

# Effectiveness of Structured Teaching Programme on Knowledge Regarding Arterial Blood Gas (ABG) Analysis among Staff Nurses

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**Abstract:** An arterial blood gas (ABG) study is a blood test that measures the levels of many different gases in oxygen-rich blood. Some of these levels are measured directly while others are calculated from the measurements of other gases. The study was aimed to improve knowledge of Staff Nurses regarding Arterial Blood Gas Analysis to take care of patient in admitted in selected Intensive Care Unit. **Methodology-** A quantitative pre experimental design consisting of pre and post test design was used sample size for this study is 50 selected by Non probability Purposive Sampling technique. Data was collected through structured teaching questionnaire. Pre test was given followed by structure teaching post test was done on eight day using a same test after the post test the data was analyzed and findings were seen. This shows that most (88%) of the sample were in the age group of 20-30. There was more representation of female (70%) and males (30%). (56% of the working was GNM staff nurses, 30% of B.Sc and 14% P.B.B.Sc nursing staff. There were 96% of staff working since 10 years and 04% staff working since 20 year. Data further shows that most (64%) of the staff nurses have participated in ABG programme and 36% have not participated in ABG programme.) 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 improved to 38% sample in excellent level. The Pretest and posttest mean knowledge scores about arterial blood gas analysis of staff nurses 511 pre-test was 11.50 and post-test 15.98. This difference was statistically significant at p value 0.000 level with 't' value of -8.694 results null hypotheses is rejected and alternative hypothesis was accepted.

**Keywords:** Effectiveness, Knowledge, Arterial Blood Gas (ABG), Staff Nurses

## 1. Introduction

Learning is the addition of new knowledge and experience interpreted in the light of past knowledge and experience. Teaching and learning is an integral part of nursing. Nurses have the responsibility to educate patients related to various aspects and keep themselves updated. Various teaching strategies are used to increase knowledge, such as lecturing, demonstration, discussion and self-education. These methods of self-education has an advantage over the others as the learner can educate himself at his own pace and it also stresses on rereading [1].

Nurses play an important role in early detection of high risk clients with acid-base imbalance in critical care units. The nurse collaborates in the administration of drug therapy, oxygen therapy and mechanical ventilation when indicated. In extreme circumstances in which therapeutic compensation is required, the nurse should be knowledgeable about potential risks of this therapy and able to carefully monitor administration rates and therapeutic responses[2].

A study conducted among clinical nurses to find the concept of acid/base balance confusing. This study presents a step-by-step approach to arterial blood gas (ABG) analysis. In addition, the components of ABGs (pH, PCO<sub>2</sub> and HCO<sub>3</sub>) are presented; metabolic and respiratory abnormalities (acidosis and alkalosis) are discussed in relation to cause and signs and symptoms; the concept of compensation is reviewed; the degrees of compensation are explained; the

five steps of ABG analysis are outlined; and practice problems are provided and explained. By using this approach, the nurse can analyze the ABG values confidently and make a wise choice about appropriate nursing actions[3].

During the clinical experiences in ICU the investigator found that majority of patients' ventilation is being monitored by ABG analysis in spite of continuous monitor with pulse – oximeter. Though the nurses take an active part in collecting ABG samples, their knowledge in interpreting ABG reports is inadequate. In the initial stage of the study the investigator had identified the need of the nursing personnel to learn all about ABG interpretation empirically, which was 100%. Keeping this in view, the investigator have justified the need to improve nurses' knowledge and practice by developing the protocol regarding ABG interpretation among nurses working in critical care units.

## 2. Review of Literature

The review of literature is a summary of current knowledge about a particular practice, problem and includes what is known and what is unknown about the problem. Literature is reviewed to summarize knowledge for use in practice or to provide a basis for conducting a study [4].

### **Review related to the effectiveness of structured teaching programme**

Kadam,A.(2014) found that Structured education programme was highly effective to improve the knowledge score and to improve the attitude score of subjects/ caregiver towards colostomy care of patient [5]. Anjum, S.(2014)conducted study to assess knowledge of contraceptives methods and appraisal of health education among married women and concluded After the health education married women knowledge was improved to 100% about female sterilization followed by condom 99%, skin implants 86%, oral pills 85% and emergency contraceptives 85%. Sociodemographic variable were significantly associated with existing knowledge and level of married women specially age at marriage, age at first child, occupation,, income, education [6][7].Babu, R. L. (2014) concluded that care takers had inadequate knowledge regarding non-curative care of terminally ill cancer patients. The planned education programme on non-curative care of terminally ill cancer patients was highly effective in improving the knowledge of care takers regarding non-curative care of terminally ill cancer patients [8]. Shinde M (2014) concluded in their study that demonstration is effective regarding feeding of hemiplegic patient [9].

