



“A Study To Assess The Effectiveness Of Structured Teaching Program On Knowledge Regarding ABG Analysis And Its Interpretation Among Staff Nurses Those Who Are Working In Critical Care Unit In Various Hospitals Of Moradabad”S

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OBJECTIVES OF THE STUDY

1. To assess the level of knowledge among staff nurses regarding ABG analysis.
2. To determine the effectiveness of structured teaching program on knowledge regarding ABG analysis among staff nurses.
3. To find the association between knowledge on interpretation regarding arterial blood gas values among critical care nurses and selected base line variable.

4. NEED FOR THE STUDY

The arterial blood gases is one of the most important investigation for assessment of clinical oxygenation and acid – base status in critically ill patients, it provides us with information about ventilation, oxygenation and acid base status.

[Cardio thoracic center Pune (2004)]

Arterial blood gas tests will help any healthcare professional to interpret certain condition that influence respiratory system, circulatory system, or metabolic process in critical situation.

The test requires a blood sample from an artery to measure the oxygen and carbon dioxide ranges in the blood. Again it checks the balance of acids and bases, known as the pH of blood.

Body normally very judiciously regulates the ranges of oxygen and carbon dioxide in the blood. Low blood oxygen levels or hypoxemia can give rise to many criticalities and damage vital internal organs.

For blood gas analysis, the sample of blood from anywhere in blood, like an artery, veins, or capillary. An artery is the only place from which blood is collected for an arterial blood gas test, commonly known as an ABG test, arterial blood gas analysis, etc.

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REVIEW OF LITERATURE

1. **Indira S, et al. (2017)** conducted a descriptive study to assess the knowledge regarding ABG analysis and interpretation of ABG results among staff nurses in NMCH, Nellore .The study was conducted on 30 samples and the result shows that 4 (13.3%) had ‘ A’ grade , 7 (23.3 %) had ‘ B+’ grade, 5 (16.7 %) had ‘ C’ grade and 2 (6.7 %) had ‘ D’ grade knowledge and mean value was 19.0 and SD was 3.5 in staff nurses , which conclude that majority of staff nurses had D grade knowledge.
2. **Amith Banga (2016)** 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%).
3. **Dr. SunithaUgramurthy (2018)** 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.
4. **Anil GD et al.(2015)** conducted a prospective observational study on severe metabolic acidosis among 100 critically ill patients of JSS Hospital, Mysore and its impact on the outcome. It was found that out of 86 patients who had lacacidosis, 69 patients expired. Out of 69 patients who had high anion gap acidosis, 47 patients had adverse outcome and a high base deficit is associated with high mortality 79.4 per cent. Out of 55 patients who were on mechanical ventilation 45 of them expired, 37 required vasopressor support and 34 had lactic acidosis. Study reveals that critically ill patients with metabolic acidosis had higher mortality rate.

5. **Winterhalter M (2019)** conducted a study on changes of arterial blood gas analysis with post-operative cardiothoracic-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 cardiothoracic surgery required post-operative ventilation during the transport from the operating theater to the intensive care unit. Akguls, (2002) Turkey Intensive care unit of a Istanbul university hospital staff nurses stated that,. They conducted the study regarding pH change before and after administration of normal saline the study results shows that there is no significant difference was found between pH levels recorded before and after 5 minutes suctioning with saline solution however the increase in pH following suctioning with saline solution was significant.
6. **Seguin P, et al [2016]**, France states that The comparison between the pulse oximetry saturation [SPO₂] with arterial blood gas saturation [SaO₂] obtained during clinical routine examination, study findings concludes that SaO₂ ranged from 87 to 99% and SPO₂ ranged from 92% to 100%. Based on this result the author concluded that before defining Fio₂ with SpO₂ the materials used daily must be evaluated
7. **Chen CZ, Hsiue TR (2018)**, Department of Internal medicine, college of Medicine National University Tainan, Stated that arterial blood gas analysis knowledge is useful in evaluation of the clinical condition of critically ill patients , however, arterial puncture or insertion an arterial catheter may be used for arterial blood gas analysis, Through this we can evaluate pH, partial pressure of carbon dioxide PaCo₂ and partial pressure of oxygen PaCo₂ and bicarbonate, (HCo₃) and predict the ABG analogs for patients with acute respiratory failure treated by mechanical ventilation in an intensive care unit.
8. **Gerontol A (2018)** Institute of Internal Medicine and Geriatrics, University of Siena, Italy stated that arterial blood gas analysis is a first step diagnostic approach in patients with suspected respiratory disorders. Respiratory alkalosis and acidosis were also the metabolic disorders diagnosed in earlier stage through the Arterial Blood gas analysis.
9. **Coleman (2016)** Australia nursing journal stated that information about acidbase balance is to be useful, we need to know how to interpret arterial blood gas [ABGs] so we can intervece rapidly when the body is unable to restore a normal acid-base balance in the face of an overwhelming derangement.
10. **Zimmerman (2018)** critical care clinic's, Baylor college of medicine, USA stated that arterial blood gas (ABG) measurement are one of the most frequently requested laboratory examinations in critically ill patients, ABGs include measurement of pH₁, PaCo₂ and Oxyhemoglotion saturation these measurements allows for assessment often nature, progression, and severity of metabolism and respiratory disturbances.
11. **Ventriglia WJ. (2019)**, Emergency medical clinic North America stated that blood gas determination provide detailed information regarding cardiopulmonary and metabolic homeostasis in the emergency patient. The rapidly available arterial blood gas (ABG) analysis is useful in the resuscitation of the acutely all or injured patient.
12. **Faria SH, (2018)** Journal of vascular Nursing stated, that many clinical nurses find the concept of acid/base balance confusing. The nurse can use the further step approach in ABG interpretation. In addition, the components at ABGs [pH₁ PCo₂ andHCo₃] are essential, metabolic and respiratory abnormalities [Acidosis and alkalosis] related cause and signs

