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"Effectiveness of planned teaching about knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals."

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Abstract : Mechanical ventilation is a life-saving intervention in critical care settings. Adequate knowledge among nurses is essential to ensure safe and effective care of clients on mechanical ventilators. Majority (58.3%) of subjects were aged 21–30 years, 86.7% were females, and 65% were GNM qualified. In the pretest, 53.33% had average knowledge, 43.33% had good knowledge, and 3.33% had poor knowledge (Mean = 14.56, SD = 3.53). After planned teaching, 76.6% had very good knowledge, 15% had good knowledge, and 8.33% had average knowledge (Mean = 25.66, SD = 5.87). The posttest mean score was significantly higher than the pretest mean score, indicating improvement in knowledge. There was no significant association between knowledge scores and demographic variables.

IndexTerms - Component,formatting,style,styling,insert.

I. INTRODUCTION

Mechanical ventilation is a life-support intervention used when a patient is unable to maintain adequate spontaneous breathing. A mechanical ventilator assists or completely controls ventilation by delivering oxygen-enriched air into the lungs through an endotracheal or tracheostomy tube. It is commonly used in intensive care units (ICUs) for patients with acute or chronic respiratory failure, severe illness, or during major surgical procedures. Although mechanical ventilation is life-saving, it does not treat the underlying disease and is associated with potential complications.

Respiratory failure occurs when the respiratory system fails to maintain adequate oxygenation or eliminate carbon dioxide, leading to hypoxemia or hypercapnia. In such conditions, positive pressure ventilation is required to support gas exchange and prevent further physiological deterioration. Mechanical ventilation may be invasive, involving endotracheal intubation or tracheostomy, and requires continuous monitoring and skilled nursing care.

According to Maslow's hierarchy of needs, maintenance of airway and breathing is a fundamental physiological priority. Nurses play a crucial role in ensuring airway patency, preventing complications, and performing procedures such as suctioning safely and effectively. Inadequate knowledge and improper practices can result in serious complications including hypoxia, arrhythmias, tube blockage, infection, and even sudden death.

Therefore, enhancing nurses' knowledge and competency in the care of patients on mechanical ventilation is essential to improve patient outcomes and ensure quality critical care services.

3.1Population and Sample

Population

Population refers to the entire group of individuals in whom the researcher is interested. In this study, the population comprised registered staff nurses working in the Intensive Care Units (ICUs) of selected hospitals.

Target Population

The target population includes all staff nurses working in selected hospitals to whom the findings of the study are intended to be generalized.

Accessible Population

The accessible population consists of staff nurses working in ICUs of selected hospitals who met the inclusion criteria and were available during the period of data collection.

Sample

A sample is a subset of the population selected to participate in a research study. In the present study, the sample consisted of 60 registered staff nurses working in ICUs of selected hospitals who fulfilled the inclusion criteria and were available at the time of data collection.

Sampling Technique

Non-probability convenient sampling technique was used for the study. This method involves selecting participants who are readily available and willing to participate. The technique was chosen due to time constraints and feasibility.

Sample Size

The sample size comprised 60 registered staff nurses working in ICUs who were available during the data collection period.

Criteria for Sample Selection

Inclusion Criteria:

1. Registered staff nurses working in ICUs of selected hospitals.
2. Nurses who were willing to participate in the study.
3. Nurses who were available during the period of data collection.

Exclusion Criteria:

1. Nurses who had already attended in-service education or training regarding care of clients with mechanical ventilator.

3.2 Data and Sources of Data

According to Polit and Beck, the accessible population is the aggregate of cases that confirmed to design inclusive and exclusive criteria and that are accessible as subject for the study.

In the present study, accessible population were staff nurses from the selected hospitals, who were fulfill the inclusion criteria

3.3 Theoretical framework

A research design is an overall plan to obtain answer to the question being studied and how to handle some of the difficulties encountered during research process and also enhances for the specification of the

study to be used in the research process. The research design helps the investigator in the selection of the subject, manipulation of the experimental variables, procedure of the data collection and the type of statistical analysis to be used to interpret the data.[37]

In the present study quasi experimental one group pre-test, post-test research design was used for the study. A pre-test was administered by means of structured knowledge questionnaire depicted as 0_1 and then planned teaching given depicted as X. A post test was conducted using the same structured knowledge questionnaire depicted as 0_2. The study design is depicted as under.

