Assessment of Nurses' knowledge and practice Regarding Arterial Blood Gases Interpretation

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Abstract

Background: Nurses are playing a crucial role in early detection of patients at high risk for acid-base imbalance in critical care units. **The aim** of the study was to assess nurses' knowledge and practice regarding arterial blood gases interpretation. Research **design:** Descriptive research design was utilized to achieve the aim of the study. **Setting:** The study was conducted in general Intensive Care Unit (ICU) and chest care unit at Benha University Hospital, Qalyubia Governorate, Egypt. **Subjects:** A convenient sample of all available nurses in ICU and chest care unit from both sexes and agreed to participate in the study. **Tools of data collection**: Two tools were used, **Tool (I):** Nurses' self-administered questionnaire which included two parts to assess **A)** Nurses' personal data. **B)** Nurses' knowledge regarding arterial blood gases interpretation. **Tool (II):** Nurses' practice observational checklist regarding arterial blood gases interpretation**. Results:** ٩١.٦٪ of nurses studied had an unsatisfactory level of total knowledge about arterial blood gas interpretation. While ٩٣.٧٪ of nurses studied had an incompetent level of practice regarding arterial blood gases interpretation**. Conclusion:** Most of studied nurses had unsatisfactory level of total knowledge and most of studied nurses had incompetent level of practice regarding the arterial blood gases interpretation .There was a positive and significant correlation between total nurses' knowledge with their total practice regarding blood gases interpretation with p-value of (< ٠.٠٥*).**Recommendation**: Ongoing educational and training programs for nurses about arterial blood gases interpretation and further study is needed about arterial blood gases interpretation with larger sample size to evaluate its effect on nurses' performance and patients' outcomes.

Keywords: Knowledge, Practice, Arterial Blood Gases Interpretation

Introduction

Arterial blood gases (ABGs) analysis is defined as a test that measures acid – base balance of blood and levels of oxygen ($O^{٢}$) and carbon dioxide ($CO^{٢}$) in the blood. Which is performed through puncturing an artery with a thin heparinized syringe. This test usually draw a small amount of blood (approximately, ١ml) from the radial artery at the wrist, or the femoral artery in the groin or other sites can be used as well. Moreover, the blood can also be drawn from an arterial catheter ***(Balzanelli et al ., ٢٠٢٣).***

ABGs analysis is necessary for optimal patients' care. It is needed to evaluate the adequacy of patient's ventilation, quantify the response to therapeutic or diagnostic interventions, monitor the severity and progression of disease process, and assess acid–base status .The usefulness of ABGs analysis as a diagnostic tool is dependent on the ability to correctly interpret the results ***(Chong et al., ٢٠٢١).*** Derangements in acid–base status are frequently observed in critically ill patients. Severe acid–base disorders, especially metabolic acidosis,

have been reported and are associated with increased mortality. Therefore, critically ill patients require laboratory investigations such as ABGs to monitor their status ***(Saberian et al., ٢٠٢٣).***

Nurses are often the first member of the healthcare team to see ABGs results and are playing a bigger role in the realm of blood gas analysis within the work area. In some settings, nurses are becoming more autonomous in patient management, including ordering and interpreting diagnostic studies, for example, ABGs analysis ***(Karunarathna et al .,, ٢٠٢٤).***

Acid–base status is measured by hydrogen ion concentration in the blood (pH), oxygen saturation(sao_2), partial pressure of arterial oxygen (pao_2), partial pressure of carbon dioxide ($paco_2$), concentration of bicarbonate (Hco_3), base excess and deficit. To accurately interpret ABGs results, nurses must understand all components that are measured and how they contribute to maintaining the patient's normal physiological function Therefore, it is necessary that critical care nurses know how to interpret ABGs and what interventions may contribute to the full restoration of homeostasis ***(Ibrahem et al ., ٢٠٢١).***

