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### Effectiveness Of Information Booklet On Knowledge Regarding Abg Interpretation And Selected Nursing Interventions Among Newly Joined Nursing Staffs Working In Critical Care Units Of Selected Hospitals In Bangalore

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#### ABSTRACT

Arterial blood gas (ABG) analysis is one of the most basic tests of pulmonary function, performed routinely in hospitals throughout the world. The proper application of the concepts of acid base imbalance will help the health care provider not only to follow the progress of the patient but also to evaluate the effectiveness of care being provided. 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. To meet this challenge, nurses must understand the mechanisms underlying acid-base balance and the common causes of acid-base imbalance. Considering this major problem, a study was carried out with a purpose of identifying the effectiveness of information booklet on knowledge regarding ABG interpretation and selected nursing interventions among newly joined nursing staffs working in critical care units of selected hospitals in Bangalore. Evaluative approach was used to conduct the study. The design for the study was one group pretest posttest, quasi experimental design. The sample size comprised of 30 staff nurse who met the inclusive criteria were selected by convenient sampling technique The tool consists of Demographic data, self- administered Structured questioner. The data was collected over a period of 4 weeks at selected urban areas Bangalore, pretest was conducted for 45 minutes. Immediately after the pretest, information booklets were given on an individual basis. After seven days posttest was done. The same procedure was continued up to 30 samples. Descriptive statistics and inferential statistics were used for data analysis. The finding shows after the administration of information booklet that 90% of staff nurse have adequate knowledge regarding ABG analysis.

**Keyword:** ABG analysis, staff nurse.

#### INTRODUCTION

ABG is very important method for acquiring patient's acid base

status. This is used to evaluate oxygen and carbon dioxide gas exchange and acid base status. General indications in severely ill adults usually include pathophysiological abnormalities that

can alter gas exchange or acid-base disturbances. Most identified general indications have not been prospectively studied to determine if this analysis is necessary for diagnosis or management. Clinical settings where analysis is indicated involve patients with acute asthma in the emergency room, postoperative treatment of patients who have had coronary artery bypass graft surgery, stable patients in the intensive care unit, and patients receiving prophylactic supplemental low-flow oxygen by nasal cannula.<sup>6</sup> The measurement of arterial blood gas analysis (ABG) has assumed an increasingly important role in the process of clinical evaluation and has been widely used during the past three decades. The number of ABG measurements has increased in different medical conditions due to greater availability.

ABG is performed to know the condition of respiratory system, kidney functioning and the buffer system. Analyzing and interpreting the ABG will help health care workers to diagnose and manage acid base status of a particular patient. This helps health care workers to evaluate the present treatment and health condition of patients. In intensive care units, emergency units, ABG helps to know the oxygenation status and acid base balance of critically ill patients by providing suitable interventions.<sup>1</sup>

Arterial blood gas analysis is an essential part of diagnosing and managing a patient's oxygenation status and acid-base balance. The usefulness of this diagnostic tool is dependent on being able to correctly interpret the results. This helps to examine the components of an arterial blood gas, what each component represents and the interpretation of these values to determine the patient's condition and treatment.

Arterial blood gases sampling has become an integral part of nurse's role when caring for the critically ill children. With the appropriate training a nurse can learn the clinical skills required to obtain a ABGs sample for recognizing any abnormalities and take corrective action.

ABG analysis is a diagnostic tool that allows the objective evaluation of a patient's oxygenation, ventilation and acid-base balance. The results from an ABG will indicate how well a patient's respiratory system is working. However, ABGs can offer more than just information on the respiratory system, they also indicate how well a patient's kidneys and other internal organs (the metabolic system) are functioning. Although all of the data in an ABG analysis can be useful, it is possible to accurately interpret the results without considering all of the values.<sup>9</sup>

The process of analysis and monitoring of arterial blood gas is an essential part of diagnosing and managing the oxygenation status and acid base balance of high risk patients, as well as in the care of critically ill patients in the intensive care units. The proper application of the concepts of acid base imbalance will help the health care provider not only to follow the progress of the patient but also to evaluate the effectiveness of care being provided.<sup>10</sup>

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. To meet this challenge, nurses must understand the mechanisms underlying acid-base balance and the common causes of acid-base imbalance. Nurses are often the first members of the health

care team to see ABG results and an understanding of their significance and the ability to decide when medical staff need to be informed is important. However, acid base balance and ABG analysis are complex concepts, requiring a great deal of study to master. For most health care professionals, nurses included, such in-depth knowledge is not necessary to enable the level of interpretation required.<sup>11</sup>

