Nurses'Performance Regarding Care of Patients Undergoing Intra-Aortic Balloon Pump Therapy

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Abstract

Background: Intra-aortic balloon pump is the first and the most commonly used mechanical circulatory support for patients with acute coronary syndromes and cardiogenic shock. Therefore, critical care nurses not only have to know how to monitor and operate the IABP, but also to provide interventions for preventing possible complications. **Aim of the study**: Was to assess nurses' performance regarding care of patients undergoing intra-aortic balloon pump therapy **Research design:** A descriptive exploratory design was utilized in this study. **Sample**: Convenience samples of 40 nurses were included in the current study. **Setting**: This study was carried out at the adult intensive care units for cardiac surgery at the Cardio Thoracic Academy affiliated to Ain Shams University Hospitals. **Tools for data collection**: Two tools were used in this study, **Tool I:** Self-Administered Interview Questionnaire it was divided into two parts; **A.** Demographic Characteristics of the studied nurses, **B.** Nurses's Knowledge Assessment Questionnaire, **Tool II:** Observational Checklist used to assess nurses' practice for patients undergoing intra-aortic balloon pump therapy **Results**: The majority of the studied nurses had unsatisfactory level of knowledge and incompetent level of practice (90% & 92.5%) respectively. **Conclusion:** There was highly statistically significant strong positive correlation between total level of knowledge and total level of practice regarding care of patients undergoing intra-aortic balloon therapy among the studied nurses, **Recommendation:** Updating knowledge and practice of critical care nurses through carrying out continuing educational programs about Intra-aortic balloon pump, strict observation of nurses' practice when caring for patients connected to Intra-aortic balloon pump.

Key Words: Intra-Aortic Balloon Pump Therapy, Nurses' Performance, Patients' Care.

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Introduction

Intra-aortic balloon pump has been the most widely used device to improve hemodynamics in cardiogenic shock (CS) For the past 5 decades, with more than 50,000 devices inserted in the United States alone, It is most commonly utilized in Acute myocardial infarction complicated by cardiogenic shock (AMI-CS), improving end-organ and coronary perfusion with diastolic augmentation while reducing left ventricular (LV) workload and myocardial oxygen consumption by reducing afterload ***(Wong & Sin, 2020).***

Common placement of IABP is via the femoral artery into aorta, with the tip of the balloon sitting below the left subclavian artery and the distal end above the renal arteries. The balloon is timed to inflate at the beginning of diastole augmenting coronary perfusion and deflate on the R wave just before systole, reducing the afterload ***(O'Donovan, 2021).***

The intra-aortic balloon inflates during diastole synchronously with aortic valve closure and the appearance of a dicrotic notch resulting in the displacement of blood from the thoracic aorta into the peripheral circulation that is followed by rapid deflation before the onset of systole phase of the cardiac cycle. Theoretically, this results in improved diastolic pressure and reduced

systolic aortic pressure by reducing the afterload, which subsequently results in decreased left ventricle wall stress reducing the myocardial oxygen demand. These hemodynamic changes improve the cardiac output by increasing stroke volume, particularly in patients with reduced left ventricular function ***(Khan & Siddiqui, 2019).***

The intra-aortic balloon therapy is contraindicated in patients with aortic regurgitation because it worsens the magnitude of regurgitation. IABP insertion should not be attempted in case of suspected or known aortic dissection because inadvertent balloon placement in the false lumen may result in extension of the dissection or even aortic rupture. Similarly, aortic rupture can occur if IABP is inserted in patients with sizable abdominal aortic aneurysms. Patients with end-stage cardiac disease should not be considered for IABP unless as a bridge to ventricular assist device or cardiac transplantation (***Nwaejike & Daneshmand, 2020).***

Complications rates reported for IABP uses remain highly variable, with thrombocytopenia, vascular injury, mesenteric/distal limb ischemia, bleeding and thromboembolism. Improper IABP catheter position and length of IABP support are highly predictive of increased morbidity and risk of vascular complications and limb ischemia ***(Saczkowski, et al., 2023).***

