



A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE OF ABG ANALYSIS AMONG STAFF NURSES OF ICU IN SELECTED PRIVATE HOSPITALS OF GUWAHATI, ASSAM

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ABSTRACT

Arterial blood gas analysis is an essential part of diagnosing and managing patient's oxygenation status and acid-base balance. Arterial blood gas analysis and its interpretation gives a view about a patient's oxygenation, acid base balance, pulmonary function and metabolic status and with the help of such parameters nurses will be able to assess and monitor critically ill patients especially in ICU, evaluate the efficiencies of therapies, monitor patient's clinical status as well as to determine treatment needs of the patients. To meet this challenge, nurses must understand the mechanisms underlying acid-base balance and the common causes of acid-base imbalance. Objectives of the study were to assess the knowledge regarding ABG analysis among staff nurses before and after administration of structured teaching programme, to determine the effectiveness of structured teaching programme on knowledge regarding ABG analysis among staff nurses and to find out association of knowledge with selected demographic variables regarding ABG analysis among staff nurses of ICU in selected private hospitals of Guwahati, Assam. A Pre experimental one group pre- test post-test design study was used to accomplish the objectives of the study. The samples were selected using non probability convenience sampling technique. The study was conducted among 68 staff nurses of ICU of selected private hospitals of Guwahati, Assam. Respondents were selected on the basis of inclusion criteria. Pre - test structured questionnaire was used for assessing knowledge regarding Arterial Blood Gas Analysis and after that Structured Teaching Programme regarding ABG analysis was administered on the same day after completion of the pre-test. Post-test was conducted to the same group by using the same structured questionnaire on seventh day. Out of 68 respondents majority 60 (82.24%) of the respondents were in the age groups of 21-31 years, 64(94.12%) of the respondents were female, 32(47.06%) of the respondents were having in Diploma nursing, 32 (47.06%) of the respondents were in Basic B. Sc nursing, 41(60.29%) of the respondents were from Neuro ICU, 37(54.41%) of the respondents were having 1-5 years experience, 30(44.12%) of the respondents were having (3months-1 year) ICU experience, 36(52.94%) of the respondents attended in-service class on ABG Analysis. In pre-test majority of the respondents 38(55.88%) had inadequate knowledge and 30(44.12%) had moderately adequate knowledge but after administration of STP, majority of the respondents 35(51.47%) had moderately adequate knowledge and 33(48.53%) have adequate knowledge. The mean of pre-test knowledge was 12.87. After intervention the mean of post-test knowledge was 21.76. The effectiveness of structured teaching programme was calculated by Z test and value of "Z" was 15.87 at 0.01 level of significance. The association of pre-test knowledge was statistically tested by Chi square test and the result showed that there was significant association of pre-test knowledge score with professional qualification, total working experience, in-service education on ABG analysis.

Conclusion: In pre-test majority of the respondents 38 (55.88%) had inadequate knowledge and 30 (44.12%) had moderately adequate knowledge but after administration of STP, majority of the respondents 35 (51.47%) had moderately adequate knowledge and 33(48.53%) have adequate knowledge. Study indicated that the Structured Teaching Programme was effective in increasing the knowledge level of Staff nurses on ABG analysis.

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INTRODUCTION

Health is considered as one of the most important values in life and health as well as longevity should be protected and enhanced as much as possible. Early detection and treatment is one of the measures to prevent illness and also to reduce complications and death. ABG studies are concerned with respiration, the exchange of gases between the lungs and blood and between blood and tissues.

Arterial blood gas analysis is an essential part of diagnosing and managing a patient's oxygenation status and acid-base balance. Disorders of acid-base balance can create complications in many disease states, and occasionally the abnormality may be so severe so as to become a life-threatening risk factor. Arterial blood gas analysis and its interpretation gives a view about a patient's oxygenation, acid base balance, pulmonary function and metabolic status and with the help of such parameters nurses will be able to assess and monitor critically ill patients especially in ICU, evaluate the efficiencies of therapies, monitor patient's clinical status as

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well as to determine treatment needs of the patients. Based on the ABG results, titration of oxygen therapy like adjusting the level of ventilator support and decision about fluid and electrolyte therapy can be taken. With increasing use of ABG analysis in various wards to aid in medical diagnosis and management, nurses if they can interpret results are often able to initiate interventions and understand the reasons for medical interventions. As Nurses are often the first members of the health care team to see ABG results and an accurate assessment of the relationship between abnormal blood gas findings and a patient's overall clinical condition is a common challenge for critical care nurses. Knowledge about ABG interpretation is essential for the nurses, so that they can analyze each component to avoid overlooking a change that could result in an inaccurate interpretation leading to inappropriate treatment.