Significance of the study

ABGs analysis is one of the most common laboratory tests in ICUs. It is made daily for all patients at ICU that allows the objectives evaluation of a patient's oxygenation, ventilation and acid-base balance, the results from an ABGs will indicate how well a patient's respiratory system is working. However, ABGs can offer more than just knowledge about respiratory system they also indicate how well a patient's kidney and other human body organs are functioning ***(Abd Elkader et al., ٢٠٢٠).***

All over the world, nurses in the ICU use considerable time in drawing, documenting, reporting, and interpreting blood gases. Nurses are usually involved in taking and analyzing the ABGs and normally they report these results to physician. Out of these results, the doctors will then prescribe further treatment for the critically ill patient. Hence, knowledge about interpretation of ABGs is consequently essential for nurses who are working in the ICU, to be able to analyze each component of the ABGs to avoid overlooking a change that could result in an inaccurate interpretation and lead to inappropriate treatment ***(Aluthge et al ., ٢٠٢٤)***.

Nurses are often the first members of the health care team to see ABGs results and play an important role to eliminate problems that interfere with the accuracy of test results and may lead to life threating medical decisions. Therefore, there is need to assess nurses' knowledge and practice regarding arterial blood gases interpretation ***(Nawarathna et al ., ٢٠٢٤).***

Research hypotheses:

١- What is the level of nurses' knowledge related to arterial blood gases interpretation?
٢- What is the level of nurses' practice related to arterial blood gases interpretation?
٣- What is the relationship between knowledge and practice of nurses related to arterial blood gases interpretation?

Subjects and Method

Research design:

Descriptive research design was utilized to achieve the aim of the study.

Study setting:

The study was carried out in general Intensive Care Unit (ICU) at Benha University Hospital, Qalyubia Governorate, Egypt.

Subjects:

A convenient sample of all available nurses in ICU (٩٥) who were working in theses settings during the time of data collection and agreed to participate in the study.

Tools for data collection

Two tools were developed by the researcher after reviewing related literature and opinions of experts for content validity.

Tool (I): Nurses' self-administered questionnaire :

This tool used to assess nurses' knowledge regarding arterial blood gases and its interpretation. It designed by the researcher based on a thorough review of recent relevant literature and scientific references***(Bayomi & Taha, ٢٠٢٢)*** **&** ***(Ibrahem et al., ٢٠٢١).*** It consisted of two parts:

Part one: Nurses' personal data as: age, gender, educational qualifications, years of experience in hospital , years of experience in ICU, training courses, number of courses and last date of courses. It contained (٨) questions.

Part two: Nurses' knowledge regarding arterial blood gases and its interpretation. This part contained (٧٦) multiple choice questions designed by the researcher. It includes general knowledge about:

- Arterial blood gases test (٨ questions).
- Indications and contraindications for arterial blood gases test (٤ questions).
- Complications resulting from taking an arterial blood sample (٢ questions).
- Factors that affect accuracy of arterial blood gases results (٢questions).
- Normal rates of arterial blood gases results (١٤ questions).
- Acid - base balance (٦ questions).
- Metabolic acid - base disorders (١١ questions).
- Respiratory acid - base disorders (٨ questions).
- Role of the nurse in drawing an arterial blood gases sample (٨ questions).
- Interpretation of arterial blood gases results (١٣ questions).

Scoring system: The score distributed as: one mark for each correct answer and zero for wrong answer, The total score of knowledge was (٧٦) marks. The knowledge scores were converted into a percent and categorized as follows:

- More than or equal ٨٠٪ of total score (٦١ marks or more) considered satisfactory level of knowledge.
- Below ٨٠٪ of total score (Less than ٦١ marks) considered unsatisfactory level of knowledge.

Tool (II): Nurses' practice observational checklist :

This tool adapted from ***(Curtis et al., ٢٠٢٣)*** **&** ***(Thomas, ٢٠٢٠)*** and modified by the researcher after reviewing recent relevant literatures and scientific references to assess nurses' practices regarding arterial blood gases and its interpretation. It included the following:

Direct arterial blood sampling method through:

* Radial artery, consisted of (٤٧) steps.

* Brachial artery, consisted of (٣٩) steps.