### **Review related to the general information about ABG analysis.**

An article on interpreting arterial blood gases: easy as ABC, describes the interpretation of step-by-step approach of oxygenation ventilation, and acid-balance. With practice nurses can improve skill and accuracy at ABG interpretation[10].Amith Banga (2006) conducted study in India, common acid base disorders are respiratory acidosis (RA) and metabolic acidosis (MA).Among the patients who had acidosis, mortality was higher for patients with metabolic acidosis (75%) than those with respiratory acidosis (52%)[11]. An article on blood gases analysis in mechanically ventilated patients. Measurement of blood gases and pH are widely used as an investigation to screen pulmonary function for pre operative, intra operative, post operative and life saving management (e.g. Ventilator support) are based on blood gas and pH values[12].

Dr. Sunitha Ugramurthy (2004) conducted a study and reports that ABG are usually measured by obtaining blood sample by arterial puncture. In certain situations arterial puncture may not be feasible like in cases of coagulation disorders, anticoagulant therapy, presence of arterial graft etc. In such Situation blood sample collected from arterialized great toe by means of pre heparinised capillary tubes can be a good substitute for arterial blood provided there is no circulatory shock[13].

Kenneth P (2001) conducted a study on Arterial Blood Gas and pulse oximetry in initial management of patients with community acquired pneumonia. The study revealed that in the initial management of community acquired pneumonia, ABG analysis can be used widely[14].

Winterhalter M (2000) conducted a study on changes of arterial blood gas analysis with post-operative cardio-thoracic-surgery patients who are in need of artificial

respiration over a short period of transport time. The ABG analysis revealed that the patients after extended cardio- thoracic surgery required post- operative ventilation during the transport from the operating theater to the intensive care unit[15].

Hamdan Al-Jahdali (1999) conducted a study to observe utilization of ABG measurements. During the study period of two weeks, 98 ABG sample were requested from adult patients (acute care general wards).

The researcher summarized that ABG measurements from acute care wards in a tertiary-care teaching hospital were found to be utilized more[16]

## **3. Research Methodology**

### **Research Approach**

The research methodology adopted for the study was and evaluative approach.

### **Research Design**

Pre experimental design is used for Research.

### **Variables**

In this study the independent variables is the structure teaching program on arterial blood gas (ABG) analysis. Dependent variables in study is knowledge regarding arterial blood gas (ABG) analysis of the staff nurses working in selected intensive care unit.<sup>21</sup>

### **Setting of the study**

The was conducted in two selected establishment of Bharati Hospital Sangli , Wanless hospital miraj the reason is to selecting establishment were convenience , easy transport ,administrative support and cooperation and availability of staff nursing . to avoid the contamination of sample the reliability and pilot study was conducted in other similar institute.

### **Population:**

The population of this study consisted of all working staff nurses in selected intensive care unit. The sample of this study comprised of staff nurses working in intensive care unit of Bharati Hospital Sangli, Wanless hospital Miraj.

### **Sampling Technique**

The sample technique used in study in this study Non probability Purposive Sampling technique will be used to select the samples for the present study.

### **Sample size:**

A Large sample is generally more representative of the population of interest than small sample. Sample comprises staff nurses working in intensive care unit of Bharati Hospital Sangli, Wanless hospital Miraj. The sample size for this study is 50 includes staff nurses.

### **Inclusive Criteria**

Staff nurses who are,

- Working in ICU and willing to participate in the study.
- Available during the period of data collection

### Exclusion Criteria

Staff nurse who are

- On leave during the period of data collection
- ANM

### Data collection technique and instrument:

Self reported structured questionnaire was use for the collecting data. Questionnaire is considered to be the most efficient and objective method which is quick generally inexpensive needs means of obtaining data from a large no. of respondent

### Description of tool:

The structure knowledge questionnaires consist of two section i.e. section I and section II

**Section I** consist of item demographic data i.e. age, gender, educational qualification, years of experience in ICU, participation in in-service education program.

**Section II** comprised of knowledge item categorized under the following the broad area Indication, Contra-indication, Normal value, Components, Characteristic, Procedure, Complications

The total number of items included under this section was 23. A blue print was prepared every correct answer was given one mark and wrong answer zero.

## 4. Results and Discussion

### Findings related to sample characteristics

Most (88%) of the sample were in the age group of 20-30. There was more representation of female (70%) and males (30%). 56% of the working was GNM staff nurses, 30% of B.Sc and 14% P.B.B.Sc nursing staff. There were 96% of staff working since 10years and 04% staff working since 20 year. Data further shows that most (64%) of the staff nurses have participated in ABG programme and 36% have not participated in ABG programme.

### Finding related Comparison of pre and post scores of knowledge

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.

### Finding related of structured teaching programme on knowledge regarding arterial blood gas (ABG) analysis among staff nurses working in selected ICU's and there Pre-test and post-test knowledge scores.

show that the mean knowledge scores about arterial blood gas analysis of staff nurses in pre-test was 11.50 and post-test 15.98. This differences was statistically significant at p value 0.000 level with 't' valve of -8.694 result.

