

A Study to Assess the Structured Teaching Program on Knowledge about Arterial Blood Gas Analysis among the Staff Nurses Working in Critical Care Unit of Selected Hospital, Barabanki

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ABSTRACT

Health is considered as one of the most important values in life. It is a key factor and is regarded as precious. Health as well as longevity should be protected and enhanced as much as possible. Early detection and treatment are one of the measures to prevent illness and also to reduce complications and death. Early diagnosis is key to better management. The samples were 30 staff nurses, selected by convenient sampling from hind Hospital, Barabanki. Pre-experimental one group pre-test post-test design was used in the study. The data was collected by administering structured knowledge questionnaire followed by structured teaching program on knowledge regarding arterial blood gas analysis. After 7 days, post-test was done to assess the effect of STP. The study concluded that there is a need to educate the staff nurses about arterial blood gas analysis.

KEYWORD: Effect, Structured Teaching Programme, Knowledge, arterial blood gas analysis

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1. INTRODUCTION

Arterial blood gas analysis is a basic and useful laboratory test for the critically ill patients. It is an essential investigation for assessing ventilation, oxygenation and acid base status among critically ill patients. These three are closely interrelated physiological parameters which maintain pH homeostasis. Measurement of arterial blood gas involves analysis of components: pH, partial pressure (PP), Base excess (BE), Bicarbonate (HCO₃), Electrolytes, Haemoglobin (Hb) and Glucose. Interpreting an arterial blood gas (ABG) is a crucial skill for physicians, nurses, respiratory therapists, and other health care personnel. Any deviation from a normal value will indicate that the client is experiencing an acid base imbalance. Disorders of acid-base balance can lead to severe complications and occasionally the abnormality may be so severe that it can lead to life threatening condition.

Arterial blood gases are the most commonly performed laboratory test in intensive care unit and there are no more definitive measurements than arterial-blood-gas values when assessing the need for respiratory therapy. Arterial blood gas studies aid in assessing the ability of the lungs to provide adequate oxygen and remove carbon dioxide, and the ability of the kidneys to reabsorb or excrete bicarbonate ions to maintain normal body PH. Moreover, it evaluates the serum electrolytes sodium and potassium.

Arterial blood gases are valuable only if obtained properly and measured carefully. Because there are corrupted factors in arterial blood gas sampling change significantly the results and adversely affect patient-care decisions when the magnitude of the error is clinically important. Some of studies conducted to determine the impact of pre-analytical factors that influence on the validity of results (Flynn, 2008) and in what extent these factors affecting the

result of arterial blood gases and how to overcome, that helps to give true value for each affected variable, these factors may be related to the preparation of syringe, handling the sample, sending time to the lab. And storage temperature. Other factors related to consider and document the patient pre-sampling condition such as the procedures which done before the time of sample, body temperature, blood transfusion, oxygen supplementation.

2. Review of literature

In this present study the review of literature is organized under the following sections:

- Review related to knowledge regarding Arterial Blood Gas analysis among staff nurses.
- Review related to the effect of structured teaching programme about Arterial Blood Gas analysis

3. Problem statement

“A study to assess the structured teaching program on knowledge about arterial blood gas analysis among the staff nurses working in critical care unit of selected hospital, Barabanki”

4. Objective

- Assess the level of knowledge about Arterial Blood Gas Analysis among the staff nurses

5. Research Methodology

Research Approach	Quantitative research approach
Design	Pre-experimental one group pre-test-post-test design
Setting	Hind hospital
Population	Staff nurse
Sample Size	30
Sample technique	Non-probability convenience sampling techniques.
Tool	Structured questionnaire

6. Development and description of the tool

The tool was prepared by the investigator after an extensive review of research and non-research literature about Arterial Blood Gas analysis and discussion with expert.

Description of the tool:

Data collection instrument consist of the following sections:

Part: 1 Demographic Performa:

It consists of demographic variables like Age, Gender, Qualification, and Year of experience in Critical Care Unit, Previous knowledge.

Part: 2 structured knowledge questionnaires about Arterial Blood Gas analysis. This tool consists of 30 items in five sections. It covered the following aspect.

Section A: General information, Section B: Pre Procedural, Section C: Intra procedural, Section D: Post procedural Section E: Interpretation

Scoring techniques:

Part I: The scoring key was prepared by coding the demographic variables to assess the background of the samples and find out the association of level of knowledge with selected demographic variables by statistical analysis.

Part II: For each question four options were given and among those only one correct answer was present. There were 30 questions and for each correct answer the score is 1. For incorrect/ unanswered one, score was accorded 0. The maximum score of the knowledge questionnaire was 30.

working in the Critical Care Unit at selected Hospital.

- Evaluate the effect of Structure Teaching Programme on level of knowledge about Arterial Blood Gas Analysis among the staff nurses working in the Critical Care Unit at selected Hospital.
- Association between level of knowledge about Arterial Blood Gas analysis among the staff nurses working in the Critical Care Unit with selected demographic variables.