Objectives of the Study

1. To assess the knowledge regarding ABG analysis among staff nurses before and after administration of structured teaching programme.
2. To determine the effectiveness of structured teaching programme on knowledge regarding ABG analysis among staff nurses.
3. To find out association of knowledge with selected demographic variables like age, gender, educational qualification, type of ICU, years of experience, exposure to any in-service education on ABG analysis.

REVIEW OF LITERATURE

Indira S, et al. (2017) conducted a descriptive study to assess the knowledge regarding ABG analysis and interpretation of ABG results among staff nurse in NMCH, Nellore. The study was conducted on 30 samples and the result shows that 4 (13.3%) had "A" grade, 7(23.3%) had "B+" grade, 12(40%) had "B" grade, 5(16.7%) had "C" grade and 2(6.7%) had "D" grade knowledge and mean value was 19.0 and SD was 3.5 in staff nurses, which conclude that majority of staff nurses had D grade knowledge

Anil GD et al.(2015) conducted a prospective observational study on severe metabolic acidosis among 100 critically ill patients of JSS Hospital, Mysore and its impact on the outcome. It was found that out of 86 patients who had lactic acidosis, 69 patients expired. Out of 69 patients who had high anion gap acidosis, 47 patients had adverse outcome and a high base deficit is associated with high mortality 79.4 per cent. Out of 55 patients who were on mechanical ventilation 45 of them expired, 37 required vasopressor support and 34 had lactic acidosis. Study reveals that critically ill patients with metabolic acidosis had higher mortality rate.

RESEARCH METHODOLOGY

Research approach: Quantitative research approach.

Design: Pre experimental one group pre- test post-test design.

Dependent variable: Knowledge of staff nurses regarding ABG analysis.

Independent variable: Structured Teaching Programme regarding ABG analysis.

Demographic variable: Age, gender, professional qualification, type of ICU, year of experience (ICU experience

and total experience), exposure to any in-service education on ABG Analysis.

Setting of the study: Study was conducted at two private Hospitals of Guwahati, Assam

Population: Staff nurses.

Target population: Staff nurses of ICU of private hospitals of Guwahati, Assam.

Accessible population: Staff nurses of ICU of selected private hospitals of Guwahati, Assam.

Sample: Staff nurses working in ICU who fulfills the inclusion criteria and present on the day of data collection.

Sample size: 68 staff nurses.

Sampling technique: Samples were selected using non probability convenience sampling technique.

Tools and techniques: The tool used for the study consisted of two sections: Demographic profile and Structured Knowledge questionnaire. Technique used was Self report.

Validity of the tool: Tool was validated by five experts from the field of critical care and five nursing experts from the field of Medical surgical nursing.

Reliability of the tool: The reliability of the tool was done by using split half method where, the reliability (r) of the knowledge questionnaire was 0.82, so the tool was found to be reliable.

Pilot study: Pilot study was conducted on 7 samples.

Main Study: 4th -31st July, 2017.

RESULTS

Table I Frequency and percentage distribution of the respondents according to their age group

n=68		
Age(in years)	Frequency	Percentage
21-31	60	82.24%
31-41	8	11.76%
Above 41	0	0%
TOTAL	68	100%

Table-I depicts that, out of 68 samples majority 60(82.24%) of the respondents were in the age groups of 21-31years, 8(11.76%) of the respondents were in age group of 31- 41 years, and none (0%) of the respondents were in the age group of above 41 years. The results are shown in bar diagram in figure 1.

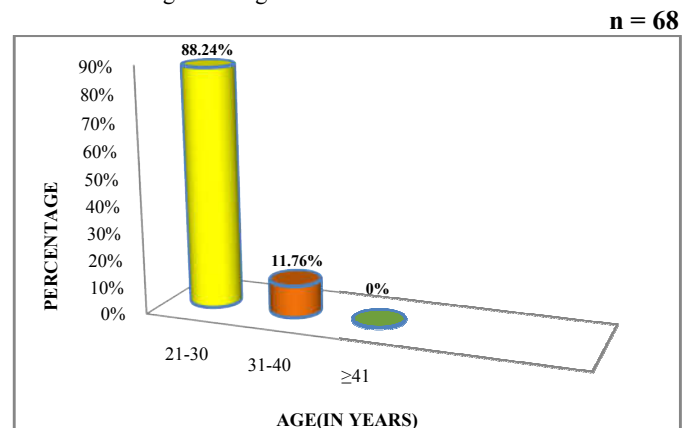


Figure 1 Percentage distribution of the respondents according to their age group

Table II Frequency and percentage distribution of respondents according to gender