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.<sup>12</sup>

Nursing as a profession is now responsible to account for its competence and performance. This has seen the birth of the language of outcome. Outcome is mechanism to evaluate quality, improve effectiveness and link practices to professional accountability. ABG analysis requires skillful observations and careful analysis by competent nurses, which can prevent fatal complication in ill patients. The nurse plays an important role in monitoring the patient's progress. A nurse has to be competent and skillful in handling situations that will result in effecting the ABG analysis of the patients. A nurse has to make a decision which is beneficial to the client life. By carefully analyzing, the nurse is able to recognize early causes and manage problems before they arise. When the ABG analysis is done properly, the patient experience more rapid positive outcomes.<sup>13</sup> To maintain homeostasis, the human body employs many physiological adaptations. One of these is maintaining acid-base balance. A Basic comprehension of respiration at cellular level is important in understanding acid-base equilibrium in the human body. Normal cellular metabolism is associated with continuous production of hydrogen ( $H^+$ ) and carbon dioxide ( $CO_2$ ). Human body normally maintains a steady balance between acids produced during metabolism and bases that neutralizes and promotes excretion of the acids.<sup>1</sup>

Despite the fact that acids are produced by body daily, the  $H^+$  concentration of body fluid is small (0.0004 meq/h). This tiny amount is maintained within a narrow range to ensure optimal cellular function. Any deviation in the normal limits of hydrogen ( $H^+$ ) will lead to acid base imbalance. Acid base imbalances are seen in any body system disorder mainly in actually ill patients, diabetes mellitus, COPD, kidney disorders etc.<sup>1</sup> Normally body has three mechanisms or defences to maintain acid base balance; they are buffer system, respiratory system and renal system. Buffer system included  $HCO_3^-$  buffer system, phosphate buffer system and protein buffer system,  $PaCO_2$  is considered as respiratory component of ABG and  $HCO_3^-$  is considered as metabolic component of ABG.<sup>2</sup> Arterial blood gas test requires blood to be drawn from artery (typically radial artery). All aseptic measures to be followed while collecting blood for ABG analysis. Artery should be punctured with heparinized syringe with needle (2G or 22G) and 2ml of arterial blood is collected. Most commonly radial artery is used but often arteries like brachial, femoral also can

be used. If the patient already has a pre-existing arterial line, this can be used to obtain the sample. The sample must be analyzed within 10 min of the procedure to ensure an accurate test results.<sup>6</sup>

An ABG test measures the arterial partial pressure of oxygen (PaO<sub>2</sub>), arterial partial pressure of carbon dioxide (PaCO<sub>2</sub>) and the blood pH. In addition, arterial oxygen saturation (SaO<sub>2</sub>), bicarbonate (HCO<sup>-</sup>) in blood, electrolytes, oxy hemoglobin can be determined. Such information is vital when caring for patients with critical illness or respiratory diseases. Therefore, the ABG test is one of the most common tests performed on patients in intensive care units. ABG testing is mainly used in pulmonology and critical care medicine to determine gas exchange across the alveolar capillary membrane. Blood Gas analysis is used to diagnose and evaluates respiratory diseases, and the acid-base component of the test is used to diagnose and evaluate metabolic conditions that lead to abnormal blood pH.<sup>2</sup> Nurses need to understand the arterial blood gases to interpret them. A nurse cannot be expected to realize the implication of the results without understanding it. There are many causes for acid base imbalances; nurse must have knowledge on interpretation of ABG irrespective of the causes of the acid base imbalance to provide timely best treatment. Every nurse who is working in critical care and emergency setting must know the limitations of the therapy based on the results of the ABG.<sup>6</sup>

**OBJECTIVES**

1. To assess the pre test knowledge regarding the risk factors, prevalence of ABG interpretation and nursing intervention and its effects on health among newly joined critical care nurse.
2. To assess the post test knowledge regarding the risk factors, prevalence of ABG interpretation and nursing intervention and its effects on health among newly joined critical care nurse.
3. To assess the effectiveness of structured teaching programme on knowledge of newly joined critical care nurse regarding risk factors, prevalence of ABG interpretation and nursing intervention and its effects on health by the post test score.
4. To find the association between pretest and post test knowledge scores regarding risk factors, prevalence of ABG interpretation and nursing intervention and its effects on health among newly joined critical care nurse with selected demographic variables.

**HYPOTHESIS**

**H1** – There will be significant difference between the knowledge of newly joined critical care nurses on ABG interpretation and nursing interventions before and after providing information booklet.

**H2** – There will be significant association between the knowledge on ABG interpretation and nursing interventions among newly joined critical care nurses with selected demographic variables.

**METHODOLOGY**

Evaluative approach was used to conduct the study. The design for the study was one group pretest posttest, quasi experimental design. The sample size comprised of 30 newly joined ICU staff nurse who met the inclusive criteria were selected by convenient sampling technique The tool consists of Demographic data, self-administered Structured questioner. The data was collected over a period of 4 weeks at selected Hospitals, Bangalore, pretest was conducted for 45 minutes. Immediately after the pretest, information booklets were given on an individual basis. After seven days posttest was done. The same procedure was continued up to 30 samples. Descriptive statistics and inferential statistics were used for data analysis.

