



# "A pre-experimental study to assess the effect of Video Assisted Teaching on knowledge regarding Arterial Blood Gas Analysis and Interpretation among staff nurses working in selected hospital, Bhopal, Madhya Pradesh, India".

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**Introduction:** An Arterial blood gas analysis test measures the acidity (pH) & the levels of oxygen & carbon dioxide in the blood from an artery. This test is used to check how well our lungs are able to move oxygen into the blood & remove carbon dioxide from the blood. The collection of arterial blood by nurse is not only technically difficult, but can be painful and hazardous for the patient. Therefore, it is essential that individuals performing arterial puncture be familiar with the proper techniques, with the complications of the procedure, and with necessary precautions. Arterial blood is one of the specimens most sensitive to pre analytic effects. Improper patient assessment, test requisition, collection or transport of a specimen of arterial blood intended for pH, and blood gas analysis can alter the gas tensions, or pH, or both. In addition to pH/gases analysis, instruments are now available for the specific measurement of pH/gases and other critical care analysis on the same arterial whole-blood specimens. Therefore, scrupulous attention to the principles outlined in this standard is mandatory to eliminate a major potential source of erroneous laboratory results. This has traditionally been the role of the doctor, however by using an education and training package along with a competency-based assessment, nurses can now perform this extended role.

**Method:** Quantitative Quasi experimental/Pre experimental research design was adopted for this study. The aim of the study is to assess the effect of Video Assisted Teaching on knowledge regarding Arterial Blood Gas Analysis and Interpretation among staff nurses working in selected hospital, Bhopal, M.P. A formal order was obtained from the Director, Chirayu Medical College and Hospital, Bhopal to conduct the main study from 19/06/2014 till 30/06/2014. The investigator collected 40 samples that fulfilled the inclusive criteria. Data collection was done within the given period in Chirayu Medical College and Hospital, Bhopal. The samples were selected using simple random sampling technique. The investigator gave a brief introduction and explained the purpose of the study. Pre-test response was assessed and selected teaching module was administered and after 7 days post-test was done to assess the effectiveness of the selected teaching module. The variables were analysed using inferential and non-inferential statistical method.

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**Results** :Video Assisted Teaching on knowledge regarding Arterial Blood Gas Analysis and Interpretation has positive impact on the staff Nurses knowledge regarding ABG Analysis and interpretation .Also noticed an association between Pre test knowledge score selected demographic variable

**Conclusion** : Video Assisted Teaching on knowledge regarding Arterial Blood Gas Analysis and Interpretation is effective module for improving the staff nurses Knowledge regarding ABG analysis and interpretation

**Key words:** Video Assisted Teaching, Staff Nurse , ABG analysis , Acidosis, Alkalosis

**DOI Number:**10.14704/nq.2022.20.8.NQ44622

**NeuroQuantology2022;20(8):5955-5964**

## Introduction

An Arterial blood gas analysis test measures the acidity (pH) & the levels of oxygen & carbon dioxide in the blood from an artery. This test is used to check how well our lungs are able to move oxygen into the blood & remove carbon dioxide from the blood.

The collection of arterial blood by nurse is not only technically difficult, but can be painful and hazardous for the patient. Therefore, it is essential that individuals performing arterial puncture be familiar with the proper techniques, with the complications of the procedure, and with necessary precautions. Arterial blood is one of the specimens most sensitive to pre analytic effects. Improper patient assessment, test requisition, collection or transport of a specimen of arterial blood intended for pH, and blood gas analysis can alter the gas tensions, or pH, or both. In addition to pH/gases analysis, instruments are now available for the specific measurement of pH/gases and other critical care analysis on the same arterial whole-blood specimens. Therefore, scrupulous attention to the principles outlined in this standard is mandatory to eliminate a major potential source of erroneous laboratory results. This has traditionally been the role of the doctor, however by using an education and training package along with a competency-based assessment, nurses can now perform this extended role.

## Material and Method

Quantitative Quasi experimental/Pre experimental research design was adopted for this study. The aim of the study is to assess the effect of Video Assisted Teaching on knowledge regarding Arterial Blood Gas

Analysis and Interpretation among staff nurses working in selected hospital, Bhopal, M.P. The study was approved by the ethical committee of Pragyan College of Nursing Bhopal Madhya Pradesh A formal order was obtained from the Director, Chirayu Medical College and Hospital, Bhopal to conduct the main study. The investigator collected 40 samples that fulfilled the inclusive criteria. Data collection was done within the given period in Chirayu Medical College and Hospital, Bhopal. The samples were selected using simple random sampling technique. The investigator gave a brief introduction and explained the purpose of the study. Pre-test response was assessed and selected teaching module was administered and after 7 days post-test was done to assess the effectiveness of the selected teaching module. The variables were analysed using inferential and non-inferential statistical method.