Nurses play a key role in the care of patients who receive IABP therapy, the involvement of nursing care throughout the process, from preparation for insertion to weaning. Nurses are particularly instrumental in identifying and preventing complications, which involves monitoring the patient's hemodynamics, respiratory, renal, gastrointestinal and vascular status, as well infection control measures. The extent and complexity of these nursing tasks highlights the importance of specialist training for nurses ***(Queiroz da Silva, et al., 2023).***

The nurse's role requires the operation of the IABP, while at the same time, the ability to deliver quality nursing care, Nurses who care for patients managed with IABP require knowledge of the mechanisms and actions of this therapeutic device as well a addressing IABP's indications, contraindications, physiology of functions, potential complications, and safety considerations, assist in gathering the equipment specific to IABP insertion, nursing care involves preparing the patients attaching the patient to the pump's electrocardiogram leads and labeling them, setting up the transducer and leveling it with the patient's phlebostatic axis, preparing the groin site, coordination of the principles of timing with hemodynamic effects, and skillful problem solving assure critical care nurse that they can effectively manage the IABP challenge ***(Thapasya, et al., 2022).***

Significance of the Study

The intra-aortic balloon pump (IABP), which has been in use for more than 50 years, is one of the most common forms of mechanical circulatory support, with an estimated 200,000 inserted annually worldwide ***(Parissis, et al., 2016).***The incidence of IABP-related vascular complications varied widely, from 0.94% to 31.1% ***(Boudoulas, et al., 2014).***

The complication rates when using an intra-aortic balloon pump are high and may account for up to 50%, with an average 20-30%, Thrombocytopenia is currently the commonest complication occurring in 50% of the patients followed by fever in almost 40% of the cases. Bleeding is also common with aorto-iliac artery injury and dissection, thromboembolism, distal leg ischemia and balloon entrapment-rupture, to occur less frequently. Despite this, over 70,000 IABP insertions are undertaken annually in the

United States alone, with an incidence of between 5-10% amongst all patients undergoing cardiac surgery ***(Parissis, et al., 2011).***

It has been observed over a period of three years of working in the critical care Unit (CCU) that some patients who are undergoing Intra- Aortic Balloon Pump developed complications. Most of these complications are life threatening although it can be prevented. Nurses could have a positive role in early detection and prevention of such complications, so they must be equipped with adequate knowledge and practices regarding the care of patients undergoing such devices. Therefore, it is very important to assess nurses' performance regarding care of patients undergoing Intra- Aortic Balloon Pump. In order to detect the defects and correct it in the future by provision of comprehensive educational and training programs for nurses to improve the quality of care.

Aim of the study

The aim of the study was to assess nurses' performance regarding care of patients undergoing intra-aortic balloon pump therapy through the following:

1) Assess nurses' level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump therapy.
2) Assess nurses' level of practice regarding care of patients undergoing Intra-Aortic Balloon Pump therapy.

Research Questions

To fulfill the aim of this study the following research questions were formulated:

1) What is nurses' level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump therapy?
2) What is nurses' level of practice regarding care of patients undergoing Intra-Aortic Balloon Pump therapy?

Subject and Methods

The subject and methods for this study was portrayed under the four main items as follows:

- Technical item
- Operational item
- Administrative item

Statistical item

I-Technical item

The technical item includes research design, setting, subject and tools for data collection

Research design

Descriptive exploratory research design was utilized in this study.

Research setting

This study was conducted at the adult intensive care units for cardiac surgery at the Cardio Thoracic Academy affiliated to Ain Shams University Hospitals. It is one of the largest educational University Hospitals in Egypt in this field, and it receives patients from all governorates of Egypt and other countries. It consists of 2 intensive care units; first unit in the second floor coronary care unit (CCU) and the second unit in the eighth floor Cardiothoracic Care Unit, each unit containing 10 beds.