RESEARCH METHODOLOGY

HYPOTHESIS:

H_0: There is no significant difference between pre-test and post-test knowledge scores of staff nurses regarding care of client with mechanical ventilator.

H_1: There is significant difference between pre-test and post-test knowledge scores of staff nurses regarding care of client with mechanical ventilator.

ORGANIZATION OF FINDINGS

The analysis and interpretation of the observations are given in the following section:

- **Section A:** Distribution of subjects according to their demographic variables.
- **Section B:** Assessment of knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals.
- **Section C:** Analysis of effectiveness of Planned Teaching on knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals.
- **Section D:** Association of knowledge score on care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals with selected demographic variables.

SECTION A

DISTRIBUTION OF SUBJECTS ACCORDING TO THEIR DEMOGRAPHIC VARIABLES

This section deals with percentage wise distribution of staff nurses working in ICU of selected hospitals in relation to knowledge regarding care of client with mechanical ventilator. A convenient sample of 60 subjects were drawn from the study population, from selected hospitals. The data obtained to describe the sample characteristics including age, gender, professional qualification, and years of experience and attended any course related to mechanical ventilator respectively.

Table 4 : Distribution of subjects according to demographic variables.

n=60

Demographic Variables	No. of staff nurses	Percentage (%)
Age(in years)		
21-30 yrs	35	58.3
31-40 yrs	18	30.0
41-50 yrs	7	11.7
>50 yrs	0	0
Gender		
Male	8	13.3
Female	52	86.7
Professional Qualification		
GNM	39	65.0
BBSc	19	31.7
PBBSc	2	3.3
MSc	0	0
Years of experience		
Upto 5 yrs	29	48.3
6-10 yrs	22	36.7
11-15 yrs	5	8.3
>15 yrs	4	6.7

The above table depicts frequency and percentage wise distribution of staff nurses working in ICU of selected hospitals according to age, gender, professional qualification, years of experience and attended any course related to mechanical ventilator etc.