n = 68

Gender	Frequency	Percentage
Male	4	5.88%
Female	64	94.12%
TOTAL	68	100%

Table II depict that, out of 68 samples, 4(5.88%) of the ICU staff nurses were male and 64(94.12%) were female. The results are shown in the Pie diagram in figure 2.

n=68

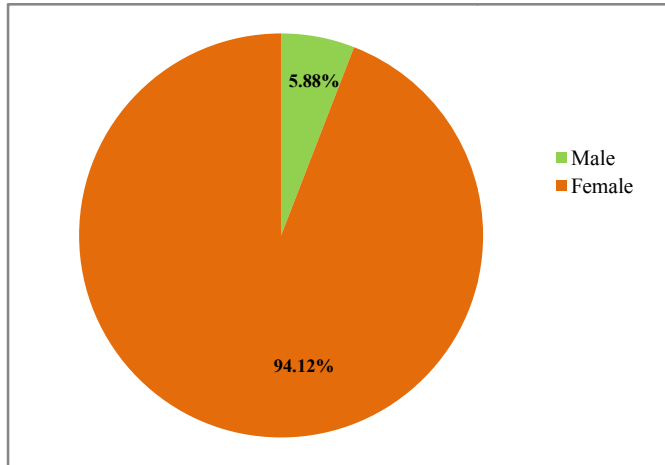


Figure 2 Percentage distribution of the respondents according to gender.

Table III Frequency and percentage distribution of the respondents according to their professional qualification

n=68

Professional Qualification	Frequency	Percentage
Diploma in Nursing	32	47.06%
Post Basic B. Sc. Nursing	4	5.88%
Basic B.sc Nursing	32	47.06%
M. Sc. Nursing	0	0%
TOTAL	68	100%

Table-III depicts that, out of 68 samples 32(47.06%) of the respondents were Diploma nurses, 32 (47.06%) of the respondents were Basic B.Sc. nurses, four (5.88%) were Post Basic B.Sc. Nurses and none (0%) of them were M. Sc. nursing. The data is presented in a form of bar diagram in figure 3.

n=68

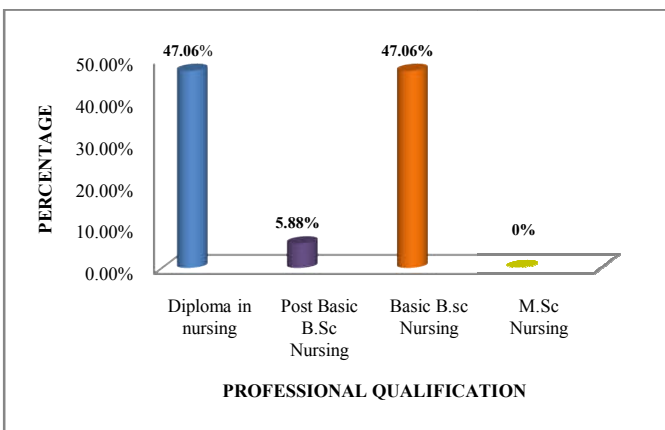


Figure 3 Percentage distribution of the respondents according to their professional qualification

Table IV Frequency and percentage distribution of the respondents according to type of ICU they are working

n = 68		
Type of ICU	Frequency	Percentage
Neuro ICU	41	60.29%
Cardiac ICU	18	26.47%
Others	9	13.24%
Total	68	100%

Table-IV depicts that, out of 68 samples majority 41(60.29%) of the respondents were from Neuro ICU, 18(26.47%) of the respondents were from Cardiac ICU, nine (13.24%) were from other ICU's. The data is presented in the form of bar diagram in figure 4.

n=68

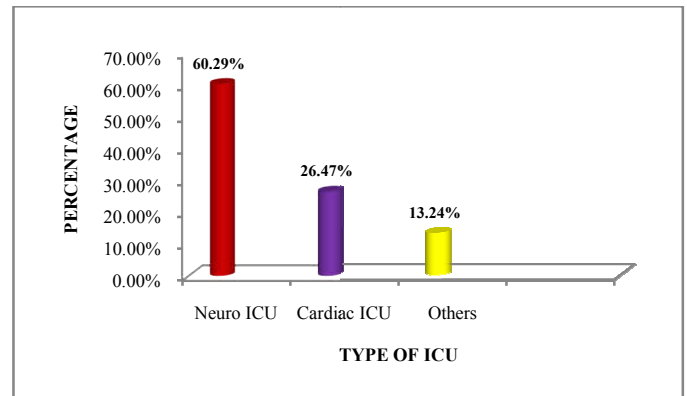


Figure 4 Percentage distribution of the respondents according to type of ICU they are working.