**RESULT AND DISCUSSION**

The major findings as follows:

- majority staff nurse 71% belong to the age group of 26 to 30 years
- majority staff nurse 65% are Hindu
- majority staff nurse 100.% were unmarried
- majority staff nurse 40% belong to vegetarian.
- majority staff nurse 51.% have not attend any traing session.
- majority staff nurse 65% were female
- majority staff nurse 47% belongs to GNM
- majority staff nurse 48% got information from media

Association between Knowledge score with selected demographic variables. It is evidence from the above table that there is no significant association between Knowledge score with selected demographic variables at 0.05 level. pre test level of knowledge regarding of ABG interpretation and nursing intervention among newly joined critical care nurse.

**Table 1: Frequency and percentage distributionof the subjects according to their pre test knowledge score. N=30**

Sl. No	Level of knowledge	Pre test	
		Frequency(f)	Percentage (%)
1	Inadequate	30	100
2	Moderately adequate	00	00
3	Adequate	00	00

The data table-I shows that out of 30 subjects 30 had inadequate and none of the subjects moderately or adequate level of knowledge regarding ABG interpretation and nursing intervention in the pre-test.

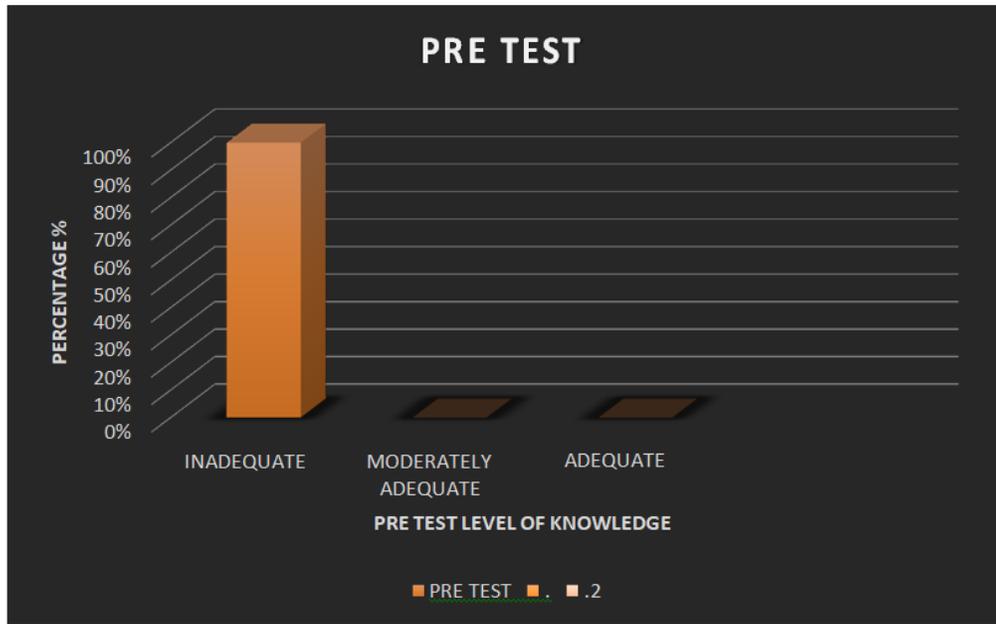


Fig 1: Bar diagram showing the percentage distribution of Pre test level of knowledge among subjects.

N=30

SL. NO	Level of knowledge	Pre test		Post test	
		Frequency(f)	Percentage (%)	Frequency(f)	Percentage (%)
1.	Inadequate	30	30	-	-
2.	Moderately adequate	-	-	3	10
3.	Adequate	-	-	27	90

The data in table-II shows that among the 30 subjects all of them 30(100%) had inadequate level of knowledge, and none of the subjects had moderately adequate or adequate level of knowledge regarding ABG interpretation and nursing intervention in the pre test. But in the post test out of 30 subjects, 3(10%) gained moderately adequate level of knowledge and 27 (90%) gained adequate level of knowledge regarding ABG interpretation and nursing intervention.