***** Femoral artery, consisted of (٣٩) steps.

Indirect arterial blood sampling method through arterial line, consisted of (٣٨) steps.

Critical care nurses' practices regarding ABGs interpretation, consisted of (٢٢) steps.

Scoring system: The scores distributed as: one mark for each step correctly done, and zero for incorrectly done & not done, the total practice scores was (١٨٥) marks.

These scores were converted into a percent and categorized as follows:

- Practices scores, more than or equal ٨٥٪ of total score (١٥٧ marks or more) considered adequate level of practice.
- Practices scores, below ٨٥٪ of total score (less than ١٥٧ marks) considered inadequate level of practice. considered inadequate level of practice.

Method:

I- Administrative design:

Official permission to conduct the study was obtained from the hospital director, nurse supervisor and head nurse of ICU at Benha University Hospital by the submission of a formal letter from the dean of the faculty of nursing at Benha University.

Ethical considerations:

- Oral and written consent was obtained from the studied nurses in order to participate in the study.
- The aim of the study explained to all nurses, and they were reassured that all information will be confidential, and it will be used only for their benefit and for the research purpose.
- The studied nurses also informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time without any reasons giving.
- The research tools will not cause any harm for participants
- Permission to carry out the study from responsible authorities in the faculty of nursing at Benha University and hospital administration personnel.

II-Preparatory phase:

This phase included reviewing of literature on various aspects of this study to develop the appropriate tools for data collection according to supervisors' guidance and experts' opinions. During this phase, the researcher also visited the study setting to be acquainted with the personnel and the setting.

Tools Validity

The tools were reviewed by a panel of five experts from medical surgical nursing field at faculty of nursing, Benha University. Jury involved two professor and three assistant professors of medical surgical nursing to test the relevance, clarity of tools' content, comprehension, understanding and applicability of the questions. The consensus among experts regarding the tools was between ٩٨٪ to ١٠٠٪ for most items, then all required modifications were done consequently, and the final form of the tools was used for data collection.

Reliability

The researcher used test – retest – methods to test the internal consistency of the tools, by administration of the same tools to the same subjects under similar condition on two different occasions. Testing the reliability of the tools through **Cronbach alpha**. Tool reliability for self-

administered questionnaire that used to assess nurses' knowledge was ٠.٧٧٤. Tool reliability for nurses' practice observational checklist that used to assess nurses' practice was ٠.٩٤٩ .

Pilot study

A pilot study was carried out on ١٠٪ of the studied subjects (٨ nurses) to test the clarity and applicability of the tools and determine the time needed for filling it. According to the results of pilot study there was no modification, so the nurses involved in pilot study were included in the study.

III- Fieldwork and data collection:

- Before conducting the study, an exploratory visit was done to the ICU at Benha University Hospital in order to estimate total number of nurses and suitable time for collecting data.
- Interviewing with nurses before starting data collection procedure was conducted to establish a good relationship with them, explain the aim and nature of the study was done for them.
- The study was conducted over a period of ٦ months which started from beginning of July ,٢٠٢٤ to the end of December ,٢٠٢٤. data were collected by interviewing the studied nurses in ICU at Benha University Hospital.
- Data collected at morning and afternoon shifts (long day shift) three days/week.
- Assessment of the nurses' knowledge through self-administered questionnaire (Tool I) was given to each nurse to fill it and time required for completion of the questionnaire was ranged from ٣٠-٣٥ minutes.
- Assessment of the nurses' practical skills through observational checklist (Tool II) was done by the researcher.
- The time required for completion of the observational checklist was ranged from ٢٥- ٣٠ minutes.

Statistical analysis:

Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version ٢٢. Data were collected, revised, coded, organized, tabulated, and analyzed using frequencies, numbers, percentage, mean scores, standard deviation. Data were presented in the form of tables Quantitative data was presented by mean (X) and standard deviation (SD) .Qualitative data was presented in the form of frequency distribution tables, number and percent. It was analyzed by Chi- square test (X^2) to detect the relation between the variables of the study (P value) .