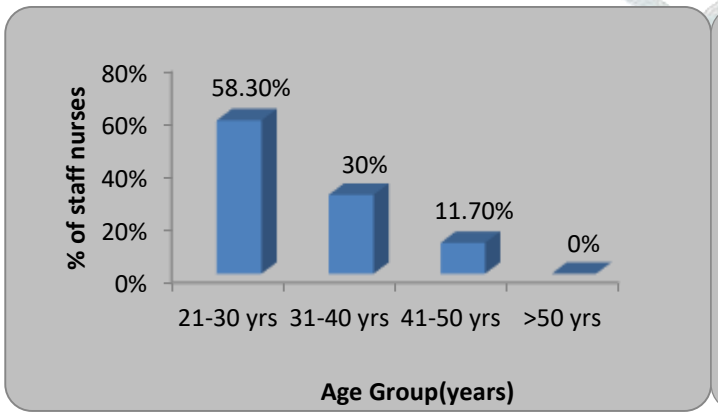


Fig. 3: Distribution of subjects according to age in years

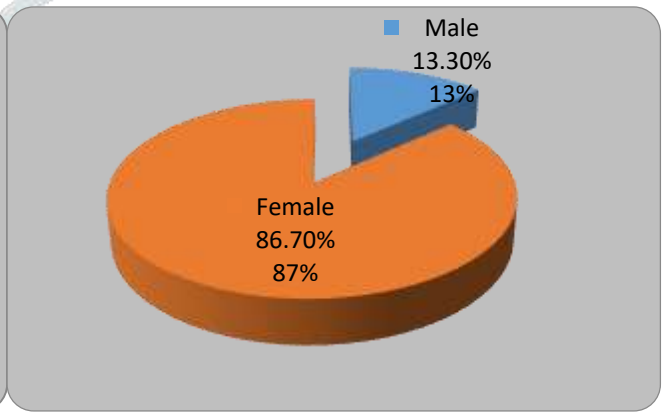


Fig. 4 : Distribution of subjects according to gender

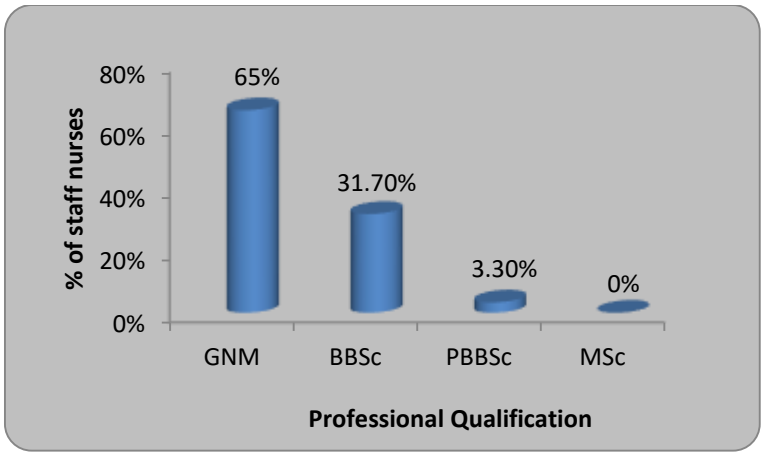


Fig. 5: Distribution of subjects according to professional qualification

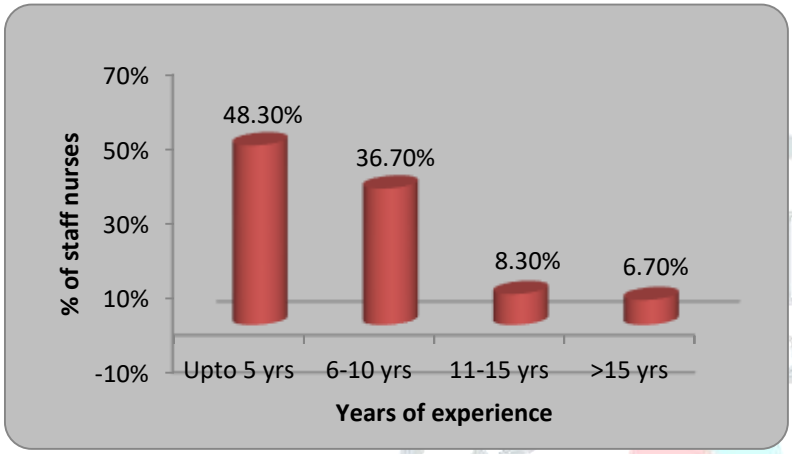


Fig. 6: Distribution of subjects according to years of experience

SECTION B

ASSESSMENT OF KNOWLEDGE REGARDING CARE OF PATIENT WITH MECHANICAL VENTILATOR AMONG STAFF NURSES WORKING IN ICU OF SELECTED HOSPITALS

Table 5 : Distribution of subjects with regard to pretest knowledge regarding care of client with mechanical ventilator

n=60

Level of knowledge score	Percentage score	Pre Test	
		Frequency	Percentage
Poor	0-25%	2	3.33
Average	26-50%	32	53.33
Good	51-75%	26	43.33
Very Good	76-100%	0	0
Mean ± SD		14.56 ± 3.56	
Mean Percentage Score		48.55%	
Range		4-22	

The above table shows the frequency and percentage wise distribution of staff nurses working in ICU of selected hospitals according to pre test level of knowledge regarding care of client with mechanical ventilator. The levels of knowledge were classified under four categories, poor, average, good and very good. Among all staff nurses 3.33% of the staff nurses had poor, level of knowledge score 53.33% had average, and 43.33% had good level of knowledge score, none of the subjects were found in very good level knowledge. Mean knowledge score was 14.56 ± 3.56 with a mean percentage score of 48.55%.

