" THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE OF III YR B.SC NURSING STUDENTS REGARDING ASSESSMENT OF ARTERIAL BLOOD GAS ANALYSIS AND ITS INTERPRETATION IN SELECTED NURSING COLLEGES AT DAVANGERE".

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Background and Objectives

In modern era caring becomes accountability in health care settings need to be well knowledge to provide quality care and satisfy the needs of patient. An arterial blood gas analysis is a blood test that is performed using blood from an artery. Blood gas analysis is often used to identify the specific acid–base disturbance and the degree of compensation that has occurred. The analysis is usually based on an arterial blood sample; the proper application of the concepts of acid–base balance will help the healthcare provider not only to follow the progress of a patient, but also to evaluate the effectiveness of care being provided. considering this the investigator felt the need to assess " THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE OF III YR B.SC NURSING STUDENTS REGARDING ASSESSMENT OF ARTERIAL BLOOD GAS ANALYSIS AND ITS INTERPRETATION IN SELECTED NURSING COLLEGES AT DAVANGERE".

The objectives of the study were:

1. To assess the knowledge of III yr B.sc (N) students regarding assessment of arterial blood gas analysis and its interpretation before and after structured teaching programme.
2. To evaluate the effectiveness of structured teaching programme on knowledge of arterial blood gas analysis and its interpretation by comparing pre-test and post-test score.
3. To identify association between selected socio demographic variable of III yr B.sc (N) students with knowledge scores.

Methods

Pre experimental single group pretest design with evaluative approach was used. Study was carried out in Raghavendra college of nursing, Davangere, using simple random sampling. 60 III yr B.sc (N) students were selected as samples. Data was collected by a Structured interview schedule, which includes demographic data, and 30 items related to General Information (5), Arterial blood gas (6), Acid base disorders (7) and Arterial blood gas interpretation(12). structured teaching programme was conducted after assessing the pre-test. A post test was conducted after 7 days with same tool.

Results

Findings reveal that the among 60 respondents majority 29(48.3%) of them were 20-21yrs age group. 34(56.7%) of them were female, 23(38.4%) of them were got information from Seminars and workshops,

Pre test revealed that III yr B.sc (N) students are having low level of knowledge with a mean score of 18.26 out of 30. After giving STP post test score increased to 23.56 which show the effectiveness of STP. It has been found that variables like age, sex and source of information shows a significant no association with pre test knowledge level.

Interpretation and conclusion

As the mean post test score is significantly higher than that of the pre-test it is evident that the knowledge of III yr B.sc (N) students was improved after the educational

intervention. The tool developed can be used to identify individuals in need of educational intervention as well as to assess the effectiveness of assessment of arterial blood gas analysis and its interpretation. Implications of various aspects of nursing care addressed and recommendations for the future research are discussed.

Key words

Assessment of arterial blood gas analysis and its interpretation**,** structured teaching programme, III yr B.sc (N) students.

INTRODUCTION

Acid-base balance refers to the homeostasis of the hydrogen ion concentration in extracellular fluid. The slightest variation in the hydrogen ion concentration causes marked alterations in the rate of cellular chemical reactions. The pH symbol is used to indicate the hydrogen ion concentration of body fluids; 7.35 to 7.45 is the normal pH range of extracellular fluid. Hydrogen ions (H+), which carry a positive charge, are protons. Depending on the number of hydrogen ions present, a solution can be either acidic, neutral, or alkaline. The body has three main control systems that regulate acid-base balance to counter acidosis or alkalosis: the buffer systems; respiration; and renal control of hydrogen ion concentration.

A study was done to assess the ability of ICU nurses to articulate respiratory physiology to provide rationale for their clinical decision-making and secondly, the barriers that limit the articulation of this knowledge. Using an evaluation methodology, multiple methods were employed to collect data from 27 ICU nurses who had completed an ICU education programme . Quantitative analysis showed that nurses articulated a low to medium level of knowledge of respiratory physiology. Thematic analysis identified the barriers limiting this use of respiratory physiology as being inadequate coverage of concepts in some ICU programmes; limited discussion of concepts in clinical practice; lack of clinical support; lack of individual professional responsibility; nurses' high reliance on intuitive knowledge; lack of collaborative practice; availability of medical expertise; and the limitations of clinical guidelines and protocols.

NEED FOR THE STUDY

Disorders of acid–base balance (acidosis and alkalosis) can lead to severe complications in many disease states, and occasionally the abnormality may be so severe as to become a life-threatening risk factor. The process of analysis and monitoring of arterial blood gas (ABG) is an essential part of diagnosing and managing the oxygenation status and acid–base

balance of the high-risk patients, as well as in the care of critically ill patients in the Intensive Care Unit. The proper application of the concepts of acid–base balance will help the healthcare provider not only to follow the progress of a patient, but also to evaluate the effectiveness of care being provided.

