patients with respiratory conditions. The selection of modality is based on the disorder and issues faced during ventilation, diffusion, or both. Therapies vary from simple and noninvasive (oxygen and nebulizer medical aid, chest physiotherapy [CPT], respiratory retraining) to advanced and extremely invasive treatments (intubation, mechanical ventilation, surgery). A mechanical ventilator could be a positive or negative pressure ventilator which will maintain ventilation and oxygen delivery for a long duration. Caring for a patient on mechanical ventilator has become an integral part of nursing care in essential care or general medical-surgical units, extended care facilities. Mechanical ventilator could also be needed for many reasons to manage the patient's respirations throughout surgery or treatment, to oxygenize the blood once the patient's efforts are inadequate, and to rest the respiratory muscles.

NEED OF THE STUDY

Retrospective Study was conducted on "Study of Reintubation in Intensive Care". According to this study within the intensive care unit (ICU), Approximately 30% of all patients need mechanical ventilation. Reintubation could be a high-risk procedure in critically ill patients. Anticipating a tough airway and identify high risk patients can is life-saving. 10–20% of critically ill patients who are extubated are going to be reintubated among 72 hours which lead to long term ventilation-related complications like ventilator-associated pneumonia and ventilator associated respiratory lung injury, that greatly have an effect on the length of stay and mortality within the ICU. The aim is to review the causes, risk factors, and outcomes related to reintubation. A complete of 532 patients were intubated within the ICU, of those 25 cases (9.2%) needed reintubation, 19 patients had diabetes, 17 of them had hypertension, and 14 had coronary artery disease. Majority of the patients improved once intubation and the mean ventilator stay once reintubation is 3,4 days. Among patients who were reintubated 9 patients were discharged once recovery, 4 patients were discharged against medical recommendation, 5 were discharged for the asking, and 7 patients died. Reintubation is related to additional procedural complications like hypoxia, hypotension and prolonged ICU stay, and the ICU team must be ready for such complications. Laryngeal swelling was additionally a determined complication during a few patients. The investigator's own experience discussed with experts and reviewing many articles, made her realize that there is a need to explore knowledge of nurses regarding weaning and extubation criteria in selected hospitals. As many studies have proved that nurses may lack in updating their knowledge regarding weaning & extubation, hence the investigator realized to distribute some contribution by administering structured teaching programme on new criteria of weaning and extubation. It will also enhance the knowledge for evidence-based practices and improvement in the routine weaning & extubation clinical practice.

METHODOLOGY

In present study, researcher adopted pre-experimental one group pretest and post-test research design. It assesses the knowledge regarding Weaning and Extubation criteria of patient's on Mechanical Ventilator among Staff Nurses working in Intensive Care Units in selected Hospitals. The researchers also described the association with demographic variables.

The population of present study comprises staff nurses working in intensive care units in selected hospitals. In inclusion criteria: Registered nurses having RGNM, GNM, B.Sc. Nursing and P.B.B.Sc. Nursing qualification. Working in Medical, Surgical, Cardiac, Neuro, Geriatric, Obstetric, and General Intensive Care Units. Willing to participate in study. In exclusion criteria: Qualified as M.Sc. Nursing. Working in wards, operation theaters, Neonatal and pediatric Intensive Care Units. Undergone the training of weaning and extubation criteria of patients on mechanical ventilator. Not willing to participate in study. Not available at the time of data collection. Description of Tool: The structured questionnaire schedule was constructed into three sections. Section A: Consisted of Semi-structured questionnaire on demographic data, Section B: Self-administered knowledge questionnaire on weaning, Section C: Self-administered knowledge questionnaire on extubation to assess knowledge. Plan For Data Analysis: Analysis is the strategy used in theory development in which concepts, statements or theories are clarified or refined. The data was planned to include descriptive and inferential statistics.

RESULT

Section I: Description of staff nurses working in intensive care unit in selected hospital with regards to demographic variables.