Subject

Convenience sample, (40) nurses from both genders who are working at Intensive Care Units of Cardiac Surgery in Cardio Thoracic Academy affiliated to Ain Shams University Hospitals.

Tools for data collection

Two tools for data collection were used as follow;

Tool I: Self-Administered interview Questionnaire

This questionnaire adapted from ***(Rushdy, 2015 &, Ellithy, 2021)*** and modified by the investigator in English and translated to Arabic Language. It is divided into two parts:

First part: Demographic Characteristics of the studied nurses

Including, age, gender, education level, position, years of experience in the field of nursing and in the ICU and Attendance of training programs related to IABP. It composed of 8 closed ended questions.

Second part: Nurses's Knowledge Assessment Questionnaire

It was used to assess nurses' knowledge about description and physiological effects of intra –aortic balloon pump (Questions 1-11), indications, contraindications, and complications of intra-aortic balloon pump (Questions 12-17), nursing care of patient connected with intra-aortic balloon pump (Questions 18-25), and weaning and removal of intra-aortic balloon pump (Questions 26-30).

Scoring system:

This tool consisted of (30 items) with a total grade (30). One grade was given for correct answer, and zero grades for incorrect answer. Subject responses were calculated in the scoring system classified into:

- **Satisfactory knowledge**: If the total score was equal or more than 80%, it means equal or more than 24 grades.
- **Unsatisfactory knowledge**: If the total score was less than 80%, it means less than 24 grades***. (Abdel Sabour, et al., 2019).***

Tool II: Observational Checklist for Assessing Nurses' Practice for Patients Undergoing Intra-Aortic Balloon Pump Therapy

It was adopted from ***(Neelavathi, 2018 and Ellithy, 2021)***. It consist of 72 items classified into three domain; the first domain is concerned with nursing practice during preparation and initiation of IABP therapy (24 items), second domain nursing practice during IABP therapy (25 items), third domain nursing practice during weaning and removal of IABP (23 items).

Scoring system;

This tool consisted of (72 items) with a total grade (72). one grade was given for done answer, and zero grade for not done answer. Subject responses were calculated in the scoring system classified into:

- **Competent level**: If the total score was equal or more than 80%, it means equal or more than 57.6 grades.
- **Incompetent level**: If the total score was less than 80%, it means less than 57.6 grades. ***(Abdel Sabour, et al., 2019).***

II-Operational item;

The operational item for this study was passed through the following phases: Preparatory phase, content validity, reliability, pilot study, field work, and limitation of the study.

The preparatory phase

It includes reviewing of related literature and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

Validity

Content and face validity was conducted to determine whether the tool covers the aim. The tools were revised by a panel of five experts, **3**Assist Professors and **2** Lectures from faculty of nursing, Helwan University who review the content of the tools for comprehensiveness, accuracy, clarity, and relevance, and applicability, minor modification were done.

Reliability: Alpha Cronbach test reliability was calculated with correlation value of 0.824 for nurses' knowledge self-administered questionnaire and correlation value of 0.873 for nurses' practice observational checklist indicating reliability of the developed data collection tools.

Pilot study

A Pilot study was carried out on 10% (4 nurses) of the studied nurses to test the applicability, clarity and efficiency of the tools, then the tools modified according to the

results of pilot study. Nurses shared in pilot study not involved in the study.

Field work

- A written informed consent was obtained from the studied nurses individually prior to data collection after explanation of the aim of the study.
- The tools of data collection were filled in by the nurses under the study (self-administered interview questionnaire) in the presence of the investigator.
- Observation for nurses' practice caring for patients undergoing IABP using observational checklist and filled by the investigator.
- Data was collected and analyzed to assess nurses' performance caring for patients undergoing IABP.
- Data collection was started and completed within eight months from beginning of April 2022 until the beginning of December 2022; two month duration from beginning of April 2022 to end of May 2022 managerial arrangements were carried out and the investigator prepared formal requests to selected ICU's managers of cardiac surgery and ended by carried out the pilot study, from June 2022 to beginning of December 2022 Data were collected.
- Purpose of the study was simply explained to the studied nurses who agree to participate in the study prior to any data collection
- Data collection was done 2 days/week by the investigator in the morning and afternoon shifts.