A study was conducted to describe structure and function of a personal computer based blood gas interpretation program (ABG consultant) developed for nurses and to test educational impact and user acceptance regarding arterial blood gas interpretation. The pre-test post-test control group design was used where the nurses were divided into two group; the first group was subjected to pre-test and then ABG consultant was made available for them for 2 months and then post test was done. The second group of nurses undergone same pre-test and had no access to the ABG consultant and the result showed an increase in the score by 4.8 points in the first group($p<0.0001$) and by 1.3 points ($p<0.16$) in second group. The results have shown that exposure to the ABG-consultant has increased the blood gas knowledge of the ICU nurses.

PROBLEM STATEMENT

"A STUDY TO ASSESS THE EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE OF III YR B.SC NURSING STUDENTS REGARDING ASSESSMENT OF ARTERIAL BLOOD GAS ANALYSIS AND ITS INTERPRETATION IN SELECTED NURSING COLLEGES AT DAVANGERE".

OBJECTIVES OF THE STUDY

4. To assess the knowledge of III yr B.sc (N) students regarding assessment of arterial blood gas analysis and its interpretation before and after structured teaching programme.
5. To evaluate the effectiveness of structured teaching programme on knowledge of arterial blood gas analysis and its interpretation by comparing pre-test and post-test score.
6. To identify association between selected socio demographic variable of III yr B.sc (N) students with knowledge scores.

ASSUMPTIONS

a) Nursing students may have some knowledge regarding arterial blood gas analysis and its interpretation.

b) The knowledge questionnaires may be efficient to measure the pre - test as well as post test knowledge of nursing students regarding arterial blood gas analysis and its interpretation.

c) Structured teaching programme may be effective in improving the knowledge of IIIyr B.Sc nursing students in gaining knowledge on arterial blood gas analysis and its interpretation which in return will be utilized in their regular practice.

HYPOTHESIS

H1: There will be a significant difference between pre-test and post-test knowledge level of students regarding arterial blood gas analysis and its interpretation.

H2: There will be a significant association between the knowledge level of students regarding arterial blood gas analysis and its interpretation, with their selected social demographic variables.

METHOD OF DATA COLLECTION :-

1. **Research Design:-**The research design for the study will be pre-experimental, with one group pre test – post test design..
2. **Research Setting: -** Selected nursing colleges , Davangere
3. **Variables Under Study:**

   a)Independent variable : Structured Teaching Programme for III yr B.sc nursing student

   b)Dependent Variable : Knowledge regarding ABG analysis and Its interpretation

   c)**Demographic variable** : Age, Gender and sources of information.

4. **Population:-** The III year B.Sc Nursing students of Selected nursing colleges , Davangere.
5. **Sample Size:-** Total of 60 III Year B.sc Nursing students.
6. **Criteria for selection sample**

   a) **Inclusion criteria**

      i. Student who are studying III year BSc(N).
      ii. Students who are willing to participate.
      iii. Students who are regular attending college.

   b) **Exclusion Criteria**

      i. Students who are not willing to participate.
      ii. Students who are not available at the time of data collection.

iii. Students who are severely ill at the time of data collection.

7. **Sampling Technique:-** Probability sampling technique is used in which simple Random sampling for the selection of subjects will be followed.
8. **Collection of Data:-** Questionnaire method is planned For Collection of data by using structured questionnaires.
9. **Tools for data collection:-**

Part 1- Socio demographic data sheets consisting of demographic variables

Part 2-Structured knowledge questionnaire to assess knowledge of III yr B.sc nursing student regarding assessment of arterial blood gas analysis and its interpretation.

PLAN FOR DATA ANALYSIS:-

Descriptive Statistics: The descriptive statistics analysis includes percentage, Frequency, Mean, Standard Deviation for the III year B.Sc Nursing students regarding ABG analysis and interpretation.

Inferential Statistics:

1. Paired t-test will be used to compare the pre-test and post-test knowledge scores.

2. The association between the interpretive scores and the selected variables will be done using Chi-square test.

ETHICAL CONSIDERATION:

1. **Informed Concern:-**

Informed concerned will be obtained from chosen sample.

2. **Ethical Consideration:-**

It is already obtained from the authority.