& symptoms. By using this approach, the nurse can analyze the ABG values confidently and make a wise choice about appropriate nursing actions

13. **Gooms (2014)** Thailand stated that ABG analysis is a diagnostic tool that allows the objectives 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, ABG can offer more than just information on the respiratory system they also indicate how well patients kidneys and other internal organs [The metabolic system] are functioning.

RESEARCH METHODOLOGY

The methodology is most important part of research as it is the framework for conducting a study. A research methodology defines what the activity of research is, how to proceed, how to measure progress, and what constitutes success:

Research methodology indicates the general pattern for organizing the procedures together valid and reliable data for an investigation. It is a way to systematically solve the research problem.

This chapter deals with description of methodology and different steps which are adopted for the study. It includes research approach, research design, setting of the study, population, sample and sampling technique, development and description of tool, content validity, reliability, pilot study, data collection process and plan for data analysis.

RESEARCH APPROACH

Research approach is a systemic, objective method of discovery with empirical evidence & rigorous control. The research approach spells out the basic strategies that the researcher adopts to develop information that is accurate and interpretable. The control is achieved by holding conditions constant & varying only the phenomenon under study

It involves the description of the plan to investigate the phenomenon under study in a structured (quantitative) and unstructured (qualitative) or a combination of these two methods. The investigator adopted a structured approach for the study since the aim of the study was to assess the effectiveness self-instructional module on the knowledge regarding proper body mechanics among critical care nurses.

The research approach for this study is quantitative approach.

RESEARCH DESIGN

For this study the research design chosen is quasi-experimental design which includes pre-test and post-test. The design was used for assessing the level of knowledge of staff nurses regarding ABG analysis

VARIABLES

A variable is a phenomena or characteristic or attribute that changes . Variables are measurable characteristic of a concept and consist of logical group attribute

➤ **Dependent variable:**

In this study knowledge of staff nurses regarding ABG sampling technique is a dependent variable

➤ **Independent variable:**

In this study, structured teaching program [STP] regarding ABG sampling technique is the independent variable.

➤ **Extraneous variable:**

In this study, extraneous variable are age, gender, professional qualification, area of work, working experience, and previous information.

RESEARCH SETTING

Site:

Site is the exact physical location where the study was conducted.

- ❖ Vivekananda hospital , Moradabad (Uttar Pradesh)
- ❖ Apex Hospital Moradabad (Uttar Pradesh)

Setting:

Setting is the physical location of the site in which data collection take place.

Presented study was conducted at CCU of Vivekananda and Apex hospital, Moradabad, (UttarPradesh)

POPULATION

The population of present study was staff nurses who are working in Asian Vivekananda super specialty hospital at Moradabad and district hospital were the populations for the study who fulfill the criteria are selected as a sample. Ethical consideration was obtained to conduct the study.

SAMPLE

Sample consist of staff nurses working in CCU of Vivekananda and apex hospital.

SAMPLE SIZE

The sample comprises of 60 staff nurses, who met the inclusion criteria and working in CCU of Vivekananda and district hospital, Moradabad.

SAMPLING TECHNIQUE

In this study non probability purposive sampling technique was used to select the sample who met inclusion criteria.