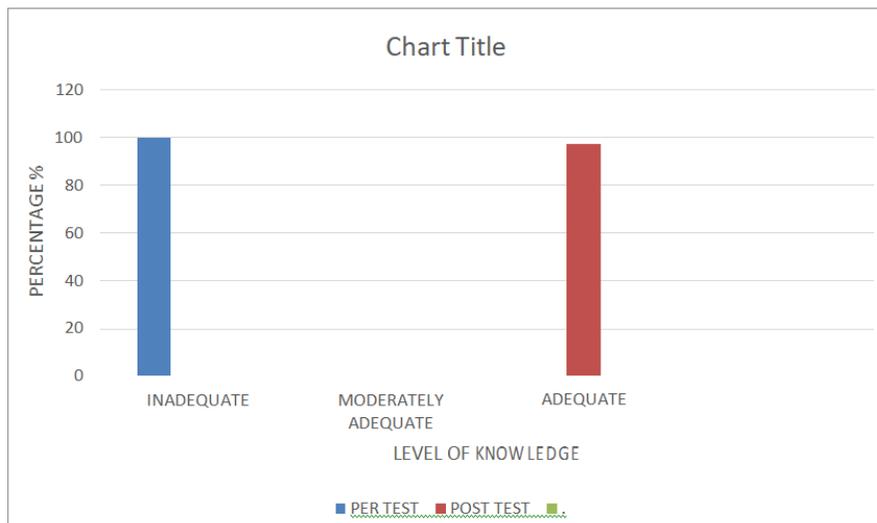


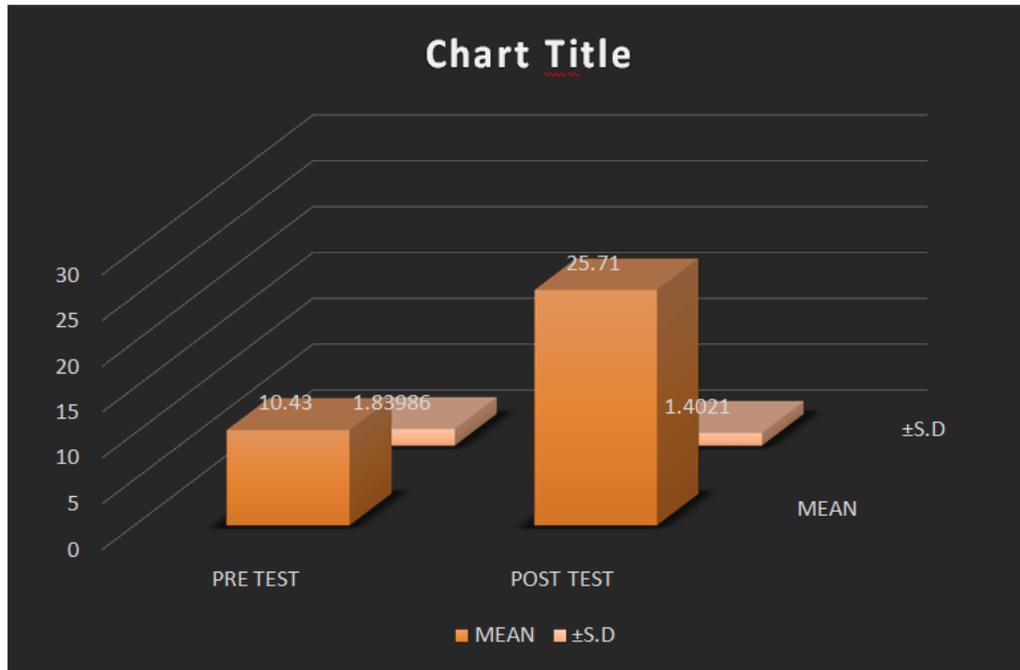
Fig 2: Bar diagram showing the percentage distribution of Pre test and Post test level of knowledge among subjects.

**Table 3: Mean, SD and ‘t’ value showing the difference between mean pre test and post test knowledge scores. N=30**

Variable	Mean		±S.D		t value
	Pre test	Post test	Pre test	Post test	
Overall knowledge score	10.43	25.71	1.83986	1.4021	<b>66.26*</b>

*T99=1.660, P<0.05*

Data in table III shows that mean post test score 25.71 is higher than the pre test knowledge score 10.43. The calculated ‘t’ value - t99=66.26 is greater than the table value (t99=1.660) at 0.05 level of significance which shows that there is significant difference between the pre test and post test knowledge score. Hence the null hypothesis is rejected research hypothesis is accepted.



**Fig 3: Bar diagram showing mean and SD scores of pre test and post test.**

***Knowledge scores of staff nurse on ABG analysis***

The mean knowledge score of staff nurse regarding ABG analysis in pre test 10.43, and SD 1.83 and in post test 25.71 and SD 1.40.

***To determine the association between knowledge of staff nurse with the selected demographic variables***

There is a no significant association between the knowledge and demographic variables.

**CONCLUSION**

The finding shows after the administration of information booklet that 90% of staff nurse have adequate knowledge regarding ABG analysis. The studies state the importance of ABG analysis in selected hospitals. The study helps the staff nurse to aware about the ABG analysis in many ways. It is very much important for the staff nurse to have adequate knowledge regarding ABG analysis. The result of the present study shows that there is a great understanding and knowledge regarding ABG analysis among staff nurse.

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