Statistical significance was considered as the following:

- P value < ٠.٠٠١ highly statistically significant relation.
- P value< ٠.٠٥ statistically significant relation.
- P value> ٠.٠٥ no statistically significant relation.

Results:

Table (١): Percentage distribution of studied nurses according to their personal data which reveals that the age of ٥٦.٨٪ of the studied nurses was <٣٠ years with a mean age of ٢٩.٤٩ ± ٠.٦١years. Regarding sex , ٧٤.٧٪ of them were females. Concerning educational level, ٤٧.٤٪ of the studied nurses graduated from nursing technical institute. ٨٧.٤ % of them had ١- <٥ years of experience in hospital, msex,r ٩١.٦ % had <٥ years of working experience in ICU and ٤٤.٢٪ of nurses reported attending training courses on arterial blood gases

interpretation, where as ٦٤.٣٪ of them had one course.

Table (٢): Frequency and percentage distribution of total nurses knowledge about arterial blood gas testing and interpreting its results which shows that ٩١.٦٪ of studied nurses had unsatisfactory level of total knowledge about basic concepts of arterial blood gas testing and interpreting its results.

Table (٣): Frequency and percentage distribution of total nurses practice regarding arterial blood gases sampling and interpretation its result which illustrates that, ٩٣.٧٪ of studied nurses had an incompetent level of practice regarding the arterial blood gases sampling and interpretation its result**.**

Table (٤): Correlation between total knowledge and practice among the studied nurses which clarifies that there was a positive and significant correlation between total nurses' knowledge with their total practice regarding blood gases interpretation.

Table (١): Percentage distribution of studied nurses according to their personal data (n = ٩٥).

Nurses' personal data	**No.**	**%**
Age / years		
<٣٠	٥٤	٥٦.٨
٣٠- < ٤٠	٣٥	٣٦.٨
≥ ٤٠	٦	٦.٤
Mean ± SD	**٢٩.٤٩ ± ٠.٦١**	
Sex		
Male	٢٤	٢٥.٣
Female	٧١	٧٤.٧
Educational level		
Secondary diploma in nursing	٨	٨.٤
Nursing Technical institute	٤٥	٤٧.٤
Health Technical institute	٣	٣.١
Bachelor of Nursing	٢٤	٢٥.٣
Post graduate studies	١٥	١٨.٩
Years of Experience working in hospital		
< ١ year	٤	٤.٢
١- <٥ years	٨٣	٨٧.٤
٥- <١٠ years	٨	٨.٤
Mean ± SD	**٤.٢١± ٠.٥٨**	
Years of Experience working in ICU		
< ٥ years	٨٧	٩١.٦
٥- <١٠ years	٨	٨.٤
Attending previous training courses for arterial blood gases interpretation		
Yes	٤٢	٤٤.٢
No	٥٣	٥٥.٨
If yes, number of training courses	**(n= ٤٢)**	
One course	٢٧	٦٤.٣
Two courses	٩	٢١.٤
Three courses	٤	١٠.٢
More than ٣ courses	٢	٤.١
The last period of taking training courses		
< ٦ months	٣٧	٨٨.١
≥٦ months	٥	١١.٩
Mean ± SD	**٥.٢٣± ٢.٢٩**	

Table (٢): Frequency and percentage distribution of total nurses knowledge about arterial blood gas testing and interpreting its results(n=٩٥).