INCLUSION CRITERIA

- Critical care nurses irrespective of their gender and years of experience working in CCU.
- Nurses who are present during the period of data collection.
- Nurses who have consented to participate

EXCLUSION CRITERIA

- Critical care nurses who are on leave during data collection period.
- Nurses who are not willing to participate in this study.

TOOL

The instrument used for data collection in this study was self-structured questionnaire which consists of 3 sections.

Section A: It consist of demographic variable of staff nurses such as gender, age, qualification, clinical experience, area of experience, and designation.

GENDER

TABLE NO - 1

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
1.	GENDER		
	MALE	32	53
	FEMALE	28	46

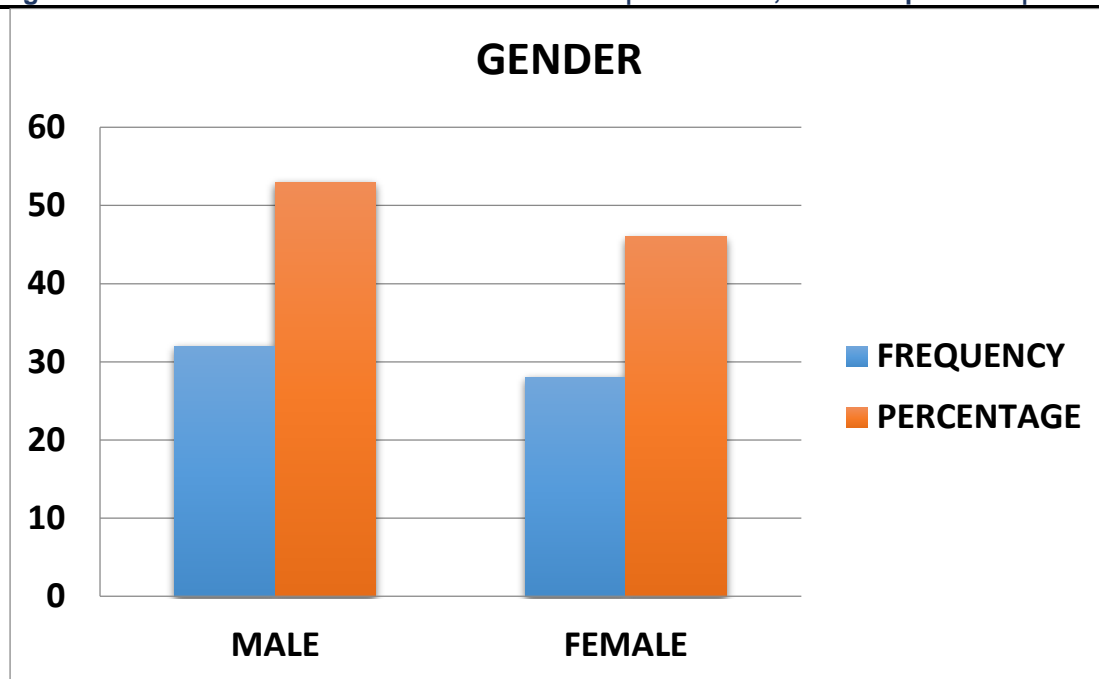


FIG 1 . GRAPH SHOWING GENDER OF THE DEMOGRAPHIC DATA

Table no and figure 3 depicts the gender of the staff nurses .the data represented in the table 2 shows that the majority of the sample population was that of the male staff (53%) and the remaining 46% staff are females

AGE IN YEARS:

TABLE NO.1.2

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
2.	AGE		
	20 – 30 YEARS	55	92
	31 – 40 YEARS	05	08