**Inclusion criteria:** Staff nurses who possess degree / diploma in nursing, Staff nurses who willing to participate in the study, Staff nurses who are present during the data collection..

**Exclusion criteria:** Staff nurses not who willing to participate in the study. ANMs and supervisors are not included in this study

In this study, the structured questionnaire consist of two parts,

Section –A: Demographic data

It consists of 6 demographic variables.

Includes-

- Age
- Sex
- Professional qualification
- Previous exposure
- Years of clinical experience



- Area of current working experience
- Section –B : Structured questionnaire consist of 30 multiple choice questions to assess the knowledge of staff nurses regarding Arterial Blood Gas Analysis and interpretation.

The structured questionnaire is divided into the following sub heading

- Anatomy and physiology
- Procedure for arterial blood gas analysis
- Interpretation of arterial blood gas analysis
- Nurses responsibility regarding arterial blood gas analysis.

#### SCORING SYSTEM

The total scores obtained will be arbitrarily graded on five point scale as follows-

- 00-06 - Poor
- 07-12 - Average
- 13-18 - Good
- 19-24 - Very Good
- 25-30 - Excellent

The staff nurses in the selected group were provided a pre-test structured questionnaire followed by which video assisted teaching module was administered on the same day. On the seventh day post-test was done with the help of structured questionnaire.

#### Statistical Analysis:

The manners for analyzing the data were frequently related to the complexity of the data or the complexity of the hypothesis. The investigator has decided to use descriptive and inferential statistics on the basis of objectives and hypothesis of the study. The data obtained from 40 selected patients would be analyzed by descriptive and inferential statistics as follows:

#### Descriptive Statistics

The master data sheet was prepared by the investigator compile the demographic data containing selected sample characteristics was analyzed using frequency and percentage distribution.

Mean, Median, and Standard Deviation of pre and post-test among the sample would be analysed.

#### Inferential Statistics:

The effect of video assisted teaching would be analyzed and calculated with the help of 't'

test. The analysis will be presented in the form of table and figure.

Chi-Square test for association was used to find out the significant association between pre-interventional knowledge score with selected demographic and clinical variables.

#### Results :

The findings of the study are organized according to the objectives set for the study. The data were edited, tabulated, analysed, interpreted and presented in the form of table and diagrams. The data are presented under the following headings-  
Section- (A) : Frequency and Percentage distribution of demographic variables.

- Majority of the selected staff nurses 18(45%) belonged to the age group of 21-25 years, 12(30%) belonged to the age group 26-30 years, 8(20%) belonged to age group 31-35years and 2(5%) belonged to the age group more than 36 years. Hence it is to interpret that most of the staff nurses were younger with in the age group of 21-25 years. As age increases number of staff nurses decreases.
- Most of the selected staff nurses 18 (45%) were males and 22 (55%) were females. It seems that most of the staff nurses were females. It might be due to that mostly females were motivated for nursing.
- Half of the selected Staff nurses 20 (50%) have completed their BSc. Nursing Degree, 16 (40%) have completed GNM and 4 (10%) have completed Post Basic Nursing. It seems that most of the staff nurses were graduates because they get more preference during recruitment.
- Majority of the selected 24 (60%) have 1-3 years of experience, 4(10%) have more than 6 years of experience and the rest two 6 (15%) that is less than 1 year and 4-6 years of experience. It might be due to majority of staff nurses under the age group of 21-25 years.
- Most of the selected staff nurses 18 (45%) are working in medical ward I, 12(30%) are working in ICU,8(20%) from surgical ward and 2 (5%) from other department. It might be due to number of staff nurses



working in medical ward is higher than other departments.

- Majority of selected staff nurses 18(45%) had information regarding Arterial Blood Gas Analysis and interpretation from various CNE programmes, 14 (35%) gained

information from friends or relatives and 08(20%) gained information from Journals or Articles. Most of the staff nurses get the information from weekly departmental teaching.

