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K Padma
Assistant Professor
Department of Medical Surgical Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

Anju Priya
B. Sc Nursing Department of Medical Surgical Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

N Subhashini
Assistant Professor
Department of Medical Surgical Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

Dr. Indira S
Principal & Nursing Dean
Department of Medical Surgical Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

Correspondence
K Padma
Assistant Professor
Department of Medical Surgical Nursing, Narayana College of Nursing, Chinthareddypalem, Nellore, Andhra Pradesh, India

A study to assess the knowledge regarding ABG analysis and interpretation of ABG results among staff nurse in NMCH, Nellore

K Padma, Anju Priya, N Subhashini and Dr. Indira S

Abstract
Background: An arterial blood gas (ABG) study as a blood test that measures that levels of many different gases the oxygen rich blood, some of these level measured directly while other are calculated from the measurement of other gases. By measuring the gases in arterial blood.
Objective: To assess the level of knowledge ABG analysis and interpretation of ABG results among staff nurse in NMCH, Nellore.
Materials and Methods: Descriptive cross sectional design and convenient sampling technique was followed which included 30 samples were used. Data was collected using structured questionnaire. Data analysis was done with SPSS.
Results: Shows that with regard to ABG analysis and interpretation results among 30 staff nurses, 4 (13.3%) had 'A' grade, 7(23.3%) had B+ grade, 12 (40%) had B grade, 5 (16.7%) had C grade and 2 (6.7%) had D grade knowledge and mean value was 19.0 and standard deviation was 3.5 in staff nurses.
Conclusions: The study concluded that majority of staff nurses had D grade knowledge.

Keywords: ABG analysis, PaO_2, $PaCO_2$

Introduction
Circulatory system is a group of organs that transport blood and the substance if carries to and from all parts of the body the circulatory system can be considered as composed of two parts. The systemic circulation which serves the body has a whole except for the lungs and pulmonary circulation, which carries the blood to and for the lungs. The organs of circulatory system consists of vessels the carry the blood and a muscular pump the heart that drives the blood.
Red blood cells transport oxygen and carbon dioxide blood gases throughout the body, the oxygen and carbon dioxide levels of our blood and P^H imbalance of our blood can indicate the presence of certain medical condition such as cardiac, lung or kidney disorders.
Arterial blood gas analysis provides information about oxygenation and ventilation. The examiner obtains a blood sample by direct puncture of Radial, Brachial or Temporal artery. If the radial artery is to be used the examiner performs an Allen's test first to ensure the hand has adequate collateral blood flow. To prevent clotting of the sample the examiner uses a pre heparinized syringe to collect the blood. Once 2 ml of blood is obtained air bubbles are expelled and syringes is scaled with an impermeable cap to prevent contact with room air. The blood sample is placed on ice until analysis arterial punctures are contraindicated in patients receiving thrombolytic agents.
An in- dwelling arterial catheters is commonly used to obtain blood sample in the critically ill. The catheter should be flushed according to hospital protocol to prevent clotting. Continuous arterial blood gas monitoring is also performed in certain instances [1].
ABG determinations are used in the management of client of mechanical ventilators. Interpretation of arterial blood gas (ABG) level can be difficult, especially if the nurse is under pressure to do it quickly and accurately, one method that can help ensure acutely when analyzing ABG levels is to follow the same steps of interpretation each time. A specific method to be used each time that blood gas values must be interpreted is presented here.

Steps for interpretation of blood gas levels

Step 1: The paO_2 values for person breathing room air at sea level is 80-100 mm Hg.

Step 2: the PH is the hydrogen ion (H^+) concentration of plasma. Calculation of PH is accomplished by using the partial pressure of Carbon Dioxide ($paCo_2$) and the plasma bicarbonate level (HCO_3).
The normal PH of arterial blood is 7.35 to 7.45 and the mean is 7.40.