The above data indicates staff nurses who are received planned teaching on arterial blood gas analysis had higher mean knowledge scores in post- test than in pre-test .it can be concluded that ,the structured teaching on arterial blood gas

analysis has proved to be effective in delivering the knowledge.

## 5. Discussion

The finding of the study has been discussed with reference to the objectives and hypothesis stated in chapter I and finding of other studies.

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So null hypothesis is rejected and alternative hypothesis was accepted.

## 6. Summary and Conclusion

This main aim of the study was assess effectiveness of structured teaching On Knowledge regarding Arterial blood gas analysis (ABG) among staff nurses working in Bharati Vidyapeeth hospital, Sangli.

The objective of study was:

- To Assess The Existing Knowledge of Staff Nurses Regarding Arterial Blood Gas Analysis.
- To Assess Effect of Structured Teaching Program On Knowledge Regarding Arterial Blood Gas.

Justification for taking this study was based on the fact that by the study assumes that adequate knowledge regarding Arterial Blood Gas Analysis. Generally working in ICU'S with patient Arterial Blood gas analysis is very important, structured teaching helps nursing staff improving their knowledge the study also assumes that selected variables like age , Gender, education qualification, years of experience in ICU, participated in in-service ABG program, information source influences the staff nurses knowledge.

**The study attempted to examine the following hypothesis.**

H1: There will be a significant difference in the pre test and post test knowledge score of staff nurses in arterial blood gas analysis.

The independent variables was the structured teaching on Arterial Blood Gas Analysis and dependent variables were extraneous variables such as age, Gender, education qualification, years of experience in ICU, participated in in-service ABG program, source information.

#### **This was based on 'Goal attainment' model by Imogene King.**

The research method adopted for the study was an Quantitative approach. The study population consisting of staff nurse working in selected ICU's. Total 50 sample were taken with purpose sampling technique. For general necessary data, a structure questionnaire (Knowledge test) was developed for assessing knowledge of staff nurses.

Development of the structured questionnaire involved the step of question construction, preparing a blue print, item writing, content validation, and establishment reliability. To find out the reliability, the tool was tried on 10 subjects. The tool was found valid and reliable.

To ensure effectiveness of structured teaching on one group pre test –post test pre experimental research design was used. The data was collected from 22<sup>nd</sup> July 2015 to 14<sup>th</sup> August 2015. After obtaining administrative approval from the authorities of the Wanless hospital, Miraj.

The sample consisted of 50 staff nurses selected by purpose sampling technique. A pretest was administered on day one structured teaching was given the same day. A post test was administered on 8<sup>th</sup> day. Data was collected individually through paper and pencil technique.

The following conclusions were drawn from the finding of the study, The structure teaching on arterial blood gas analysis was found to be effective in increasing the knowledge in the staff nurses sample had a highly significant gain in knowledge after the structure teaching program. They showed a gain in knowledge in all the content area of structure teaching.

Arterial blood gas analysis is a important study for nurses in care of the patient in clinical setting. Every Nurse should be update their knowledge to take care of patient.

### **7. Implication of the Study**

An active search for study of arterial blood gas analysis is important for care of patient. It is the responsibility and right of an individual to attain a positive state of health. A large number of nursing staff In ICU's could be helpful to prevented critical condition.

The present study finding have implicated for nursing practice, nursing administration, and nursing research.

### **8. Limitation**

The study is limited to staff nurses who are working in selected Intensive care unit hospital of Sangli- Miraj Kupwad Corporation Area.

#### **Nursing practice**

The primary importance knowledge of arterial blood gas analysis for nursing staff in hospital setting will help to care of patient effectively and taking part in diagnosis in arterial blood gas analysis.

Nurses need to be equipped with advanced knowledge and skill to become involved in providing necessary services to patient in ICU's setting

#### **Nursing Education**

With changing health care trend nursing education must emphasize primary health care approach on prevention of further problem to early detection of diagnosis and given immediate treatment is important.

a) However specialty oriented courses are offered at the master level. Training programme for nurses however, need to be improved, to meet the new demands of critical care area as nurses are expected to encounter increasing number of patient with arterial blood gas analysis as part of their professional practice

b) *Nursing Administration*

In the event of changing disease manifestation, knowledge explosion, technological and ever growing challenges of critical care nursing, the administration has a responsibility to provide nurses with substantial continuing education opportunities by them for in-service education programmes, special courses workshop conferences. This will enable the nurses in updating their knowledge.

#### **Nursing research**

There are increasing number of studies related to arterial blood gas analysis in critical care nursing specifically taken up by the nurses at master's and PhD level in various Indian settings.

### **9. Recommendations**

- A similar study may be repeated on large sample; thereby findings can be generalized for a large population.
- Similar kind of studies can be undertaken in different setting and different target population, such as ward sister, Supervisor.
- A study to assess the effectiveness of structured teaching program often

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