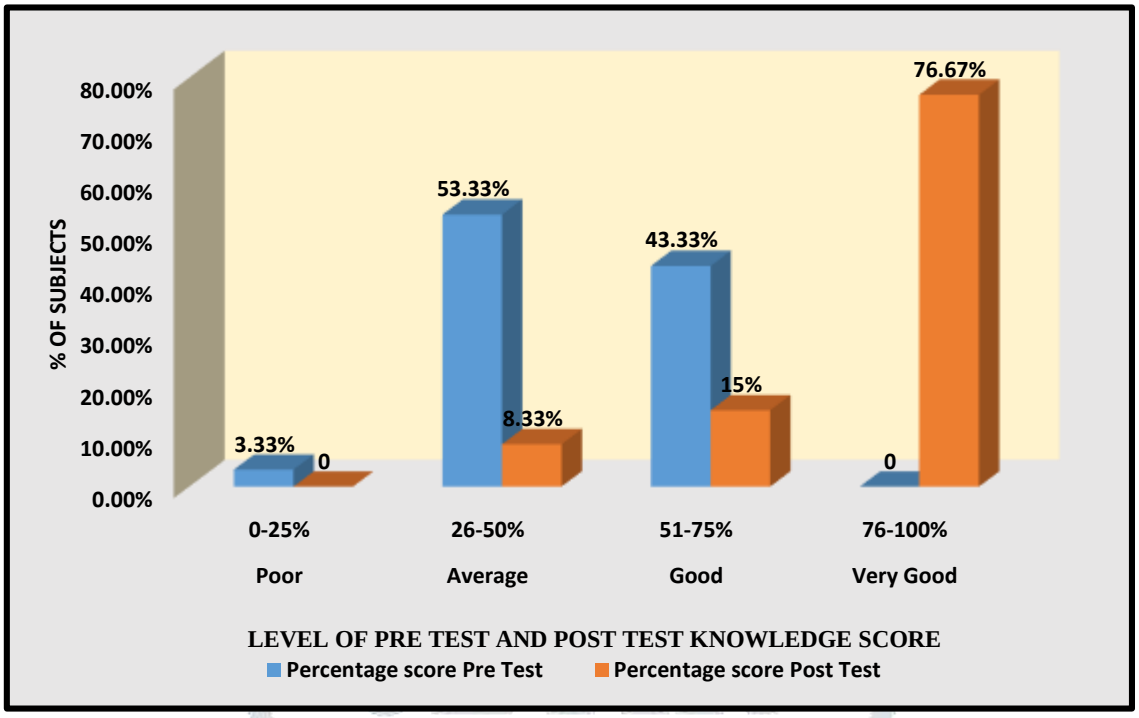
Table 6 : Distribution of subjects with regard to posttest knowledge regarding care of client with mechanical ventilator

n=60

Level of knowledge score	Percentage score	Post Test	
		Frequency	Percentage
Poor	0-25%	0	0.00
Average	26-50%	5	8.33
Good	51-75%	9	15
Very Good	76-100%	46	76.67
Mean ± SD		25.66 ± 5.87	
Mean Percentage Score		85.55%	
Range		10-30	

The above table revealed the frequency and percentage wise distribution of staff nurses working in ICU of selected hospitals according to post test level of knowledge regarding care of client with mechanical ventilator. The levels of knowledge were classified under four categories, poor, average, good and very good. 8.33% of the staff nurses had average level of knowledge score, 15% had gained good and 76.67% had gained very good level of knowledge score after post test. Mean knowledge score was 25.66 ± 5.87 with a percentage score of 85.55%.

Fig. 9 : Comparison of pretest and posttest knowledge score of subjects regarding care of client with mechanical ventilator



Revealed the comparison between pretest and posttest level of knowledge score regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals, it was found that 3.33% of staff nurses were having poor level of knowledge score in pretest, whereas no one in posttest. 53.33% of staffs had average level of knowledge in pretest and 8.33% in posttest. 43.33% of staff nurses had good level of knowledge and after planned teaching only 15% of the staffs comes in this category. No one was in the category of very good level of knowledge in pretest which was increased to 76.67% in posttest after planned teaching.

SECTION C

Table 8 : Significance of difference between pre and posttest knowledge of staff nurses regarding care of client with mechanical ventilator

n=60

	Overall	**Mean**	**SD**	**Mean Percentage**	**t-value**	**p-value**
Knowledge score	**Pre Test**	14.56	3.56	48.55	15.50	P<0.05
	Post Test	25.66	5.87	85.55		

***S- Significant**

Table 9: Association of knowledge score regarding care of client with mechanical ventilator in relation to age.

n=60

Age Group(yrs)	Level of posttest knowledge score				Total	χ2-value
	Poor	Average	Good	Very Good		
21-30 yrs	0	2	6	27	35	χ2(1) at 5%=9.49 χ2 cal= 4.29 p>0.05 level NS
31-40 yrs	0	3	3	12	18	
41-50 yrs	0	0	0	7	7	
>50 yrs	0	0	0	0	0	
Total	0	5	9	46	60	

This table shows the association of knowledge scores with age in years of staff nurses working in ICU of selected hospitals. The tabulated 'χ2' values was 9.49(df=4) which is much higher than the calculated 'χ2' i.e. 4.29 at 5% level of significance. Also the calculated 'p'=0.36 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpostted that age in years of staff nurses is not associated with their post test knowledge score.