Table VI-1: Table showing frequency and percentage wise distribution of staff nurses according to their demographic characteristics.

n=75

Sr. No.	Demographic variable		Frequency (f)	Percentage (%)
1.	**Age (year)**	21-30 years	46	61.3
		31-40 years	19	25.3
		41-50 years	9	12.0
		>50 years	1	1.3
2.	**Gender**	Female	68	90.7
		Male	7	9.3
3.	**Professional Qualification**	RGNM/GNM	42	56.0
		B.Sc./B.B.Sc. Nursing	26	34.7
		P.C.B.Sc./P.B.B.Sc. Nursing	7	9.3
4.	**Area of working**	General ICU	10	13.3
		Medical ICU	27	36.0
		Surgical ICU	19	25.3
		Other	19	25.3
5.	**Experience in intensive care unit**	< 1 year	15	20.0
		1-5 year	41	54.7
		6-10 year	9	12.0
		> 10 years	10	13.0
6.	**Monthly Income (Rs.)**	Below 10000 Rs.	1	1.3
		10001-20000 Rs.	51	68.0
		20001-30000 Rs.	18	24.0
		>30000 Rs.	5	6.7
7.	**Protocol for ventilator weaning and extubation**	Yes	48	64.0
		No	27	36.0

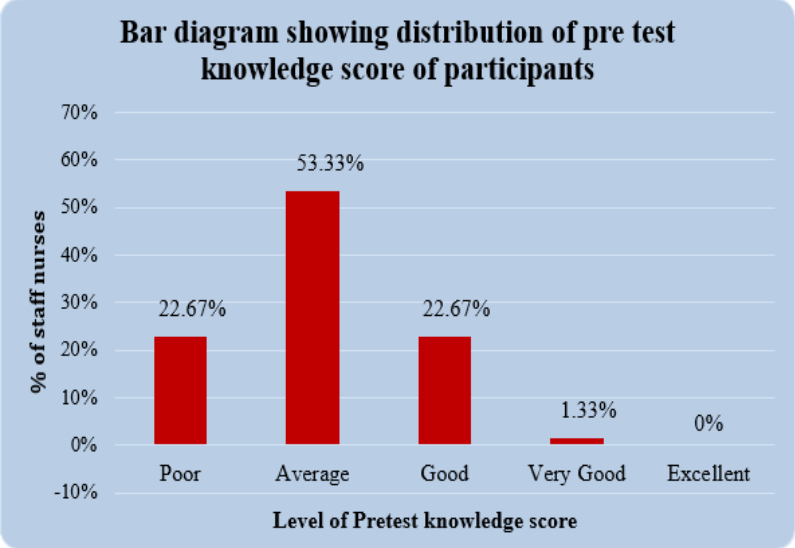
Majority 46 (61.30%) of the staff nurses were in the age group of 21-30 years, 19 (25.30%) of them were in the age group of 31-40 years, 9 (12%) were in the age group of 41-50 years and 1 (1.30%) of staff nurses were more than 50 years of age. Majority 68 (90.70%) of the staff nurses were females and 7 (9.30%) of them were males. Majority 42 (56%) of the staff nurses were educated up to RGNM/GNM, 26 (34.70%) of them were B.Sc./B.B.Sc. Nursing and 7 (9.30%) of them were educated up to P.C.B.Sc./P.B.B.Sc. nursing. Majority 27 (36%) of them in medical intensive care unit, 19 (25.30%) of staff nurses were working in both surgical intensive care unit and others department and 10 (13.30%) of the staff nurses were working in general intensive care unit. Majority 41 (54.70%) of the staff nurses had 1-5 years of working experience, 15 (20%) of the staff nurses had experience less than 1 year, 10 (13.30%) of staff nurses had more than 10 years of working experience and 9 (12%) had between 6-10 years of working experience in intensive care unit. Majority 51 (68%) of staff nurses had monthly income between 10001-20000 Rs., 18 (24%) of them had monthly income between 20001-30000 Rs., 5 (6.70%) of staff nurses had monthly income more than 30000 Rs., and 1 (1.30%) of the staff nurses were having monthly income below 10000 Rs. Majority 48 (64%) of the staff nurses had protocol and 27 (36%) of staff nurses had no protocol for ventilator weaning and extubation criteria in hospital.

Section II: Description on pretest knowledge of staff nurses working in intensive care unit in selected hospitals regarding weaning and extubation criteria of patient's on mechanical ventilator.