**Section- (B) : Comparison between pre-intervention and post-intervention knowledge score**

**Table-1.:** Comparison between Pre-intervention and Post-interventional knowledge score

Designation: \*'t' (39) 2.25, P<0.05

Knowledge	Mean	Mean difference	Mean Percentage (%)	Standard Deviation (S.D)	t-value (N=40)
Pre-intervention	11.6	4.7	41.58	4.14	5.59*
Post-intervention	16.3		58.42	3.42	

Data presented in the table shows that mean post-test score (16.3) is apparently higher than the mean pre-intervention knowledge score (11.6). The mean difference between pre interventional knowledge score and post- interventional knowledge score is 4.7. The computed 't' value 't'(39) 5.59, P< 0.05 shows that there is a significant difference between pre-test score and post test score. This indicates that selected teaching module is effective to increase the knowledge level of staff nurses.

The table revealed that the mean post intervention knowledge score (41.58%) is

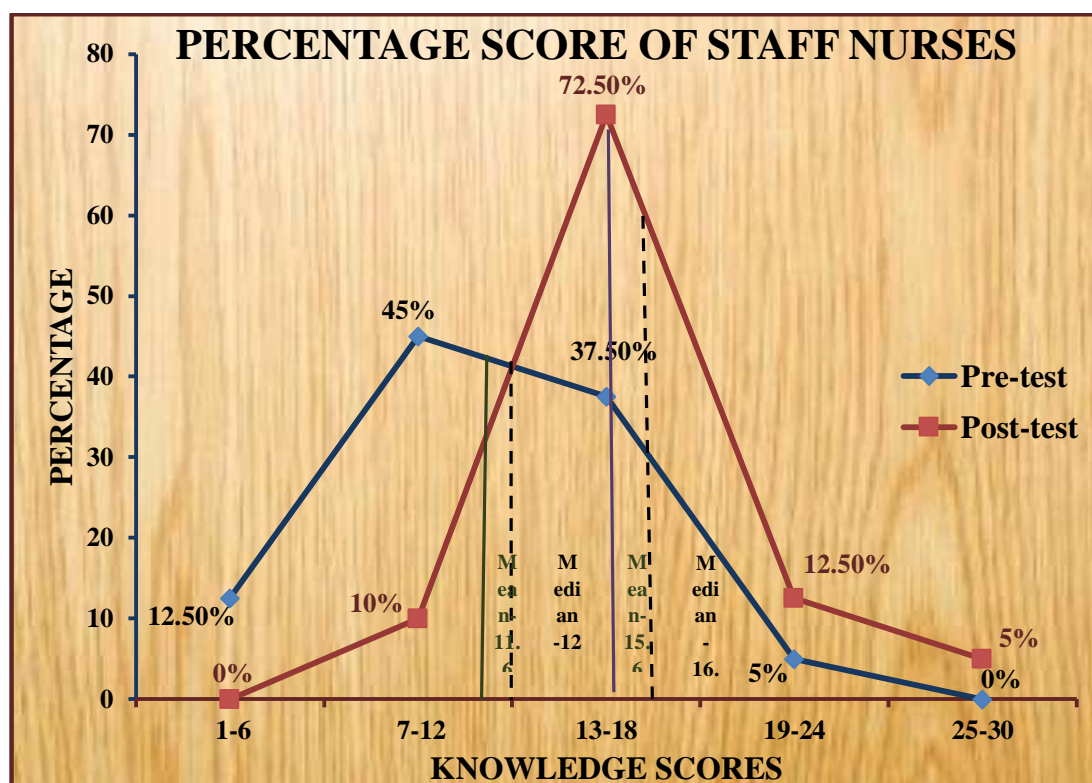
apparently higher than the mean pre-intervention knowledge score (58.42%). Improvement mean percentage (16.84%) obtained for pre and post- intervention knowledge score with 't' value of 5.59 at P< 0.05 level of significance. It reveals that there is an enhancement of knowledge level indicating the effectiveness of selected teaching intervention.

Hence, the hypothesis H<sub>1</sub> stating that the mean post-interventional knowledge score is significantly higher than the mean pre- interventional knowledge score among staff nurses is accepted

**Table-2:** Categorical comparison between Pre and Post- test knowledge score regarding Arterial Blood Gas Analysis and Interpretation

Score	Grading	Pre-test		Post-Test	
		Frequency (f)	Percentage (%)	Frequency (f)	N=40 Percentage (%)
1-6	Poor	05	12.5	00	00
7-12	Average	18	45	04	10
13-18	Good	15	37.5	29	72.5
19-24	Very Good	02	05	05	12.5
25-30	Excellent	00	00	02	5





**Figure 1:** The Line graph showing the comparison between Pre-test and Post-test knowledge score on Arterial Blood Gas Analysis and Interpretation among staff nurses.