Table 10 : Association of knowledge score regarding care of client with mechanical ventilator in relation to professional qualification.

n=60

Education	Level of posttest knowledge score				Total	χ2-value
	Poor	Average	Good	Very Good		
GNM	0	4	4	31	39	χ2(1) at 5%=9.49 χ2 cal= 3.41 p>0.05 level NS
BBSc	0	1	5	13	19	
PBBSc	0	0	0	2	2	
MSc	0	0	0	0	0	
Total	0	5	9	46	60	

This table shows the association of knowledge scores with professional qualification of staff nurses working in ICU of selected hospitals. The tabulated 'χ2' values was 9.49 (df=4) which is much higher than the calculated 'χ2' i.e. 3.41 at 5% level of significance. Also the calculated 'p'=0.49 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that professional qualification of staff nurses is statistically not associated with their post test knowledge score.

MAJOR FINDINGS OF THE STUDY

The following were the major finding of the study.

Section A: Distribution of subjects in according to their demographic variables.

This section deals with distribution of staff nurses according to their demographic variables in relation to age in years58.30% subjects were from the age group of 21-30 years, 30% subjects were from the age group of 31-40 years and 11.70% of them were belonging to the age group of 41-50 years.

In relation to their gender 13.30% of the staff nurses were males and 86.70% of them were females respectively.

In relation to their professional qualification 65% of the staff nurses were educated upto GNM, 31.70% of them were educated upto Basic BSc Nurses and remaining 3.30% of them were educated upto PBBSc Nursing and no one from M.Sc Nursing.

In relation to their years of experience 48.30% of the staff nurses had experience upto 5 years, 36.70% had experience between 6-10 years, 8.30% had between 11-15 years and remaining 6.70% of the staff nurses had working experience of more than 15 years respectively.

SECTION -B: Assessment of knowledge regarding care of patient with mechanical ventilator among staff nurses working in ICU of selected hospitals

This section deals with assessment of pre-test and post-test knowledge of subjects regarding care of patient with mechanical ventilator among staff nurses working in ICU of selected hospitals

Pretest level of knowledge of subjects regarding care of client with mechanical ventilator.

The level of knowledge were categorized into 4 categorized poor, average, good and very good. The findings of the pretest shows that 53.33% of subject had average knowledge, 43.3 3% of subjects had good knowledge, and 3.33% of subjects had poor level knowledge. Pretest knowledge score subjects 14.56 ± 3.56. Minimum knowledge score is in pretest 4 and maximum knowledge score was 22.

Distribution of level of knowledge regarding care of client with mechanical ventilator after the planned teaching.

The section deals with the planned teaching on care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals. In which none of the subjects had poor level knowledge, 5(8.33%) subjects had average level knowledge, 6 (15%) subjects had good level knowledge, and majority of 46 (76.67%) subjects had very good level of knowledge in posttest. Minimum score obtained by the participants was 10 maximum score was 30. The mean knowledge was 25.66 ± 5.87. Thus it was concluded that there was gain in knowledge level after a planned teaching.

Comparison pretest and posttest knowledge score of subjects regarding care of client with mechanical ventilator

The distribution of knowledge of subjects regarding care of client with mechanical ventilator before and after of planned teaching. In the posttest majority of the subjects had is very good level of knowledge 46(76.67%), whereas in pretest only 5 (8.33%)subjects had existing level of knowledge. In the pretest 43.33% subjects had good level of knowledge score where as in posttest it was 6(15%) subjects had good knowledge. In the pretest

maximum 32 (53.33%)subjects had average level of knowledge score where as in posttest 5(8.33%) had average knowledge, and 2 (3.33%) subjects were in the category of poor level of knowledge whereas in posttest none of the subjects had poor level of knowledge. The mean gain in very good level of knowledge was 85.5%. Thus it can be inferred that the planned teaching was effective in increasing the knowledge of subjects regarding care of client with mechanical ventilator.