Content validity of the tool was obtained on the basis of expert on the appropriateness of items in the tool. Reliability of the tool was established by Split half method by using Spearman's Brown Prophecy formula and was found to be(r=0.82). A pilot study was conducted prior to the actual study in the Kumuda institute of nursing sciences, Davangere, setting for finding out the feasibility of administration of tool and study.

RESULT

Result of the study were organized in the following ways

Part-I:-

Frequency and percentage distribution of selected socio-demographic variables

Table 1: Frequency and percentage distribution according to Age in years.

SL. NO.	AGE IN YEARS	FREQUENCY	PERCENTAGE (%)
1.	**18-19 yrs.**	-	-
2.	**20-21 yrs.**	29	48.3
3.	**22-23 yrs.**	26	43.3
4.	**24 yrs and above**	5	8.4
	TOTAL	60	100

The data represented in the fig shows that 29(48.3%) of them were 20-21yrs old, 26(43.3%) of them were 22-23yrs, 5(8.4%) of them were 24 yrs and above and none of them were 18-19 yrs age old.

TABLE 2: Frequency and percentage distribution according to Sex

SL. NO.	SEX	FREQUENCY	PERCENTAGE (%)
1.	**Male**	26	43.3
2.	**Female**	34	56.7
	TOTAL	60	100

The data represented in pie chart shows that 26(43.3%) of them were male, 34(56.7%) of them were female.

Table 3: Frequency and percentage distribution according to source of information

SL. NO.	SOURCE OF INFORMATION	FREQUENCY	PERCENTAGE (%)
1.	**Mass media**	8	13.3
2.	**Journals**	20	33.3

3.	**Seminars and workshops**	23	38.4
4.	**Health personnel**	9	15
	TOTAL	60	100

The data represented in bar chart shows that 8(13.3%) of them were got information from mass media, 20(33.3%) of them were got information from Journals, 23(38.4%) of them were got information from Seminars and workshops, and 9(15%) were got information from Health personnel.

Part-II: - Assessment of level of knowledge in Pre test

Table 4: KNOWLEDGE SCORE REGARDING ASSESSMENT OF ARTERIAL BLOOD GAS ANALYSIS AND ITS INTERPRETATION

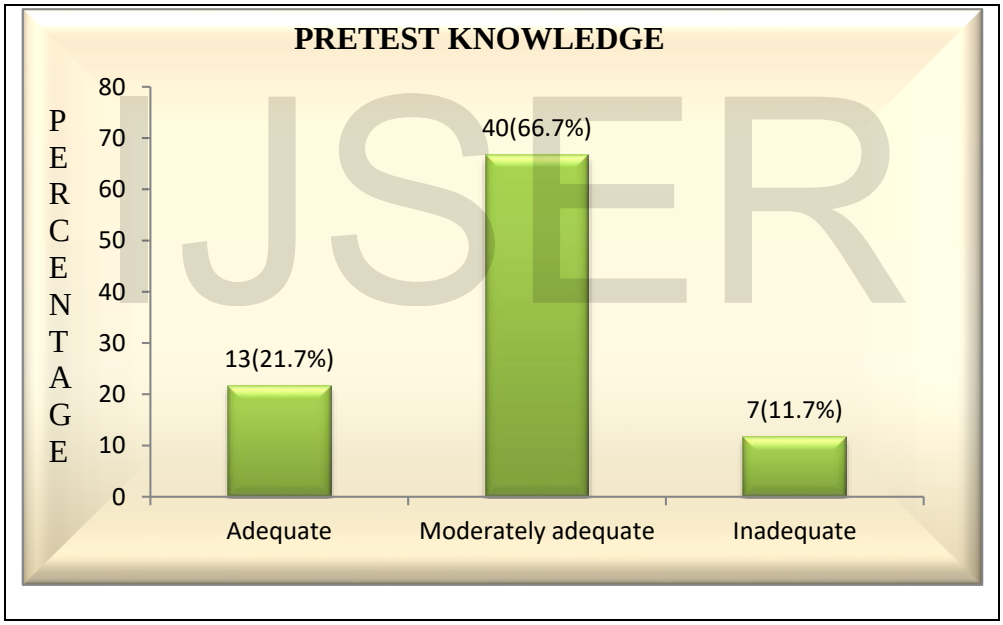
N=60

Sl. No.	Aspect wise analysis	No. of items	Mean	Median	SD
1.	**General information**	5	3.11	3	1.19
2.	**Arterial blood gas**	6	3.31	3.5	1.21
3.	**Acid base disorders**	7	4.1	4	1.36
4.	**Arterial blood gas interpretation**	12	7.73	8	1.98
5.	**Overall knowledge score**	30	18.26	19	3.82

The data presented in the above table shows that in pre test from General information mean was 3.11, Standard deviation was 1.19, as like in Arterial blood gas mean was 3.31, standard deviation was 1.21. If we come to Acid base disorders mean was 4.1, standard deviation was 1.36. If we come to Arterial blood gas interpretation mean was 7.73, standard deviation was 1.98. finally over all knowledge score was mean was 18.26, standard deviation was 3.82.