Total nurses' knowledge regarding arterial blood gas testing and interpreting its results	Response	(No.)	%
Arterial blood gas testing	Satisfactory ≥ ٨٠٪	٣٨	٤٠.٠
	Unsatisfactory < ٨٠٪	٥٧	٦٠.٠
Indications and contraindications for using the arterial blood gas test	Satisfactory ≥ ٨٠٪	٥٩	٦٢.١
	Unsatisfactory < ٨٠٪	٣٦	٣٧.٩
Complications of arterial blood sample and factors that affect the accuracy of its results	Satisfactory ≥ ٨٠٪	٥٢	٥٤.٧
	Unsatisfactory < ٨٠٪	٤٣	٤٥.٣
Normal rates of arterial blood gas analysis results	Satisfactory ≥ ٨٠٪	٣٦	٣٧.٩
	Unsatisfactory < ٨٠٪	٥٩	٦٢.١
Acid base balance	Satisfactory ≥ ٨٠٪	٢٢	٢٣.٢
	Unsatisfactory < ٨٠٪	٧٣	٧٦.٨
Metabolic disorder (acid - base)	Satisfactory ≥ ٨٠٪	١٩	٢٠.٠
	Unsatisfactory < ٨٠٪	٧٦	٨٠.٠
Respiratory disorder (acid - base)	Satisfactory ≥ ٨٠٪	١٧	١٧.٩
	Unsatisfactory < ٨٠٪	٧٨	٨٢.١
The role of the nurse in drawing an arterial blood gas sample	Satisfactory ≥ ٨٠٪	٣٧	٣٨.٩
	Unsatisfactory < ٨٠٪	٥٨	٦١.١
Interpreting the results of the arterial blood gas sample	Satisfactory ≥ ٨٠٪	٢٠	٢١.١
	Unsatisfactory < ٨٠٪	٧٥	٧٨.٩
Total knowledge	Satisfactory ≥ ٨٠٪	٨٧	٩١.٦
	Unsatisfactory < ٨٠٪	٨	٨.٤

Table (٣): Frequency and percentage distribution of total nurses practice regarding arterial blood gases sampling and interpretation its result (n=٩٥).

Total nurses' practice	Response	(No.)	%
Nurses' practice of arterial blood sampling via radial artery	Competent ≥ ٨٥٪	٥	٥.٣
	In Competent < ٨٥٪	٩٠	٩٤.٧
Nurses' practice of arterial blood sampling via brachial artery	Competent ≥ ٨٥٪	٩	٩.٥
	In Competent < ٨٥٪	٨٦	٩٠.٥
Nurses' practice of arterial blood sampling via femoral artery	Competent ≥ ٨٥٪	١٣	١٣.٧
	In Competent < ٨٥٪	٨٢	٨٦.٣
Nurses' practice of arterial blood sampling via arterial line	Competent ≥ ٨٥٪	٢١	٢٢.١
	In Competent < ٨٥٪	٧٤	٧٧.٩
Nurses' practice of arterial blood gases interpretation	Competent ≥ ٨٥٪	٢١	٢٢.١
	In Competent < ٨٥٪	٧٤	٧٧.٩
Total	Competent ≥ ٨٥٪	٨٩	٩٣.٧
	In Competent < ٨٥٪	٦	٦.٣

Table (٤): Correlation between total knowledge and practice among the studied nurses (n=٩٥).

r-\ p values / *variable*	*Total knowledge*	
	r	**p- value**
Total practice	٠.٠٤٦	٠.٧٢٩

Discussion:

Nurses are primary caregivers who monitor, manage, and support critically ill patients. A typical problem for nurses is determining the association between aberrant blood gas findings and a patient's overall clinical status. To meet this challenge, nurses must understand the mechanism underlying acid-base balance, the common cause of acid-base imbalance and understanding of ABGs interpretation to manage and provide effective care to patients with respiratory, cardiovascular, acid-base and renal disorders ***(Pakkirisamy, ٢٠٢١).***

Regarding to age, the present study finding revealed that more than half of the studied nurses aged less than thirty years old with mean and standard deviation of (٢٩.٤٩ ± ٠.٦١). **From the researcher's point of view,** this result might be due to the majority of staff were newly graduated and newly hired and tolerate the nature of the work in ICU units, critical care units usually need newly graduated staff because they have full of energy and enthusiasm. This finding is inconsistent with ***Bagul,(٢٠٢١)*** in their study entitled '' Effect of Planned Teaching Program on Knowledge regarding ABG Analysis among Staff Nurses working in a selected hospital in Mumbai " whose results revealed that staff nurses were fully distributed in one age group ٢٠ -٢٥ years and no sample distributed in age group ٢٦-٣٠ years old.