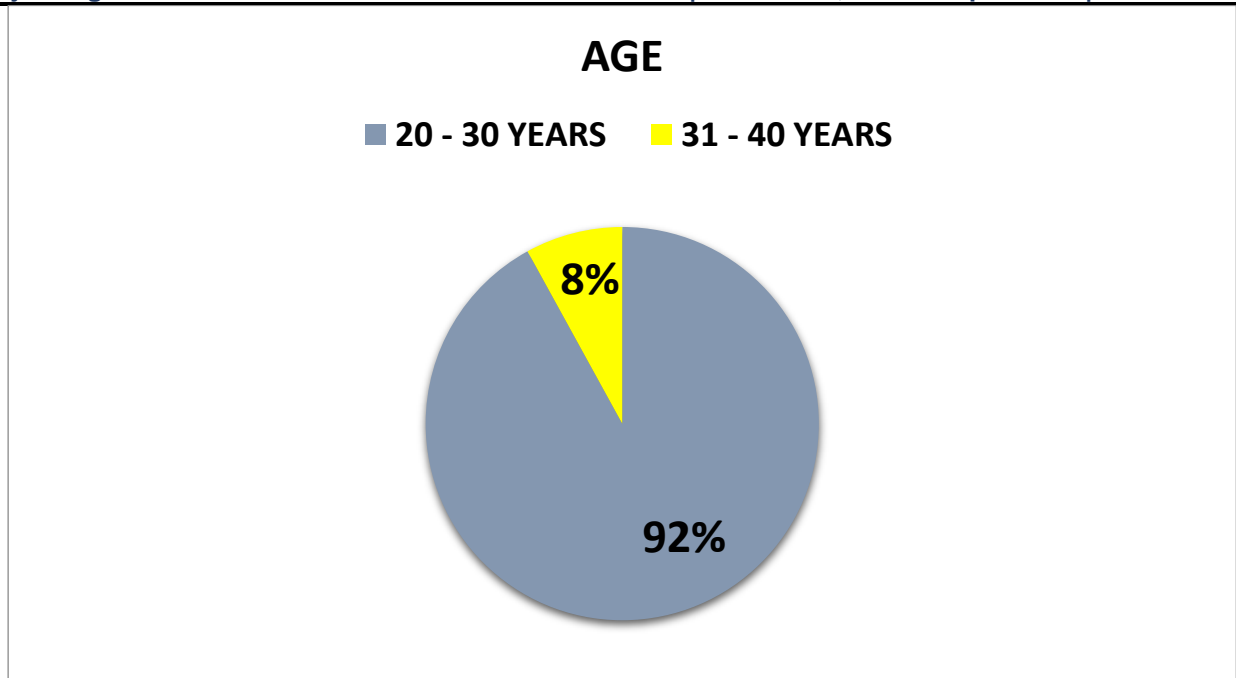


FIG. 2 PIE DIAGRAM SHOWING DISTRIBUTION OF AGE AMONG STAFF NURSES

Table no1.2 and fig no. 2 depicts the age of the staff nurses. The age group of 20-30 years made a majority of the sample population (92 %) remaining (8%) are age group of 31 to 40 years .

QUALIFICATION:

TABLE NO. 1.3

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
3.	qualification		
	GNM	26	43
	P.B.B.SC NURSING	04	07
	B. SC NURSING	27	45
	M. SC NURSING	03	05