Table 5: DISTRIBUTION OF SUBJECTS ACCORDING TO LEVEL OF KNOWLEDGE IN PRETEST.

N=60



The above diagram shows that in pre test 13(21.7%) of them were having adequate knowledge, 40(66.7%) of them were having moderately adequate knowledge and 7(117%) of them were having inadequate knowledge.

Assessment of level of knowledge in Post test

Table 6: KNOWLEDGE SCORE REGARDING ASSESSMENT OF ARTERIAL BLOOD GAS ANALYSIS AND ITS INTERPRETATION

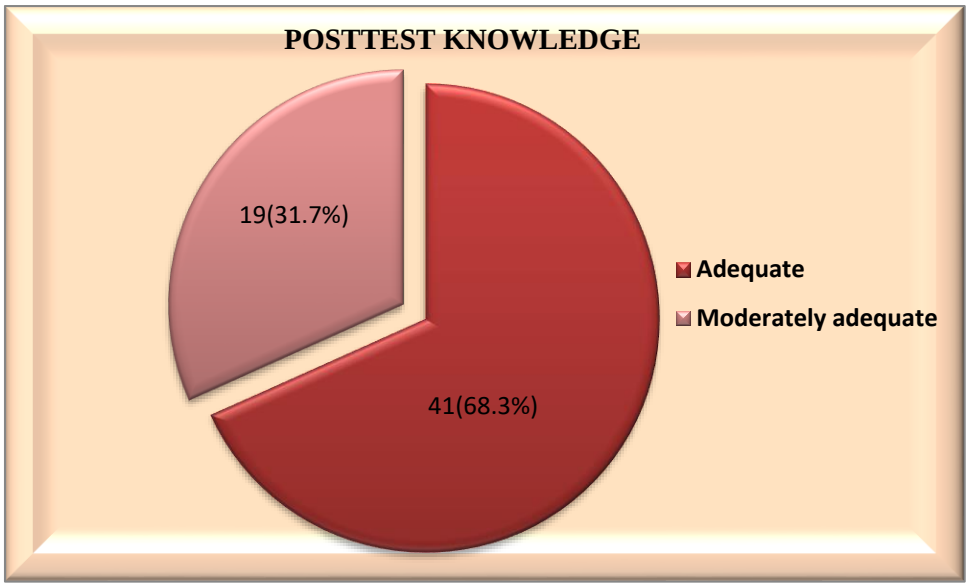
N=60

Sl. No.	Aspect wise analysis	No. of items	Mean	Median	SD
1.	**General information**	5	3.98	4	0.91
2.	**Arterial blood gas**	6	4.65	5	1.33
3.	**Acid base disorders**	7	5.46	5.5	1.17
4.	**Arterial blood gas interpretation**	12	9.5	9	1.67
5.	**Overall knowledge score**	30	23.56	23	4.22

The data presented in the above table shows that in posttest from General information mean was 3.98, Standard deviation was 0.91, as like in Arterial blood gas mean was 4.65, standard deviation was 1.33. If we come to Acid base disorders mean was 5.46, standard deviation was 1.17. If we come to Arterial blood gas interpretation mean was 9.5, standard deviation was 1.67. finally over all knowledge score was mean was 23.56, standard deviation was 4.22.

DISTRIBUTION OF SUBJECTS ACCORDING TO LEVEL OF KNOWLEDGE IN POST TEST

N=60



The above pie diagram shows that in post test 41(68.3%) of them were having adequate knowledge, 19(31.7%) of them were having moderately adequate knowledge and none of them were having inadequate knowledge.

Comparison of pre test and post test knowledge scores to determine the effectiveness of structured teaching programme

Sl. No.	Aspect wise analysis		Mean	SD	't' value
1.	General information	Pre	3.11	1.19	4.43
		Post	3.98	0.91	
2.	Arterial blood gas	Pre	3.31	1.21	5.48
		Post	4.65	1.33	
3.	Acid base disorders	Pre	4.1	1.36	5.9
		Post	5.46	1.17	
4.	Arterial blood gas interpretation	Pre	7.73	1.98	5.16
		Post	9.5	1.67	
5.	Overall knowledge	Pre	18.26	3.82	7.03
		Post	23.56	4.22	

	score				

The data represented in the table shows that there was a significant increase in knowledge level after intervention in all the assessment variables. Regarding General information he mean score prior intervention was only 3.11, it was increased to 3.98, in Arterial blood gas it was increased from 3.31to 4.65, in Acid base disorders it was increased from 4.1 to 5.46, in Arterial blood gas interpretation it was increased from 7.73 to 9.5, and at last the overall knowledge score increased from 18.26 to 23.56.