Table V Frequency and percentage distribution of the respondents according to years of experience

n=68

Years of experience	Frequency	Percentage
3 months -1year	20	29.41%
1 year -5 years	37	54.41%
5years-10years	8	11.77%
≥10 years	3	4.41%
TOTAL	68	100%

Table-V depicts that, out of 68 samples majority 37(54.41%) of the respondents were having 1-5 years of experience, 20(29.41%) of the respondents were having 3months-1 year of experience, eight (11.77%) of respondents were having 5-10 years, and three (4.41%) of respondent were having ≥10 years of experience. The results are shown in bar diagram in figure 5.

n=68

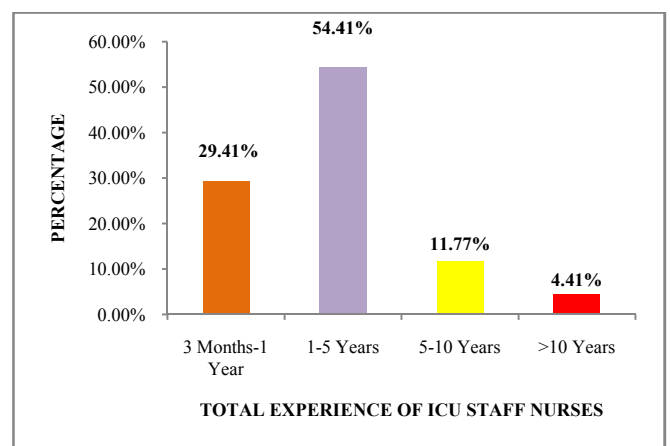


Figure 5 Percentage distribution of the respondents according to total years of working experience

Table VI Frequency and percentage distribution of respondents according to working experience (only in ICU) **n=68**

ICU Experience	Frequency	Percentage
3 months -1year	30	44.12%
1 year -5 years	28	41.18%
5years-10years	9	13.23%
≥10 years	1	1.47%
TOTAL	68	100%

Table-VI depicts that, out of 68 samples majority 30(44.12%) of the respondents were having 3months-1 year experience, 28(41.18%) of the respondents were having 1-5 years of experience, nine(13.23%) of respondents were having 5-10 years of experience, and one (1.47%) of respondent was having ≥10 years of experience. The results are shown in bar diagram in figure 6.

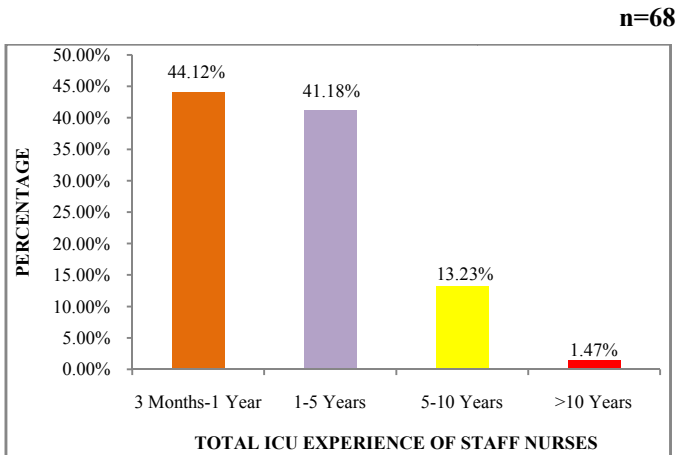


Figure 6 Percentage distribution of the respondents according to total years of working experience in ICU

Table VII Frequency and percentage distribution of respondents according to in-service education on arterial blood gas analysis **n=68**

In-service education on ABG Analysis	Frequency	Percentage
Yes	36	52.94%
No	32	47.06%
TOTAL	68	100%

Table-VII depicts that, out of 68 samples, majority 36(52.94%) of the respondents have attended in- service class on ABG Analysis and rest 32(47.06%) of the respondents have not attended any in-service class. The results are shown in pie diagram in figure 7.