Procedure

The current study was conducted through two phases.

1) **Preparation and planning phase:** It was concerned with construction and preparation of different data collection tools. In addition, managerial arrangements were carried out and the investigator prepared formal requests to selected ICU's managers of cardiac surgery at the Cardio Thoracic Academy affiliated to Ain Shams University Hospitals. The purpose and nature of the study were explained to gain acceptance, and support. This stage lasted for two month duration from beginning of April 2022 to the end of May 2022 and ended by carrying out the pilot study.
2) **Implementation phase**: Data were collected from June 2022 to beginning of December 2022. The investigator visited the selected settings on two days basis during the morning and afternoon shifts. The average number of nurses who answered the questionnaire was three to five nurses per day. Nurses' answering on the nurses' personal background tool and IABP nurses' knowledge self-administered questionnaire (tool I) required about 20-30 minutes. The investigator was available to answer any questions or explanations and to check each questionnaire after its completion, to be sure that there are no missed items. Later, two nurses were observed directly by the investigator in each day. Each nurse was observed in two different occasions for one hour, while performing each step of the procedure in the observational checklist Obtained data were converted into numeric data, and the average of the two observations was calculated

Limitations of the study

- The flow rate of the patients was low.

III-Administrative item

An official permission was obtained from the director of Cardio Thoracic Academy affiliated to Ain Shams University Hospitals and Head of Intensive Care Units, Cardiac Care unit in which the study was conducted. A litter was issued to them from the Dean Faculty of Nursing, Helwan University explaining the aim of the study for obtaining the permission for data collection.

Ethical considerations

An approval obtained from Dean of faculty of nursing- Helwan University, the Scientific Research Ethics Committee, and Participations in the study is voluntary and subjects given complete full information about the study and their role before signing the informed consent. The ethical considerations includes explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs will be respected.

IV-Statistical item

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean ±SD). Chi-Square (x2) was used to test the association between row and column variable of qualitative data. The fisher exact test was used with small, expected numbers.

T independent test was used to compare mean in normally distributed quantitative variables at two groups. Pearson correlation was done to measure correlation between quantitative variables.

For all tests, a two-tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant, while p-value > 0.05 was considered not significant.

RESULTS

Table (1): Frequency and Percentage Distribution of Demographic Characteristics among the Studied Nurses (N= 40)

Items		No.	%
Age (year)	20 < 30	29	**72.5**
	30 < 40	11	27.5
	Mean ± SD		**27.9 ± 4.55**
Position	Head nurse	2	5.0
	Charge nurse	7	17.5
	Staff nurse	31	**77.5**
Attendance of training programs	Yes	2	5.0
	No	38	**95.0**
Years of experience in the field of nursing	1 ≤ 5 Yrs.	26	**65.0**
	6 ≤ 10 Yrs.	13	32.0
	> 10 Yrs.	1	2.5
	Mean ± SD		**9.37 ± 3.33**
Years of experience in ICU	1 ≤ 5 Yrs.	33	**82.5**
	6 ≤ 10 Yrs.	6	15.0
	> 10 Yrs.	1	2.5
	Mean ± SD		**4.00 ± 1.93**

Table 1: This table shows that 72.5% of the age of the studied nurses was ranged between 20 < 30 years old, with a mean age of 27.9 ± 4.55, Regarding to position 77.5% were staff nurses, 95% of them not attending training programs, Additionally, 65% and 82.5% of the studied nurses had years

of experience ranged between 1 ≤ 5 years old in the nursing field and ICU, with a total mean of = 9.37 ± 3.33 & 4.00 ± 1.93 respectively.