Section- (C) : Association of Pre-intervention knowledge score of staff nurses with their selected demographic variables.

There is an Association between pre-interventional knowledge level and selected demographic variables. It is mainly due to the exposure ie, the clinical exposure is high in BSc Nursing syllabus rather others.

The demographic variable such as age, professional qualification, year of experience. Showed significant association between the demographic whereas pre-interventional knowledge scores was found to be independent of selected demographic variables such as age, sex, working experience, area of current working and , previous exposure to the topic as evident by the computed chi-square value.

Hence the research hypothesis H2 stated that there is significant association between pre-interventional knowledge scores with selected demographic variable (professional qualification) was accepted.

**Discussion**

**Section I – Distribution of staff nurses according to their demographic variable.**

- Majority of the selected staff nurses 18(45%) belonged to the age group of 21-25 years, 12(30%) belonged to the age group 26-30 years, 8(20%) belonged to age group 31-35years and 2(5%) belonged to the age group more than 36 years.

Close findings were found in a study conducted by Mary Kutty (2012), the study revealed that majority of the staff nurses were under the age group of 20 – 30(52%) and 31-40 is 30%.

Hence it is to interpret that most of the staff nurses were younger with in the age group of 21-25 years. As age increases number of staff nurses decreases.

- Most of the selected staff nurses 18 (45%) were males and 22 (55%) were females.

These findings were supported by the same study conducted by Mary Kutty (2012), the result showed that more than half of the staff nurses were females (64%).



It seems that most of the staff nurses were females. It might be due to that mostly females were motivated for nursing.

- Half of the selected Staff nurses 20 (50%) have completed their BSc. Nursing Degree, 16 (40%) have completed GNM and 4 (10%) have completed Post Basic Nursing.

Similar findings were found in the study conducted by Varghese Ann (2013), which showed that half of the staff nurses are graduates 15 (50%).

It seems that most of the staff nurses were graduates because they get more preference during recruitment.

- Majority of the selected 24 (60%) have 1-3 years of experience, 4(10%) have more than 6 years of experience and the rest two 6 (15%) that is less than 1 year and 4-6 years of experience. It might be due to majority of staff nurses under the age group of 21-25 years.

Similar findings were found in the study conducted by Ponnamma Samuel and Vinitha (2012), it shows that 60% having the experience of 0-3 years and 20% are having experience between 4-6 years.

- Most of the selected staff nurses 18 (45%) are working in medical ward, 12(30%) are working in ICCU, 8(20%) from surgical ward and 2 (5%) from other units. It might be due to number of staff nurses working in medical ward is higher than other departments.

Similar findings were found in the study conducted by Mary Kutty (2012) the finding shows that majority that is 56% were working in medical ward.

- Majority of selected staff nurses 18(45%) had information regarding Arterial Blood Gas Analysis and interpretation from various CNE programmers, 14 (35%) gained information from friends or relatives and 08(20%) gained information from Journals or Articles.

This findings is supported by the study that has been conducted by Vinayaka.A.M (2012),which showed that 60% of staff nurses had improved their knowledge by attending

various CNE programmes organized by their respective institutions.

Most of the staff nurses get the information from weekly departmental teaching.

### **The pre-interventional knowledge of staff nurses regarding Arterial blood gas analysis and interpretation**

The finding showed that majority of staff nurses had average knowledge. The mean pre-test knowledge score secured is 11.6 and the dispersion of pre-test knowledge score is  $SD \pm 4.14$ . The finding shows that 18(45%) had average knowledge ie, between (7-12), 15 (37.5 %) had good knowledge ranging from 13-18, 02 (5%) having very good knowledge ranging from 19-24 and none had excellent knowledge.