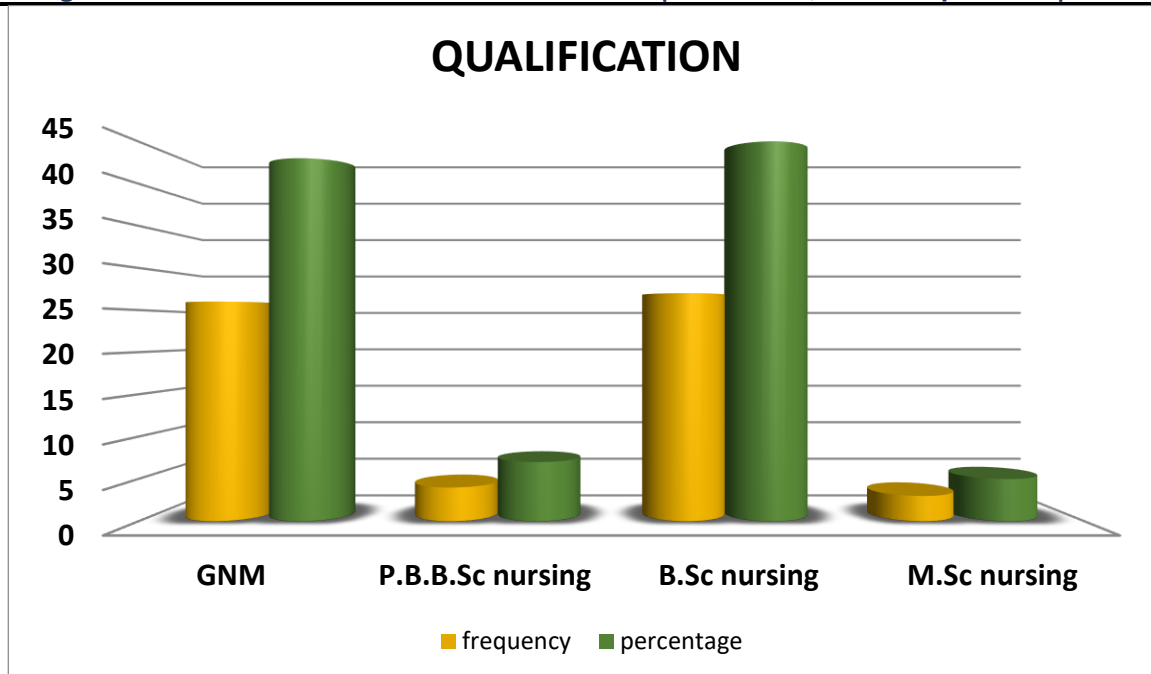


FIG. 3 THIS GRAPH SHOWS THE QUALIFICATION OF STAFF NURSES

Table no.1.3 and fig.3 depicts the qualification of the staff nurses. The data represented in the above table that 45 % of samples had a qualification of B. SC Nursing , 43 % samples of G.N.M, 7 % samples of P.B. B. sc nursing and 5 % samples of m. sc nursing.

CLINICAL EXPERIENCE:

TABLE NO.1.4

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
3.	CLINICAL EXPERIENCE		
	0 –1 YEAR	33	55
	2-3 YEARS	09	15
	3-4 YEARS	04	07
	ABOVE 4 YEARS	14	23

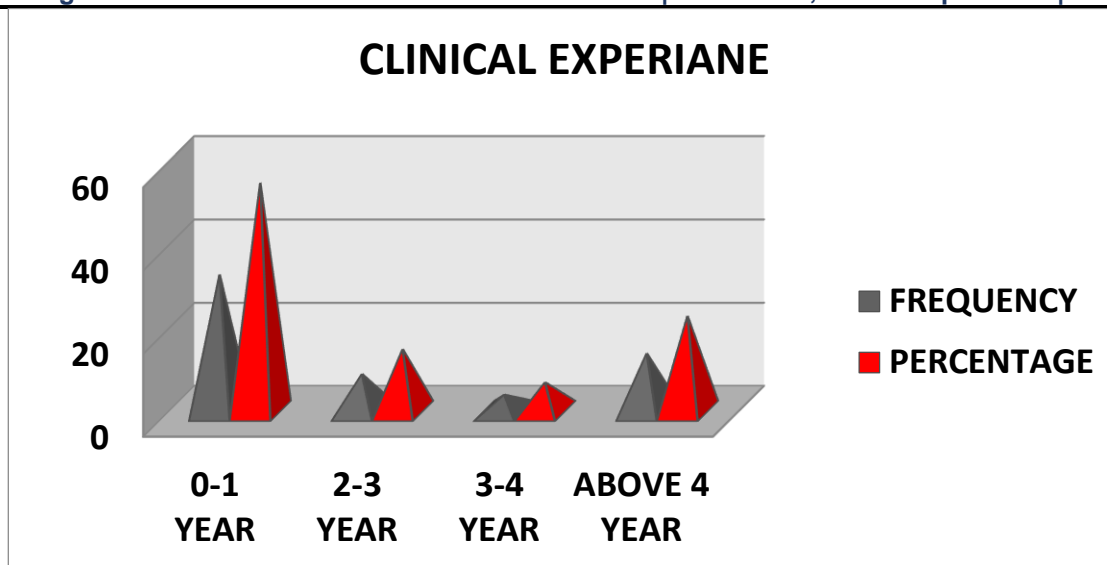


FIG 4: THIS GRAPH SHOWS THE CLINICAL EXPERIENCE OF STAFF NURSES

The above table and fig. 4. Depicts the clinical experience of the staff nurses .the data represented in the above graph shows 55% samples had 0-1 year clinical experience , 15% had 2-3 year experience , 7 % had 3-4 years experience and 23% had above 4 year clinical experience

AREA OF EXPERIENCE:

TABLE NO.1.5

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
5.	AREA OF EXPERIENCE		
	ICU	26	43
	CCU	07	12
	GENERAL WARD	27	45