Part-III :- Chi square value showing the association between the pretest knowledge score and demographic variables

Sl. No.	Demographic variables	Pre-test median knowledge score(19)		χ^2 calculated value	Df	Inference
1.	**Age in yrs**	**≤median**	**≥median**			
	18-19 yrs.	-	-	0.39	3	NS
	20-21 yrs.	16	13			
	22-23 yrs.	14	12			
	24yrs and above	2	3			
2.	**Sex**					
	Male	13	13	0.20	1	NS
	Female	19	15			
3.	**Source of information**					
	Mass media	2	6	4.19	3	NS
	Journals	11	9			
	Seminars and workshops	15	8			
	Health personnel	4	5			

Note: NS: Nothing significant, S^*: Significant, df: Degree of freedom, $p<0.05$ At df=1: critical value is 3.84, At df=2: critical value is 5.59, At df=3: critical value is 7.82, Yaete's correction done for the observed value less than 5.

Comparison of pre test and post test knowledge scores to determine the effectiveness of structured teaching programme

In the present study, subject's knowledge scores increased after structured teaching programme. The knowledge gain is as follows.

- Regarding General information, knowledge score increased from 3.11to 3.98.
- Regarding Arterial blood gas knowledge score increased from 3.31to 4.65.
- Regarding Acid base disorders knowledge score increased from 4.1to 5.46.
- Regarding Arterial blood gas interpretation knowledge score increased from 7.73to 9.5.
- Regarding Overall knowledge score increased from 18.26 to 23.56.

CONCLUSION

The study shows that

1) The knowledge of III Yr B.Sc nursing students regarding assessment of arterial blood gas analysis and its interpretation was inadequate when assessed in pre-test.

2) The structured teaching programme tested in this study was found to be effective in improving the knowledge of subjects.

3) Structured teaching programme is an effective teaching method in improving the knowledge of III Yr B.Sc nursing students.

4) The study proved that there is no significant association between pre-test knowledge scores and selected demographic variables like age in years, sex and Source of information.

RECOMMENDATIONS

1. The present study was conducted on a small sample, a more extensive study on large sample is recommended to arrive at generalization.

2. It would be of immense value to conduct a study on different subjects like, ANM, GNM students etc.

3. A follow up study need to be conducted to find the effectiveness in terms of retention of knowledge and to reinforce health promotion behavior.

4. Teaching and demonstration materials regarding assessment of arterial blood gas analysis and its interpretation can be demonstrated in hospitals, community health and primary health centers.

5. Health education regarding assessment of arterial blood gas analysis and its interpretation can be given to the health personnel and other public by seminars. Workshops. Studying articles.

6. Health authorities can conduct campaign to improve public awareness.

Health education is regarding assessment of arterial blood gas analysis and its interpretation campaign is very necessary for the all care givers to give quality and effective care.

REFFERENCE

1. Sue c. delaune , Patricia k. ladner , Fundamentals of Nursing standards and practice , II edition, page no:-1079 .
2. http://en.wikipedia.org/wiki/Arterial_blood_gas.
3. D.C Flenley, Arterial puncture, British medical journal july/12/1980, page no:-128 Available from :www.ncbi.nlm.nih.gov
4. Brunner and Suddarth , Text book of Medical Surgical Nursing, 10TH Edition, Page Number:-281.
5. Pramodsood ,Gunchanpaul , Sandeeppai Interpretation of arterial blood gas, Indian Journel of critical care medicine ,Volume:-14, issue:2 April-June 2010, Page Number:-57-64. Available from: http://www.ijccm.org/text.asp?2010/14/2/57/68215.
6. Robichaud-Ekstrand S, Interpretation of blood gas analysis. Can J Cardiovasc Nurs. 1990 Jan;1(3): page no:- 11-5. Available from:- http://www.ncbi.nlm.nih.gov.
7. Alison .m. pirret, The level of knowledge of respiratory physiology articulated by intensive care nurses to provide rationale for their clinical decision-making.Intensive and Critical Care NursingVolume 23, Issue 3, June 2007, Pages 145–155.
8. Frutiger A, Brunner JX. Computerized blood gas interpretation as tool for classroom and ICU.Intensive Care Med. 1993;19(4):209-14.