In regard to sex, the current study revealed that three quarter of nurses were females. **From the researcher's point of view**, these results may be because nursing is a female profession for a long time in Egypt as it appeared from nursing history. Additionally male nurses prefer to travel abroad or working in private hospitals for high salary outcome. This finding agreed with ***Vahedian-Azimi et al, (٢٠٢١)*** in their study entitled "Effect of the specific training course for competency in doing arterial blood gas sampling in the intensive care unit" whose results more than two thirds of the studied nurses were females.

Regarding educational level, the current study revealed that approximately two fifth of the studied nurses had technical institute of nursing. **From the researcher's point of view**, these results may be due to technical institute of nursing provide the community with large number of nurses and most bachelor nurses in the governmental hospitals are working as nursing supervisor or head nurse. this result disagreed with ***Karpukkarasi & Arasumani, (٢٠٢٤)*** in their study entitled " Effectiveness of Structured Teaching Program on Knowledge Regarding Arterial Blood Gas Analysis and its Interpretation among Intensive Care Unit Staff Nurses, India " whose results revealed that the majority of the respondents were B.Sc Nurses.

In relation to years of experience in hospital, the current study results showed that majority of the studied nurses had experience less than five years. **From the researcher's point of view**, nurses had experience less than five years related to their age which was less than thirty years old. This finding is in the same line with ***Maseeh et al., (٢٠٢٤)*** in their study entitled " Assess the knowledge regarding ABGs Analysis among Nurses" whose results revealed that majority of the studied nurses had experience less than five years.

Regarding years of experience in the intensive care unit, the current study results

revealed that most of the studied nurses had experience less than five years. **From the researcher's point of view**, nurses had experience less than five years due to work stress, severity of patient condition and occupational hazards that facing nurses, all of these factors prevent nurses from continuing work in the critical care unit. This finding agreed with ***Begum, et al., (٢٠١٩)*** in their study entitled "Assess The effectiveness of structured teaching Program on knowledge of ABG Analysis Among Staff Nurses of ICU In Selected Private Hospitals of Guwahati" whose results revealed that majority of the studied nurses had one to five years of experience in ICU.

In relation to attendance of previous training courses about arterial blood gases interpretation, the present study finding displayed that only approximately two fifth of the studied nurses receive training courses regarding arterial blood gases interpretation. **From the researcher's point of view**, this may be due to workload in critical care units and training courses specific to arterial blood gases interpretation were not offered in the nursing in service training programs or in the educational curriculums. This finding disagreed with ***Upreti & Mishra, (٢٠٢٢)*** in their study entitled " Effectiveness of Planned Teaching Program on Knowledge and Practice regarding Arterial Blood Gas analysis and its Interpretation among Staff Nurses working in Critical Care units at selected hospital of Delhi/ NCR " whose results showed that most of the studied sample had attended courses about ABG.

Regarding to nurses' total knowledge regarding arterial blood gas testing and interpreting its results, the present study revealed that most of studied nurses had unsatisfactory level of knowledge about basic concepts of arterial blood gas testing and interpreting its results . **From the researcher's point of view,** this finding may be because nurses more interested in the practical part than knowledge and may be related to work load that probably does not give nurses time to revise their knowledge. As well as nursing curricula may not always provide in-depth training on acid-base imbalances which leading to leaving gaps in knowledge.

This finding supported by ***Karpukkarasi & Arasumani, (٢٠٢٤)*** whose results revealed that more than two third of studied nurses had inadequate knowledge regarding ABGs Analysis. Also, This finding agreed with ***Younas et al., (٢٠٢٢)*** in their study entitled " Nurses Knowledge Regarding Arterial Blood Gases Interpretation " whose results revealed that majority of studied nurses had poor knowledge about arterial blood gases interpretation .

In addition to, this finding is consistent with ***Jasmi et al ., (٢٠٢٣)*** in their study entitled " Effectiveness of nurse-led education on knowledge regarding interpretation of ABG analysis among ICU staff nurses working in selected hospitals at Kanpur, up " whose results revealed that three fifth of studied nurses had inadequate level of knowledge interpretation of ABG analysis.