Step 3: The $paCo_2$ is a measure of the partial pressure of carbon dioxide dissolved in arterial blood plasma and it is reported in million meter of mercury (mm Hg.)
The normal range for pa Co_2 is 35 to 45 mmHg

Step 4: Bicarbonate (HCo_3) is the acid base component that reflects kidney function. The bicarbonate level is reduced or increased in the plasma by renal mechanisms. The normal range is 22 to 26 mg/l

Step 5: If the PH level is abnormal (less than 7.35 or greater than 7.45). the $paCo_2$ value or the HCO_3 level of both, will also be abnormal.
By comparing the PH, $paCo_2$ and HCO_3 level or both will also be abnormal ABG values.[2]

Table 1: Shows the Normal and Abnormal values for arterial blood gases

Value	Definition	Normal Range	Abnormal range
PH	Indication by hydrogen ion concentration	7.35-7.45	<7.35-acidosis >7.45 alkalosis
pao_2	Respiratory parameters indication of adequacy of ventilation and carbon dioxide elimination	35-45	<35 = alkalosis >45 = acidosis
$paCo_2$	Reflects the body's ability to use and transport oxygen through the system	80-100	<80 hypoxemia
HCO_3 level	Metabolic parameter; assess the kidney ability to retain or excrete HCO_3	22-26	<22 acidosis >26 alkalosis

ABG is used to assess the effectiveness of gaseous exchange and ventilation spontaneous or mechanical. It would therefore seen logical to request an ABG on any patient who is or has the potential to become critically ill [3].
Acid base balance and ABG analysis are complex concepts requiring a great deal of study in order to improve the knowledge for all staff nurses regarding ABG analysis and interpretation of results.
Risho By Re (2012) conducted a cross sectional study to assess the knowledge regarding ABG analysis among nurses in SPSS University. The study sample was 400 nurses and the convenience sampling technique was used for selection of data and data was analysed in the form of descriptive and inferential statistics. Results showed that majority 52.5% of critical care nurses have good knowledge regarding ABG analysis and poor knowledge in ward nurses about 25.7%. The study was concluded by nurses need a practices regarding ABG analysis help to improve the knowledge among nurses [4].
Advances in medical science and technology have prompted the establishment of many highly specialized units (ICUs) providing intensive patient care. ICU psychosis /Delirium in the intensive care unit is a serious problem that has recently attracted much attention. As
the number of intensive care units and the number of people in them grow, ICU psychosis is perforce increasing as a problem [5].
Low birth weight is defined as a birth weight of a live born infant of less than 2500 g (5 pounds 8 ounces) regardless of gestational age. This study is conducted to compare the knowledge of primigravida and multigravida mothers on low birth weight babies. Comparative research design is used to conduct the study on 50 mothers (25 primi and 25 multigravida) from the OPD, Maternity Hospital were selected by non-probability convenience sampling technique. Assessment of knowledge on low birth weight babies among 25 primi mothers, 16 (64%) had moderate knowledge, 7 (28%) had inadequate and 2 (8%) had adequate knowledge. Among multi gravida mothers, 13 (52%) had moderately knowledge, 6 (24%) had inadequate and 6 (24%) had adequate knowledge. The study concluded that among primi mothers majority, 16 (64%) had moderately adequate knowledge and in multi gravida mothers, 13 (52%) had moderate knowledge [6].
The purpose of the study was to identifying the knowledge of the staff nurses regarding ABG Analysis and Interpretation and also in order to improve their skills and knowledge in ABG results.

Statement of the problem: A study to assess the knowledge regarding ABG analysis and interpretation of ABG results among staff nurse in NMCH, Nellore.

Objectives of the Study

- To assess the level of knowledge regarding ABG analysis and interpretation of ABG results among staff nurses.
- To find out the association between the level of knowledge regarding ABG analysis and interpretation of ABG results among staff nurses with their selected socio demographical variables.