HYPOTHESIS:

The study attempted to examine the following hypothesis:

- **H1:** There will be significant effect of Structure Teaching Programme on level of knowledge about Arterial Blood Gas analysis among staff nurses working in Critical Care Unit at $p < 0.05$ level of significance.
- **H2:** There will be significant association between level of knowledge with selected demographic variable about Arterial Blood Gas analysis among staff nurses working in Critical Care Unit at $p < 0.05$ level of significance.

7. Data analysis and interpretation

PART I: Distribution of demographic characteristics of staff nurses.

PART II: Assessment of level of knowledge about Arterial Blood Gas analysis among staff nurses.

PART III: Analysis of effect of Structured Teaching Programme about Arterial Blood Gas analysis.

Section A: Analysis of mean, SD and mean percentage of pre-test and post-test knowledge score.

Section B: Area wise mean, SD and mean percentage of pre-test and post-test knowledge score.

Section C: Analyzing the effect of Structured Teaching programme about Arterial Blood Gas analysis.

PART IV: Association of pre-test and post-test knowledge among staff nurses with selected demographic variables.

PART I: Distribution of demographic characteristics of staff nurse.

Table1: Frequency and percentage distribution according to demographic variables of staff nurses.

S. NO	DEMOGRAPHIC DATA	CATEGORY	FREQUENCY (f)	PERCENTAGE (%)
1.	Age (in years)	20-25 year	8	26.7%
		26-30 year	10	33.3%
		31-35 year	9	30.0%
		36 and above	3	10.0%
2.	Gender	Male	9	30%
		Female	21	70%
3.	Qualification	GNM	16	53.3%
		BSc Nursing	4	13.3%
		Post Basic nursing	10	33.3%
4.	Years of experience in Critical Care Unit	<1 year	2	6.7%
		1 year - <3 years	8	26.7%
		3 years - <5 years	12	40.0%
		5 years - <7 years	6	20%
		> 7years	2	6.7%
5.	Previous knowledge	No	22	73.3%
		Yes	8	26.7%

Table 1 reveals the percentage distribution of staff nurses according to the demographic variables Out of 30 samples 8 (26.7%) were belonged to age group 20-25 years, 10 (33.3%) were belonged to age group 26-30 years, 9 (30.0%) were belonged to age group 31-35 years and 3 (10.0%) were belonged to age group 36 and above.

With respect to the gender 9 (30%) were male and 21 (70%) were female.

With regards to the qualification 16 (53.3%) were undergone GNM course, 4 (13.3%) were undergone BSc nursing course and 10 (33.3%) were undergone post basic nursing course.

With respect to the year of experience in Critical Care Unit 2 (6.7%) were having less than 1 years of experience, 8 (26.7%) were having experience between 1year - <3 years, 12 (40.0%) were having experience between 3 years - <5 years, 6 (20%) were having experience between 5 years - <7 years and 2 (6.7%) were having experience more than 7 years.

With respect to the previous knowledge 22 (73.3%) don't have any previous knowledge regarding arterial blood gas analysis and 8 (26.7%) were having some knowledge regarding arterial blood gas analysis.

PART II: Assessment of level of knowledge about Arterial Blood Gas analysis among staff nurses.

TABLE 2: Assessment of level of knowledge about Arterial Blood Gas analysis among staff nurses

LEVEL OF KNOWLEDGE	SCORE	FREQUENCY	PERCENTAGE
ADEQUATE	21-30	00	00%
MODERATE	11-20	26	86.7%
INADEQUATE	0-10	4	13.3%

The table above shows the pretest knowledge score of 30 subjects, 26 (86.7%) had moderate knowledge and 4 (13.3%) had inadequate knowledge.

TABLE: 3 Assessment of level of knowledge about Arterial Blood Gas analysis among staff nurses.

CATEGORY	SCORE	FREQUENCY	PERCENTAGE
ADEQUATE	21-30	24	80%
MODERATE	11-20	06	20%
INADEQUATE	0-10	00	00%

The table above shows the post-test knowledge score of 30 subjects, 24 (80%) had adequate knowledge and 06 (20%) had moderate knowledge.

PART III: Analysis of effect of Structured Teaching Programme about Arterial Blood Gas analysis.

Section A: Analysis of mean, SD and mean percentage of pretest and posttest knowledge score.

Table 4: Analysis of mean, SD and mean percentage of pretest and posttest knowledge score.

Total	Min- Max score	Pretest knowledge			Posttest knowledge		
		Mean score	Percentage	SD	Mean score	Percentage	SD
	0-30	13.96	46.5%	3.39	23.00	76.6%	2.36

The above table displays the comparison of mean, SD and percentage of pretest and posttest knowledge scores. It reveals that the mean percentage of pretest score was 46.5% with total mean and SD 13.96 ± 3.39 , which was increased in posttest as mean percentage score of 76.6% with total mean and SD 23.00 ± 2.36 . With respect to the area of 'interpretation', it shows that the mean percentage of pre-test score was 41.08% with total mean and SD 4.93 ± 1.96 , which was increased in post-test as mean percentage score was 72.16% with total mean and SD 8.66 ± 1.80 .