Moreover, This finding is consistent with ***Adhikari &Thapa (٢٠١٩)*** in their study entitled "Effectiveness of Structured Teaching Program on Knowledge Regarding Arterial Gas Analysis among Nursing Students " whose results revealed that in pre – test, the majority of respondents had inadequate level of knowledge regarding ABG analysis.

On the other hand, this finding is inconsistent with ***Kumari et al., (٢٠٢٠)*** in

their study entitled " A pre-experimental study to assess the effectiveness of structured teaching program on knowledge regarding Arterial Blood Gas analysis and interpretation among staff nurses working in selected hospitals of district Mohali, Punjab " whose results revealed that majority of studied nurses' had a good level of knowledge regarding Arterial Blood Gas analysis and interpretation. Also, This finding disagreed with ***Kulvi, (٢٠٢٣)*** in their study entitled '' A Quasi-Experimental Study to Assess the Effectiveness of Structured Teaching Program on Knowledge Regarding ABG Analysis and Its Interpretation Among Nursing Officers, BLK-MAX Super Specialty Hospital, New-Delhi. " whose results revealed that most of studied nurses had average score of knowledge pre structure teaching program implementation.

Concerning total nurses' practice regarding arterial blood gases sampling and interpretation its result, the present study revealed that most of studied nurses had incompetent level of practice regarding arterial blood gases sampling and interpretation its result, **From the researcher's point of view,** these findings may be due to poor skills, increased work load which may hinder the ability to train and improve their practice . In addition to Hospitals and healthcare institutions may not have implemented structured educational programs to ensure that all nurses develop proficiency in ABG interpretation as well as limited time for learning and lack of access to continuous education resources.

This finding supported by ***Mohammed et al., (٢٠٢٤)*** in their study entitled " Effect of Educational Guidelines on Nurses' Performance Regarding Arterial Blood Gases Sampling and Interpretation at Mansoura University, Egypt" whose results showed that more than half of studied nurses had unsatisfactory level of practice regarding arterial blood gases sampling and interpretation

Also, this finding is in the same line with ***Elkholy et al., (٢٠٢٤)*** in their study entitled "Nurses' Compliance with Safety Measures of Arterial Line, Egypt" whose results showed that the majority of the studied nurses had incompetent level of practices regarding arterial blood sampling from arterial line.

In addition to, this finding is consistent with ***Kaur & Charan, (٢٠١٨)*** in their study entitled "A study to assess the effectiveness of structure teaching program on knowledge and practice regarding ABGs among ICU nurses in selected hospitals at Jalandhar, Punjab" whose results revealed that three quarters of staff nurses were having bad practice level regarding arterial blood gases sampling.

Concerning correlation between total nurses' knowledge and practice, the present study revealed that there was a positive and significant correlation between total nurses' knowledge with their total practice regarding arterial blood gases sampling and interpretation its result .**From the researcher's point of view,** there was a positive correlation between total nurses' knowledge with their total practice because knowledge directly influences clinical competence and decision-making.

This finding is in the same line with ***Mohammed et al., (٢٠٢٤)*** whose results showed that there was a positive correlation between total score of knowledge and practice. This finding is also consistent with ***Bayomi & Taha, (٢٠٢٢)*** in their study entitled " Effect of Self –Learning Package on Nurses' Knowledge and Practice Regarding

Arterial Blood Gases Analysis for Critically Ill Patients at Zagazig University hospital, Egypt" whose results showed that there was a positive correlation between total score of knowledge and practice.

Conclusion:

Most of studied nurses had unsatisfactory level of total knowledge regarding arterial blood gases interpretation. And most of studied nurses had an incompetent level of practice regarding the arterial blood gases interpretation. Also, there was a positive and significant correlation between total nurses' knowledge with their total practice regarding blood gases interpretation with p-value of (< ٠.٠٥*).

Recommendations:

١- The need for ongoing educational and training programs for nurses about arterial blood gases interpretation .

٢- Further study is needed about arterial blood gases interpretation with larger sample size to evaluate its effect on nurses' performance and patients' outcomes.

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