Materials and Methods

- **Sampling and data collection: Descriptive cross sectional design**, used to assess the level of knowledge regarding ABG Analysis and Interpretation among staff nurse in NMCH at Nellore. Non-probability convenient sampling techniques was used. Staff nurses Who are working in Narayana Medical College Hospital, Both male and females and Who are working in General ICU, M.HDU, Emergency wards and Cardiac ICU. Who are not willing to participate, who are sick and who are on leave were excluded. Prior Permission was obtained from ethical clearance committee Participants signed an informed consent [5].

Description of Tool

Part I

deals with the socio demographic variables of the knowledge regarding care of dying patient among staff nurses, they are age, gender, educational qualification, total

professional experience in ICU, source of information and attended any CNE.

Part II

deals with the self-administered structured questionnaire to assess the level of knowledge regarding ABG analysis and interpretation of the results among staff nurses consists of 40 closed ended multiple choice questions which was developed by the investigator.

The tool consists of 40 items, each correct response has been scored with one mark. The total possible score was 40 and each wrong answer has been scored with 0 mark.

Score Interpretation: The score was interpreted as follows:

Grade	Score
A+	>85%
A	>75%
B+	>65%
B	>55%
C	>50%
D	<50%

Data analysis: Data was analysed by using descriptive and inferential statistics. Frequency, percentage, mean, standard deviation and chi-square test were done.

Results: The results shows that frequency and percentage distribution with regard to 28(93.3%) staff nurses are between 21-24 years and 2(6.7%) are between 25-27 years, with regard to gender 29(96.7%) staff nurses are females and 1(3.3%) staff nurse is male, regard to educational qualification, 29(96.7%) studied BSC (N) and 1(3.3%) studied PBBSC (N).

With context to professional experience 15 (50%) staff nurses are below 1 year, 14(46.7%) nurses have 1-3 years and 1(3.3%) nurses has 3-5 years, regard to duration of experience in ICU, 16 (53.3%) have <1 year experience, 8(26.7%) have 1-2 years experience, 5(16.7%) have 2-3 years experience and 1(3.3%) have >3 years, regard to area of working., 4 (13.3%) staff nurses are working in emergency,8(26.7%) are in HDU,7(23.3%) are in cardiology ICU and 11(36.7%) in general ICU.

Table 2: Frequency & Percentage distribution of staff nurses based on level of knowledge n=30

Level of Knowledge	Nursing faculties	
	Frequency (f)	Percentage (%)
A+	4	13.3
B+	7	23.3
B	12	40
C	5	16.7
D	2	6.7
Total	30	100

Table 3: Mean and standard deviation of knowledge scores of Staff nurses (n=30)

Group	Mean	Standard Deviation
Staff nurses	19.67	3.56

For staff nurses there was significant association with educational qualification and the remaining variables professional experience, duration of experience in ICU and area of working are non-significant

Discussion

The discussion of the present study was based on the findings obtained from the descriptive and inferential statistical analysis of collected data. It is presented in the view of the objectives of the study. The study related to level of knowledge regarding ABG analysis & Interpretation, Pertaining to level of knowledge regarding ABG analysis and interpretation among staff nurses, majority 12 (40.0%) had 'B' grade knowledge. Results shows with regard to association, there was significant association between the level of knowledge of staff nurses on ABG analysis and interpretation results with socio demographic variables such as educational qualification and there was no significant association between the level of knowledge on ABG analysis and interpretation with socio demographic variable of age, gender, professional experience, duration of experience in ICU and area of working.

Conclusion

The study concluded that 12 (40%) majority of staff nurses had B grade knowledge regarding ABG analysis and interpretation of results

Recommendations

- A similar study can be replicated as a large sample to generalize findings special education programme can be provide to staff nuses.
- A similar study can be done in different sittings.
- An experimental study can be conducted to assess the effectiveness of ABG analysis and interpretation results in various settings.
- Planned teaching can be conducted to improve ABG analysis and interpretation results.

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