Table No. VI-2: Table showing frequency and percentage wise distribution of pre test knowledge scores of staff nurses working in intensive care unit in selected hospital regarding weaning and extubation criteria of patient's mechanical ventilator.

n=75

Level of pre test knowledge	Score Range	Level of Pre test Knowledge Score	
		Frequency (f)	Percentage(%)
Poor	0-20% (0-6)	17	22.67
Average	21-40% (7-12)	40	53.33
Good	41-60% (13-18)	17	22.67
Very Good	61-80% (19-24)	1	1.33
Excellent	81-100% (25-30)	0	0
Minimum score		4	
Maximum score		24	
Mean knowledge score		10.28 ± 4.07	
Mean % Knowledge Score		34.26 ± 13.58	

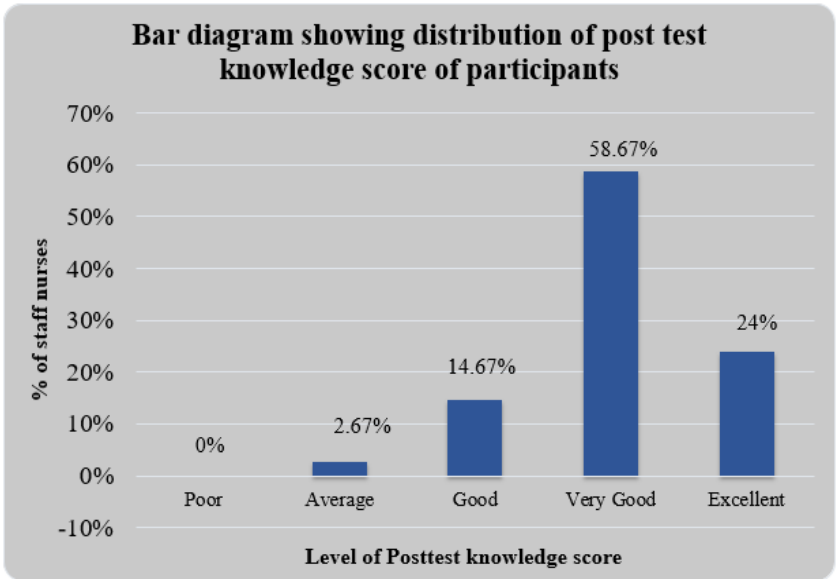


Section III: Description on posttest knowledge of staff nurses working in intensive care units in selected hospitals regarding weaning and extubation criteria of patient's on mechanical ventilator.

Table No. VI-3: Table showing frequency and percentage wise distribution of post test knowledge scores of staff nurses working in intensive care unit in selected hospital regarding weaning and extubation criteria of patient's on mechanical ventilator

n=75

Level of post test knowledge	**Score Range**	**Level of Post test Knowledge Score**	
		Frequency (f)	**Percentage(%)**
Poor	0-20% (0-6)	0	0
Average	21-40% (7-12)	2	2.67
Good	41-60% (13-18)	11	14.67
Very Good	61-80% (19-24)	44	58.67
Excellent	81-100% (25-30)	18	24
Minimum score		12	
Maximum score		28	
Mean knowledge score		21.78 ± 3.47	
Mean % Knowledge Score		72.62 ± 11.57	



Section IV: Description on effectiveness of structured teaching programme on knowledge of staff nurses working in intensive care unit in selected hospitals regarding weaning and extubation criteria of patient's on mechanical ventilator.

Table No. IV-4: Table showing comparison of pre test and post test grading score

n=75

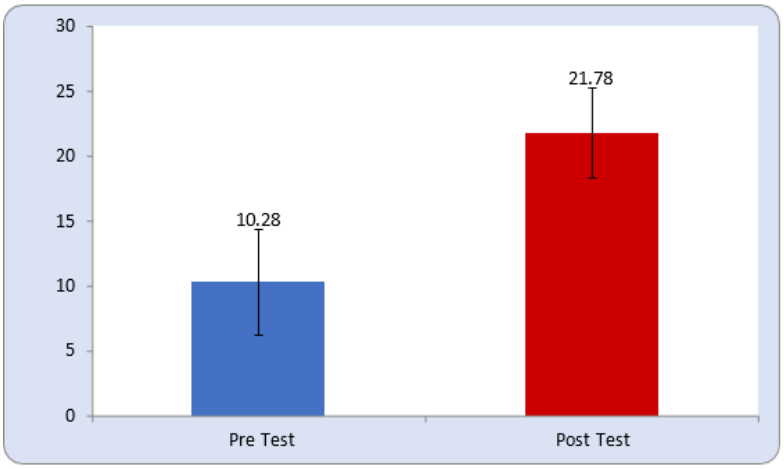
Level of knowledge score	Score Range	Pre test		Post test	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Poor	0-20% (0-6)	17	22.67	0	0
Average	21-40% (7-12)	40	53.33	2	2.67
Good	41-60% (13-18)	17	22.67	11	14.67
Very Good	61-80% (19-24)	1	1.33	44	58.67
Excellent	81-100% (25-30)	0	0	18	24
Minimum score		4		12	
Maximum score		24		28	
Mean knowledge score		10.28 ± 4.07		21.78 ± 3.47	
Mean % Knowledge Score		34.26 ± 13.58		72.62 ± 11.57	