SECTION C: Analysis of effectiveness of planned teaching on knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals

The overall mean pretest and posttest knowledge score of subjects reveals that posttest mean knowledge score was higher 25.66 with SD of ±5.87 when compared with pretest mean knowledge score value which was 14.56 with SD of ±3.56. Mean, standard deviation and difference value are compared and students paired 't' test is applied at 0.05 level of significance. The calculated 't' value n = 60 i.e. (df=59) is 15.5 and the tabulated value is 2.00. The calculated value much higher than tabulated value at 0.05% level of significance.

SECTION D: Association of posttest knowledge regarding care of client with mechanical ventilator with selected demographic variables.

This section has dealt with the association between levels of knowledge score in relation to demographic variables. Association of knowledge score regarding care of client with mechanical ventilator in relation to age in years reveals that knowledge scores among subjects in 21-30 years of age 2 subjects had average knowledge level, 6 subjects had good knowledge level and 27 subjects had very good knowledge level. In age group of 31-40 years of age 3 subjects had average knowledge level, 3 subjects had good knowledge level and 12 subjects had very good knowledge level. The tabulated chi-square value was 9.49 at df = 4 which is much higher than the calculated '$\chi 2$' i.e. 4.29 at the level of significance i.e. $P < 0.05$. Hence it was interpreted the age in years of subjects were statistically not associated with their knowledge score.

Association of knowledge score regarding care of client with mechanical ventilator in relation to professional qualification. Out of 60 subjects among GNM 4 subjects had average knowledge level, 4 subjects had good knowledge level and 31 subjects had very good knowledge level. In the Basic.B.Sc Nursing 1 subject had average knowledge level, 5 subjects had good level of knowledge, 13 subjects had very good level of knowledge, and Post Basic.B.Sc Nursing 2 subjects had very good level of knowledge whereas no one in the category of good, average, and poor. The tabulated chi-square value was 9.49 (df=4) which is much higher than the calculated chi-square i.e. 3.41 at $P < 0.05$ level of significance. Hence it was interpreted that professional qualification was statistically not associated with their knowledge score.

Association of knowledge score regarding care of client with mechanical ventilator in relation to years of experience. Out of 60 subjects, one subjects had average knowledge score, 5 subjects had good knowledge score and 15 had very good knowledge score among staff nurses with 5 years of experience. Three subjects had average knowledge score, 4 had good knowledge score and fifteen subjects had very good knowledge score in 6-10 years of experience. One subjects had average knowledge score and 4 had very good knowledge score in 11-15 years of experience. Four subjects had very good knowledge score in >15 years of experience.

The tabulated chi-square values was 12.59 (df=6) which is much higher than the calculated i.e. 4.84 at P <0.05 level of significance. Hence it was interpreted that years of experience of subjects was statistically not associated with their knowledge score.

DISCUSSION

The findings of the study was discussed with reference to the objective stated as below. The study was undertaken as, "Effectiveness of planned teaching about knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals."

PRIMARY / GENERAL OBJECTIVES

- To study the effectiveness of planned teaching about knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals.

SECONDARY OBJECTIVE

1. To assess existing knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals.
2. To assess the effectiveness of planned teaching about knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals.
3. To find the association of knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU of selected hospitals with their selected demographical variables.

CONCLUSION

After the detailed analysis, this study leads to the following conclusion that planned teaching on care of client with mechanical ventilator among staff nurses working in ICU was found to be effective in improving the knowledge of subjects. The demographic variables did not show any association with the age in year, gender, professional qualification, year of experience. Hence based on the above finding, it was concluded undoubtedly that the written prepared material by the investigator in the form of planned teaching helped the subject to improve their knowledge regarding care of client with mechanical ventilator among staff nurses working in ICU.

RECOMMENDATIONS

Recommendation for further study based on the finding of the study the following recommendation could be made-

- A study can be conducted to evaluate the effectiveness on a video assisted teaching on knowledge regarding care of client with mechanical ventilator.
- Planned teaching can be conducted on staff nurses working in ICU to assess the knowledge regarding care of client with mechanical ventilator.
- Such studies can be carried out using other teaching strategies like survey study.

- Other descriptive cross sectional study can be conducted on effectiveness of Structured teaching on knowledge regarding care of client with mechanical ventilator.

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