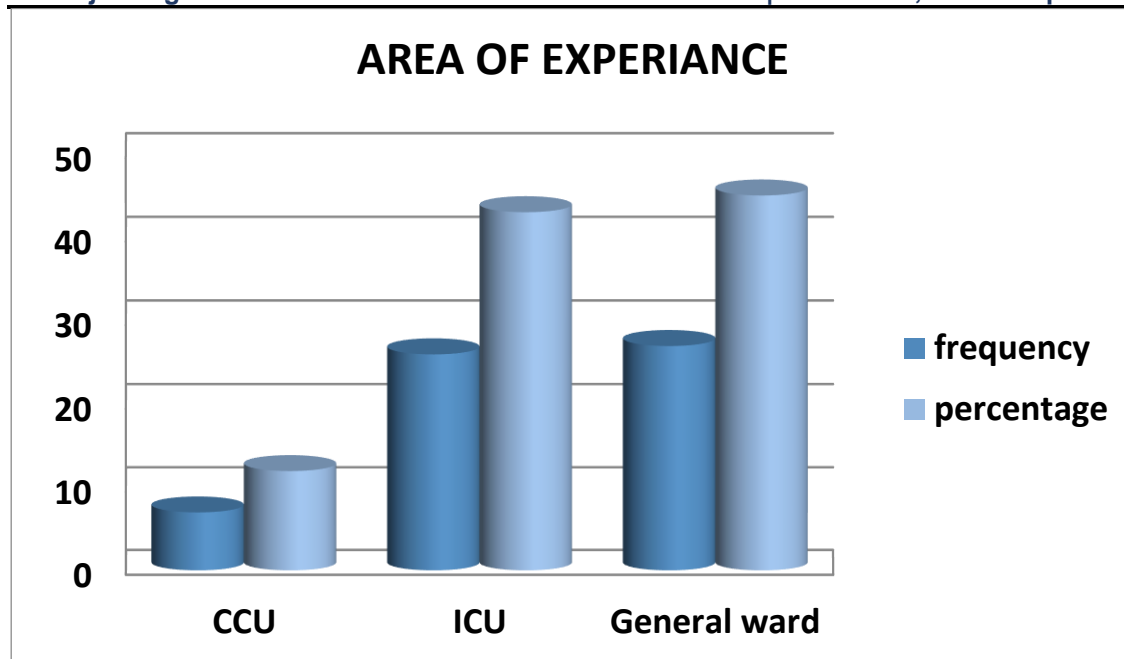


FIG 5: THIS GRAPHS REVEALS THE AREA OF EXPERIENCE OF STAFF NURSES

Above table and fig 5 . depicts the area of experience of staff nurses which shows 45% of samples had an experience with general ward, 43% were that of ICU and the remaining 12% belong to CCU .

DESIGNATION:

TABLE NO1..6

S.NO	DEMOGRAPHIC DATA	FREQUENCY	PERCENTAGE
6.	Designation		
	HEAD NURSE	08	13
	INCHARGE	07	12
	WARD NURSE	45	75

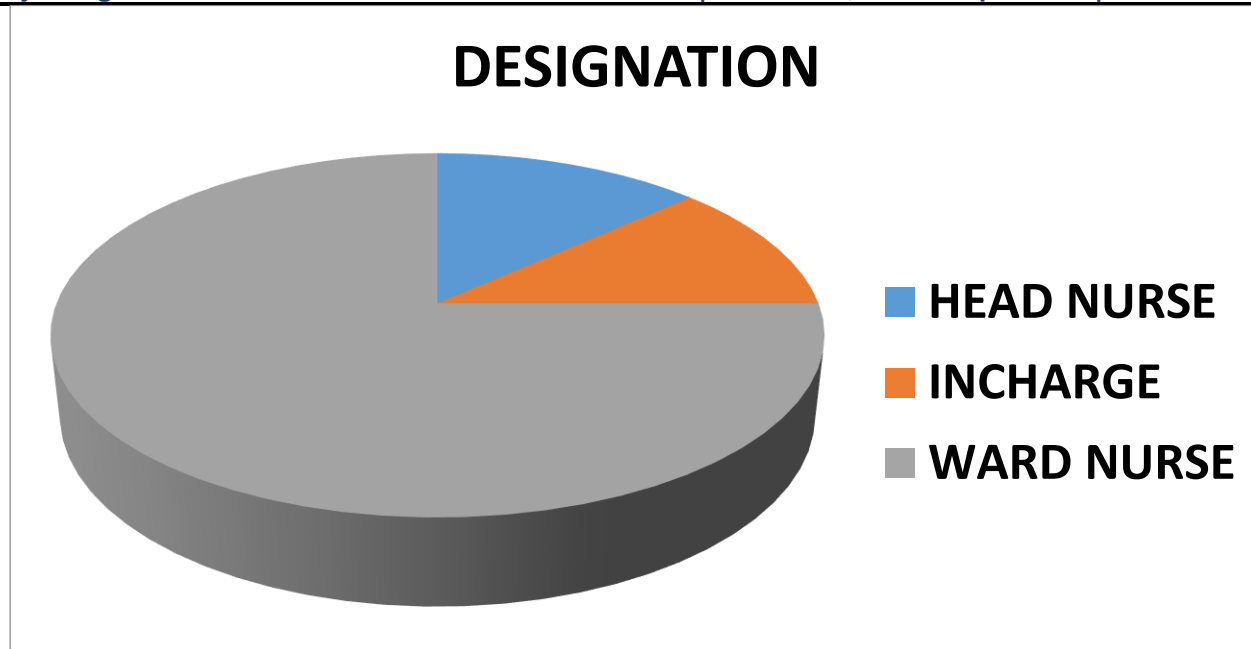


FIG 6: PIE CHART SHOWS THE DESIGNATION OF THE STAFF NURSES

Above graph and fig 6 depicts the designation of staff nurses which shows 75% of the staff nurses were ward nurses , 13% were head nurses and 12% were incharges