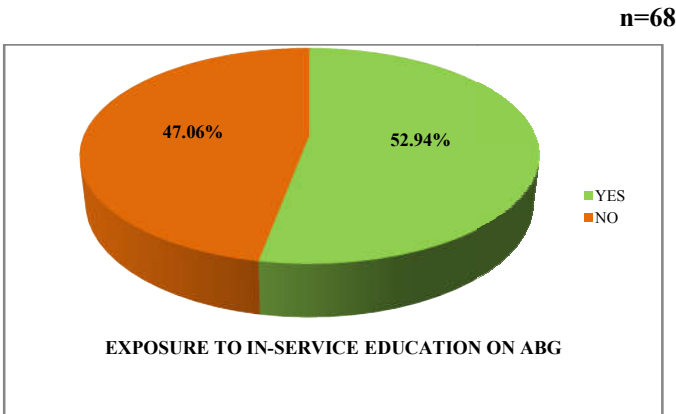


Figure 7 Percentage distribution of respondents according to exposure to in-service education on arterial blood gas analysis

Table VIII Frequency and percentage distribution of respondents according to number of session of in-service education on arterial blood gas analysis **n=36**

Number of sessions of In-service education on ABG Analysis	Frequency	Percentage
1 session	32	88.88%
2 sessions	22	5.56%
>2 sessions	2	5.56%
TOTAL	36	100%

Table-VIII depicts that out of 36 samples, majority 32(88.88%) of the respondents have attended one session of in-service class on ABG Analysis, 22 (5.56%) attended two sessions and rest two (5.56%) attended more than two sessions. The result is shown in pie diagram in figure 8.

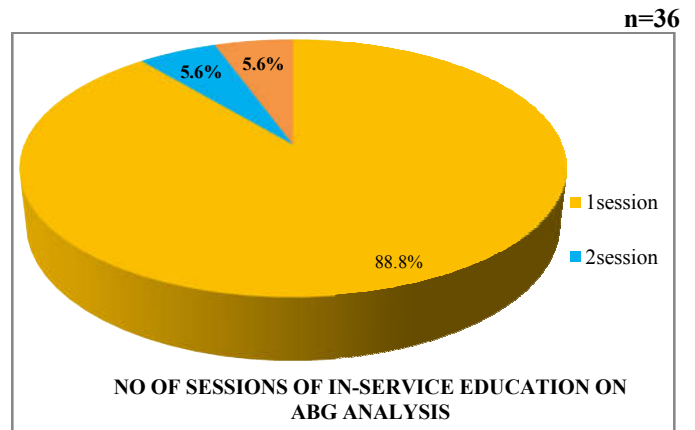


Figure 8 Percentage distribution of respondents according to number of sessions of in-service education on arterial blood gas analysis

Table IX Frequency and percentage distribution of staff nurses according to their level of knowledge regarding arterial blood gas analysis before and after administration of structured teaching programme **n=68**

Variable	Inadequate		Moderately Adequate		Adequate	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Pre-test knowledge	38	55.88%	30	44.12%	0	0%
Post-test knowledge	0	0%	35	51.47%	33	48.53%

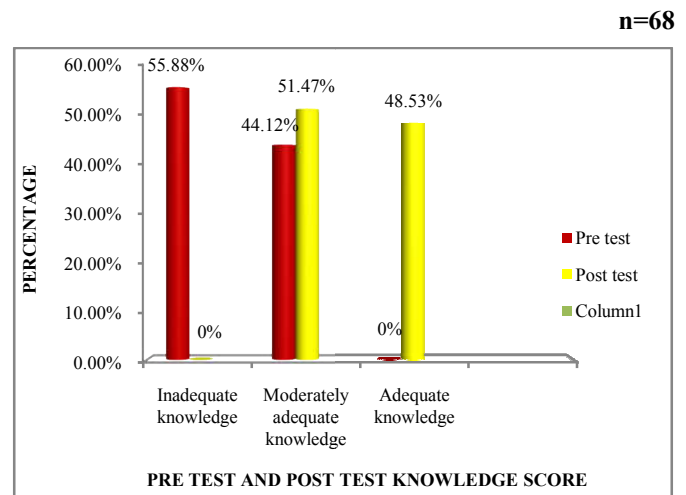


Figure 9 Percentage distribution of staff nurses according to level of knowledge regarding arterial blood gas analysis.