Section C: Analyzing the effect of Structured Teaching programme about Arterial Blood Gas analysis.

Table 5: Comparison of pretest and posttest knowledge scores among staff nurses about Arterial Blood Gas analysis using Paired t- test.

CATEGORY	Mean	SD	Mean difference	Df	Paired t value	P value	Table value at 0.05
Pretest	13.96	3.39	9.04	29	-12.547	.000	2.05
Posttest	23.00	2.36					

** Significance at 0.05 level

The above table shows the comparison of knowledge regarding Arterial Blood Gas analysis among staff nurses working in critical care unit before and after structured teaching programme. The mean pretest knowledge score regarding Arterial Blood Gas analysis was 13.96 with a standard deviation of 3.39. After giving STP the mean score was increased to 23.00 with a standard deviation of 2.36. Increased in knowledge score was statistically tested by paired t test. The calculated t value -12.54 is highly significant with the degree of freedom of 29 at $p < 0.05$ which shows that STP was effective for improving the knowledge among labor room staff nurses.

PART IV: Association of pretest and post-test knowledge among staff nurses with selected demographic variables.

Association of pretest knowledge score of staff nurses with selected demographic variables.

The association of pretest knowledge score of staff nurses with selected demographic variables like age, gender, qualification, year of experience in critical care unit, and previous knowledge. The association was statistically tested by chi square. It indicated that the chi square values computed between the knowledge score and age ($\chi^2 = 17.67$) found to be highly significant at 0.05 level of significance and with gender ($\chi^2 = 4.43$), qualification ($\chi^2 = 1.53$), year of experience ($\chi^2 = 14.85$), and previous knowledge

($\chi^2 = 0$) were found to be statistically non-significant at 0.05 level of significance.

Association of posttest knowledge score of staff nurses with selected demographic variables. The association of posttest knowledge score of staff nurses with selected demographic variables like age, gender, qualification, year of experience in critical care unit, and previous knowledge.

The association was statistically tested by chi square. It indicated that the chi square values computed between the knowledge score and qualification ($\chi^2 = 12.18$) found to be highly significant at 0.05 level of significance and with age ($\chi^2 = 5.44$), gender ($\chi^2 = 0.62$), year of experience ($\chi^2 = 4.7$), and previous knowledge ($\chi^2 = 0.17$) were found to be statistically non-significant at 0.05 level of significance.

DISCUSSION:**The first objective of the study states that to assess the level of knowledge regarding Arterial Blood Gas analysis among staff nurses working in critical care unit.**

In the present study, on assessing the pre-test knowledge of the staff nurses about Arterial Blood Gas analysis, 4 (13.3%) were having inadequate knowledge, 26 (86.7%) were having moderate knowledge. The mean pretest score was 13.96. After giving structured teaching programme about Arterial Blood Gas analysis, the posttest knowledge score increased to, 24 (80%) were having adequate knowledge, 06(20%) were having moderate knowledge score. The mean posttest score was 23.

This study was supported by a pre experimental study conducted to assess the effectiveness of structured teaching programme on knowledge regarding Arterial Blood Gas analysis among staff nurses. The study was done among 50 staff nurses selected by non-probability purposive sampling technique. According to category Poor, Average, Good, and Excellent. In pre-test the majority of sample has good knowledge that is 50% To 75% but no one was at excellent level where as post-test the good knowledge was improve to 38% sample in excellent level. The Pre-test and post-test mean knowledge scores about arterial blood gas analysis of staff nurses was 11.50 and 15.98 respectively.

The second objective of the study states that to assess the effect of structured teaching programme about Arterial Blood Gas analysis among staff nurses working in Critical Care Unit.

The mean pretest score about Arterial Blood Gas analysis was 13.96 and standard deviation is 3.39. After rendering structured teaching programme, the mean score increased to 23.00 with standard deviation of 2.36. The significance of structured teaching programme about Arterial Blood Gas analysis was assessed using the paired t test (dependent t test). The calculated t value for knowledge regarding Arterial Blood Gas analysis is -12.54 and P value is .000 which is highly significant at 0.05 levels. As the calculated value of “t” at 29 degree of freedom was greater than the table value at 0.05 level of significance.

The finding of the study is supported by an evaluative study to assess the effectiveness of structured teaching programme on knowledge Arterial Blood Gas analysis among the staff nurses at selected hospital, Chennai. 30 samples were selected using purposive sampling technique. The pre-test mean value is 19.5 and the standard deviation value is 3.03. The post-test mean value is 25.1 and standard

deviation value is 2.14. The mean difference is 5.6 and the standard deviation difference is 9. The Paired “t” value is 8.4, which is statistically significant at $p < 0.001$.

CONCLUSION:

The above study was undertaken to assess the knowledge on ABG Analysis among staff nurses. If they are able to interpret correctly can prevent complications, keep away from errors and help in improving the condition of the patient. So, the study motivates staff nurses in improving knowledge on ABG analysis and ultimately improve the patient care and quality of nursing care. It becomes vital for the nurses working in critical care departments should have additional knowledge on ABG Analysis in order to save the patients from developing lot of complications.

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