The above findings is supported with a study which was conducted by Ann Varghese (2013) An evaluative study which was conducted to find out the effectiveness of interpretive educative session in improving the knowledge on interpretation regarding arterial blood gas values among critical care nurses in selected hospitals at Mangalore. The goal of the study was to determine the knowledge of staff nurses regarding arterial blood gas analysis and interpretation. The findings were the mean post-test knowledge score on interpretation (21.30) was higher than the mean pre-test knowledge score on interpretation (9.00). The study showed that majority of the critical care nurses had an inadequate knowledge on interpretation regarding arterial blood gas values; however the knowledge on interpretation has significantly improved after the administration of interpretive educative session. Hence it was concluded that interpretive educative session was an effective teaching strategy in improving the knowledge on interpretation regarding arterial blood gas values among critical care nurses.

### **Effect of video assisted teaching on knowledge of staff nurses regarding Arterial blood gas analysis and interpretation.**

Pre--interventional knowledge showed that majority of staff



nurses 18(45%) had average knowledge i.e. between 7-12, 15(37.5%) had good knowledge ranging from (13-18), 05 (12.5%) had poor knowledge ranging from (1-6) and 02 (5%) had very good knowledge and none had excellent knowledge ranging from 25-30.

The post-interventional knowledge showed that 29 (72.5%) gained knowledge ranging from (13-18), 05(12.5%) gained very good knowledge ranging from (19-24) , 04 (10%) gained average knowledge ranging from (7-12) and 02(5%) in excellent category.

The mean post-test score (16.6) is apparently higher than the mean pre-intervention knowledge score (11.6).

Further, to know the statistical significance between pre and post-interventional knowledge scores 't' (39) 5.59,  $P < 0.05$  level showed that there was significant increase in the knowledge level after administration of Video-assisted teaching. The mean post intervention knowledge score (58.42%) is apparently higher than the mean pre-intervention knowledge score (41.58%). Improvement mean Percentage (16.84 %) obtained for pre and post- intervention with 't' value of 5.59 at  $P < 0.05$  level of significance.

These findings are consistent with the study conducted by **Tamizharasi K.(2012)** the author conducted a quasi-experimental research, pre and post-test without control group design with experimental approach was undertaken to assess the effectiveness of Video assisted teaching program on the knowledge of nurses . Data were collected from 248 nurses selected by cluster sampling technique in PHCs of Salem district through closed ended questionnaire and observational checklist. The overall pre-test mean knowledge score was  $28.13 \pm 7.55$  (42.61%) whereas in post-test it was  $57.71 \pm 3.94$  (87.44%) revealing 44.83% enhancement of knowledge score. Highly significant difference was found between the total knowledge scores of pre and post-test and area wise score values of pre and post- test ( $P < 0.01$ ) revealing effectiveness of Video assisted teaching programme.

The above results clearly indicate that the Video assisted teaching was effective in increasing the knowledge level of staff nurses working in selected hospital of Bhopal.

Thus, the hypothesis made by the investigator i.e.  $H_1$ , The mean post - interventional knowledge score is significantly higher than the mean pre- interventional knowledge score regarding Arterial blood gas analysis and interpretation among staff nurses at 0.05 level was accepted and retained by the findings of the study.

#### **Association between the pre-interventional knowledge of staff nurses with their selected demographic variables.**

In order to find association between the pre-interventional knowledge of staff nurses and their selected demographic variables, chi-square test was used. It shows that there is no significant relationship between the pre-interventional knowledge of staff nurses and their selected demographic variables.

There is no significant association between Pre-test knowledge score and age and its value of chi square at  $P < 0.05$  is 12.71 (**NS**), chi square value of gender 2.67 (**NS**), chi square value of professional qualification is **28.2 (Significant)**, chi square value of total working experience is 13.61 (**NS**), chi square value of area of current working experience is 8.15 (**NS**) , and chi square value of previous exposure to the topic arterial blood gas analysis is 7.36 (**NS**).

Hence there is an association between pretest knowledge score and professional qualification.

Thus the hypothesis made by the researcher ie,  $H_2$  stating that there is a association of pre interventional knowledge score with selected demographic variables of staff nurses was accepted.

#### **Limitation**

1. Nursing related literatures in Indian context were limited in number.
2. The study was conducted for a small sample size in a selected setting by purposive sampling, which limits the generalization of principles.



3. All samples were from one area because of convenience of researcher due to newly emerged pandemic diseases

### Conclusion

The present study was truly an inspirational experience to the investigator. It also helped to develop an immense compact to explore and improve the knowledge and skill of the researcher. The invariable encouragement and direction of the guide, co-operation and interest of respondents to participate in the study, contribute to the successful completion of study

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