The data presented in Table-IX depicts that, out of 68 samples, in pre-test majority 38(55.88%) of respondents had Inadequate

knowledge and remaining 30(44.12%) had moderately adequate knowledge. After administration of STP, in post-test majority 35(51.47%) had moderately adequate knowledge, remaining 33 (48.53%) had adequate knowledge and none had inadequate knowledge regarding ABG analysis. Data are presented in bar diagram in figure 9.

Table X Evaluation of effectiveness of structure teaching programme on knowledge regarding Arterial blood gas analysis among the staff nurses

The following hypothesis was formulated to test the effectiveness of structured teaching programme regarding Arterial blood gas analysis among the staff nurses.

H₀₁: There is no significant difference between the mean pre-test knowledge score and mean post-test knowledge score regarding arterial blood gas analysis of staff nurses.

H₁: The mean post-test knowledge score of staff nurses is significantly higher than the mean pre-test knowledge score regarding arterial blood gas analysis.

n=68

Knowledge	Mean	SD	P-Value	Calculated Z-value	Table Z-value
Pre-test	12.87	3.71	0.01	15.87	2.33
Post-test	21.76	2.74			

The Table-X depicts that, the mean knowledge score in pre-test is 12.87 with standard deviation 3.71. In post-test, the mean knowledge score is 21.76 with standard deviation 2.74. The improvement is statistically tested by Z test. The calculated value of “Z” 15.87 is higher than the tabulated value 2.33 at 0.01% of level of significant. Therefore, H₁ is accepted which indicates that the mean post test knowledge is significantly higher than the mean pretest knowledge. Hence, STP on Arterial blood Gas analysis is effective.

Table XI Association of pre-test knowledge with selected demographic variables

Chi square test was used to assess the association of pre-test knowledge with selected demographic variables.

H₀₂ -There is no significant association between pre-test knowledge score and selected demographic variables.

n=68

1.Age in years	Below mean	Above mean	Total	Cal χ^2	Tab χ^2	df	Remark
21-31	27	33	60	1.15	5.99	2	NS
31-41	2	6	8				
≥41	0	0	0				
TOTAL	29	39	68				
2. Gender	Below mean	Above mean	Total	Cal	Tab	df	Remark
Male	1	3	4	0.54	3.84	1	NS
Female	28	36	64				
TOTAL	29	39	68				
3. Professional qualification	Below mean	Above mean	Total	Cal	Tab	df	Remark
Diploma in Nursing	20	12	32	9.47	5.99	2	S
Basic B.Sc Nursing	8	32	32				
Post Basic B.Sc and M.Sc Nursing	1	3	4				
TOTAL	29	39	68				
4. Type of ICU	Below mean	Above mean	Total	Cal	Tab	df	Remark
Neuro ICU	17	24	41	2.79	5.99	2	NS
Cardiac ICU	6	12	18				
Others	6	3	9				
TOTAL	29	39	68				

5. Total working experience	Below mean	Above mean	Total	Cal	Tab	df	Remark
3 months-1 year	13	7	20	6.04	5.99	2	S
1 year-5 years	13	24	36				
>5 years	3	8	11				
TOTAL	29	39	68				
6.Total working experience in ICU	Below mean	Above mean	Total	Cal	Tab	df	Remark
3 months-1 year	17	13	30	5.05	5.99	2	NS
1 year-5 years	10	18	28				
>5years	2	8	10				
TOTAL	29	39	68				
7. In-service education	Below mean	Above mean	Total	Cal	Tab	df	Remark
Yes	9	27	36	9.72	3.84	1	S
No	20	12	32				
TOTAL	29	39	68				

For calculation purpose, clubbing of the scores was done and chi square formula was used.

NS=Not Significant, S=Significant, Cal-value= calculated value of chi square, Tab= Table value of chi square, df= degree of freedom.

CONCLUSION

In pre-test majority of the respondents 55.88% had inadequate knowledge and 44.12% had moderately adequate knowledge but after administration of STP, majority of the respondents 51.47% had moderately adequate knowledge and 48.53% have adequate knowledge. The mean of pre-test knowledge was 12.87. After intervention the mean of post-test knowledge was 21.76. The calculated value of “Z” of knowledge was 15.87 which showed structured teaching programme was effective. There was significant association between pre-test knowledge with the selected demographic variables like professional qualification, total years of experience and exposure to in-service education.

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