Section B: Self-structured questionnaire on knowledge regarding ABG analysis:

- a) Introduction regarding ABG analysis
- b) Procedure for taken the sample
- c) Reference ranges regarding ABG analysis

It consist of 20 items, all the items were multiple choice questions it divided into the areas like basic knowledge regarding ABG analysis.

- Introduction: 03
- Procedure: 07
- Interpretation: 10

TABLE NO. 2.1

FREQUENCY AND PERCENTAGE OF STAFF NUESSES BY THE LEVEL OF KNOWLEDGE BASED ON THEIR KNOWLEDGE SCORE (PRE TEST)

S. NO	LEVEL OF KNOWLEDGE	FREQUENCY	PERCENTAGE (%)
1.	ADEQUATE KNOWLEDGE	18	30
2.	AVERAGE KNOWLEDGE	42	70

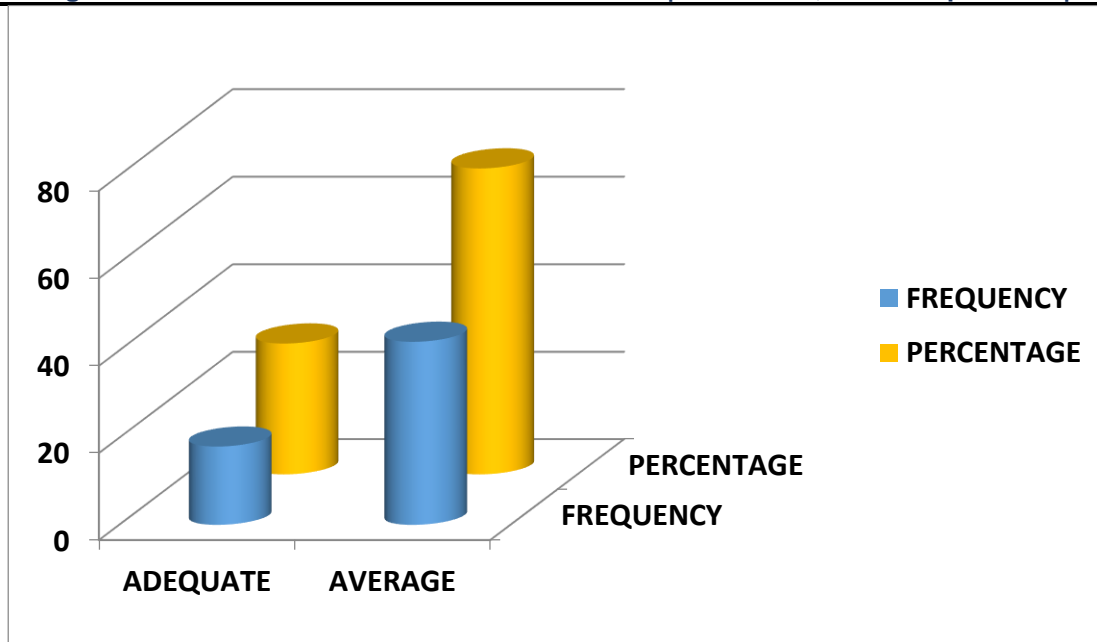


FIG. 7 THIS GRAPH REVEALS KNOWLEDGE OF DEMOGRAPHIC VARIABLE IN PRE TEST

- ✓ Above table shows that frequency and percentage distribution of samples according to the knowledge score of staff nurses regarding ABG analysis. it reveals that 70 % have average , and 30 % have adequate knowledge in pre-test.