Table No. VI-5: Table showing effectiveness of structured teaching programme on knowledge score of pre test and post test regarding weaning and extubation criteria of patient's on mechanical ventilator among staff nurses working in intensive care unit in selected hospitals.

n=75

Test	Mean	SD	Mean Difference	Calculated t-value	df	Table value	p-value	Significance
Pre Test	10.28	4.07	11.50±2.74	36.33	74	1.98	0.0001 S,p<0.05	S
Post Test	21.78	3.47						

Figure No. VI-10: Bar diagram representing effectiveness of structured teaching programme on knowledge score of pre test and post test of staff nurses working in intensive care units regarding weaning and extubation criteria of patient's on mechanical ventilator.



Section V: Description on association of post test knowledge score with selected demographic variables

Table No. VI 6: Table showing association of post test knowledge score with selected demographic variables.

n=75

Demographic variables	Calculated value			df	Table value	Level of significance < 0.05	Significance
	t-value	F- value	p- value				
Age (years)	-	3.52	0.019	3,71	2.68	< 0.05	S
Gender	0.05	-	0.95	73	1.98	> 0.05	NS
Professional qualification	-	17.34	0.0001	2,72	3.07	< 0.05	S
Area of working	-	0.53	0.65	3,71	2.68	> 0.05	NS
Experience in intensive care unit	-	4.02	0.011	3,71	2.68	< 0.05	S
Monthly income	-	5.69	0.001	3,71	2.68	< 0.05	S
Protocol for weaning and extubation criteria	0.49	-	0.61	73	1.98	> 0.05	NS

Key S- significant NS- Not significant

DISCUSSION

A pre-experimental study was conducted on effectiveness of structured teaching programme on knowledge regarding modes of mechanical ventilator among staff nurses at a selected hospital, Bangalore. This study was conducted to assess the effectiveness of structured teaching programme on modes of mechanical ventilator among staff nurses at Kempegowda Institute of Medical Sciences and Research Centre, Bangalore. The Pre experimental one group pre-test and post-test research design were selected, with non-probability sampling technique in which purposive sampling method was used. Sample of 60 (N=60) nurses working in Kempegowda Institute of Medical Sciences, Hospital and Research Centre were taken and requested to answer the structured knowledge questionnaire followed by implementation of structured teaching programme (STP) and post-test conducted after 8 days, using the same structured questionnaire to find out the effectiveness.[6]

In the above study mean percentage of pre test and post test knowledge scores were 39.85% and 74.72% respectively and the enhancement of the knowledge score noticed in this study is 34.87%. The overall findings showed that the Structure Teaching Program on modes of mechanical ventilator was significantly effective in improving the knowledge of nurses. Similarly in present study mean percentage of pretest and posttest knowledge score 34.26% and 72.62% respectively and the enhancement of the knowledge score noticed in this is 36.33%. Hence it is statistically interpreted that the Structured Teaching Programme on knowledge regarding weaning and extubation criteria of patients on mechanical ventilator was effective. Thus, the H_1 is accepted.

In the above study observed that there was no significant association found with their selected demographic variables like age, qualification and experience. In the present study, there was significant association found between post test knowledge score with age (years), professional qualification, experience in intensive care unit, and monthly income.

CONCLUSION:

The study reveals mean pre test knowledge score was 10.28 and mean post test knowledge score was 21.78. The calculated value 36.33 is greater than tabulated value 1.98 at 0.05 level of significance. Hence it is statistically interpreted that structured teaching programme on knowledge regarding weaning and extubation criteria of patient's on mechanical ventilator was effective. Thus H1 is accepted and H0 is rejected. Analysis also reveals that there is association of knowledge score with age (years), professional qualification, experience in intensive care unit, and monthly income while none of the other demographic variable were associated with knowledge score. Demographic variables did show a major role in influencing the pre test and post test knowledge score among staff nurse working in intensive care unit. Hence, based on the above cited findings, it was concluded undoubtably that the written prepared material by the investigator in the form of structured teaching programme helped the staff nurses to improve their knowledge on regarding weaning and extubation criteria of patient's on mechanical ventilator and interpretation.

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