TABLE NO.: 2.2
FREQUENCY AND PERCENTAGE OF STAFF NUESSES BY THE LEVEL OF KNOWLEDGE BASED ON THEIR KNOWLEDGE SCORE (POST TEST)

S. NO	LEVEL OF KNOWLEDGE	FREQUENCY	PERCENTAGE (%)
1.	ADEQUATE KNOWLEDGE	52	86.3
2.	AVERAGE KNOWLEDGE	08	13.3

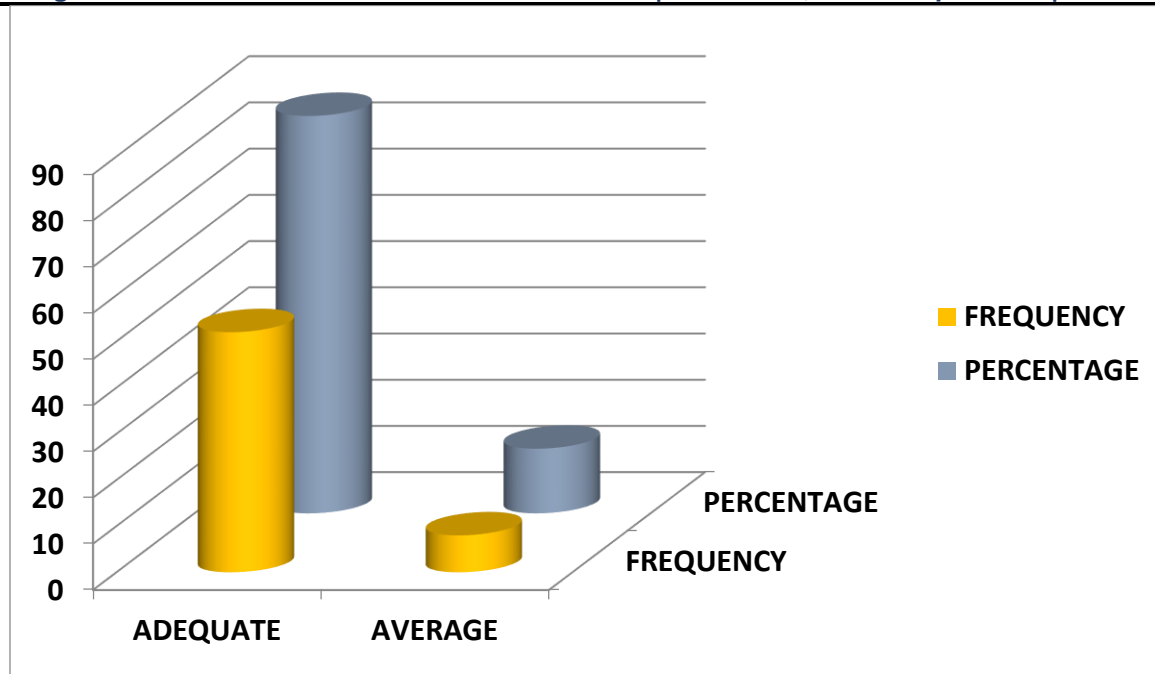


FIG.8 THIS GRAPH REVEALS KNOWLEDGE OF DEMOGRAPHIC VARIABLE IN POST TEST

- ✓ Above table shows that frequency and percentage distribution of samples according to the knowledge score of staff nurses regarding ABG analysis. it reveals that **86 %** have adequate , **14%** have average knowledge in post-test.

1. Comparison of mean of pre-test and post-test level of knowledge regarding ABG analysis.

TABLE NO.3

Group	Mean	Std. deviation	P value	df	't' value
Pre-test	12.2500	2.13625	0.250	59	-14.085
Post-test	16.6000	1.74861			

- Above table depicts the mean pre-test level of knowledge regarding ABG analysis is 12.25 which increased to 16.60 at post test. There is effectiveness of structured teaching program to improve the knowledge regarding ABG analysis among staff nurses working in CCU.

VALIDITY

The content validity was assessed by obtaining from five experts in the field of medical surgical nursing. The experts suggested specification in limits of questions, recognition and addition to certain items.

Appropriate modification were made accordingly after that the tool was finalized.

RELIABILITY

Reliability of structured knowledge questionnaire was completed by split half method formula among staff nurses working in CCU. The result of reliability was 0.825.

RESEARCH FINDINGS

Comparison of mean of pre-test and post-test level of knowledge regarding ABG analysis

Table 1

Group	Mean	Std. deviation	P value	df	't' value
Pre-test	12.2500	2.13625	0.250	59	-14.085
Post-test	16.6000	1.74861	-	-	-

- Above table 1 depicts the mean pre-test level of knowledge regarding ABG analysis is 12.25 which increased to 16.60 at post test. There is effectiveness of structured teaching program to improve the knowledge regarding ABG analysis among staff nurses working in CCU.

Summary:

- The introductory chapter 1 dealt with the introduction of the topic, need of the study, problem statement, objectives, hypothesis, variables, assumption, operational definition and conceptual framework of the study.