Figure (1): Frequency Distribution of Gender among the Studied Nurses (N= 40)

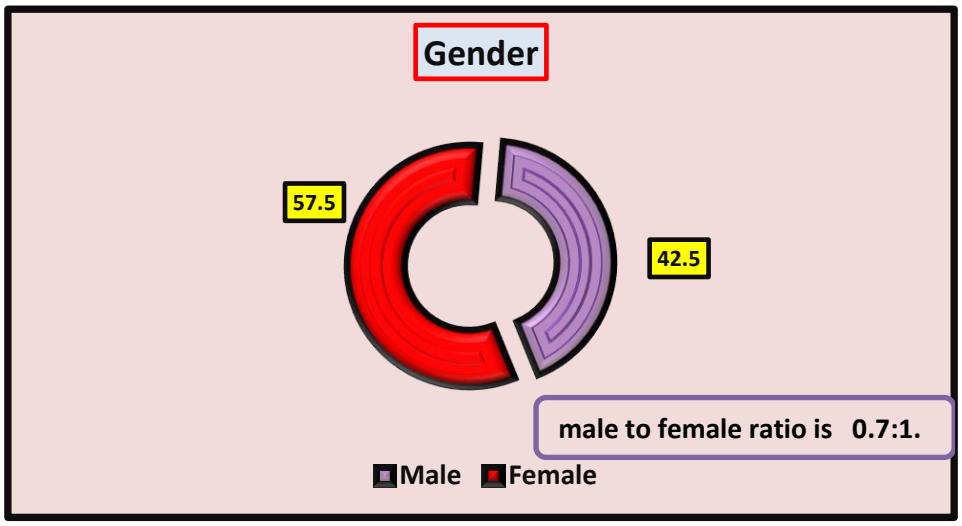

Figure 1: Shows that **57.5%** of the studied nurses were a female. Additionally, Male to female ratio is **0.7:1**.

Figure (2): Frequency Distribution of Educational Level among The Studied Nurses (N= 40).

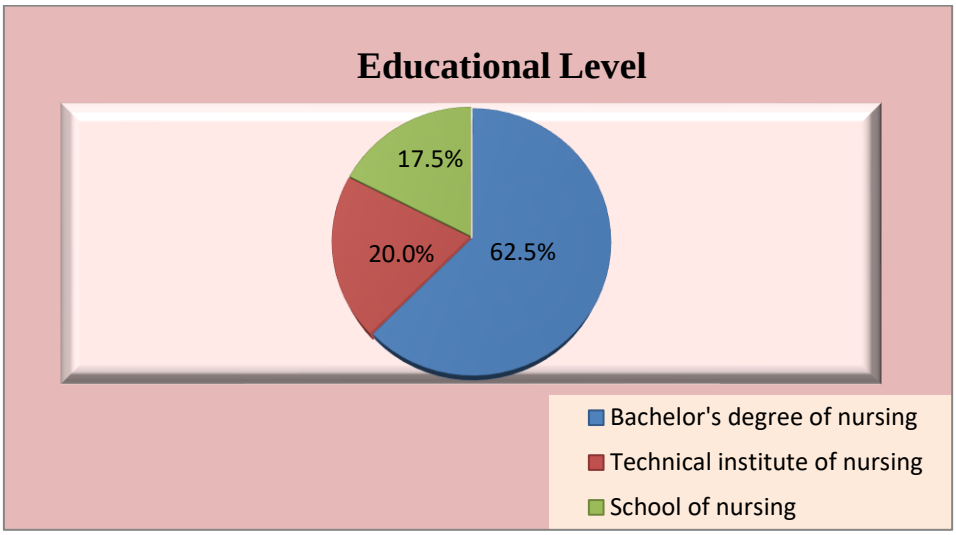

Figure 2: Shows that 62.5% of the studied nurses had bachelor's degree of nursing, 20.0% of them had technical institute of nursing and, additionally, 17.5% of them had school of nursing.

Table (2): Total Mean Score of Knowledge Regarding Care of Patients Undergoing IABP Therapy among the Studied Nurses (N= 40)

Variable		No	%	Min	Max	$\bar{x}$	SD	T test	P value
Description and Physiological effects of IABP	Unsatisfactory	32	80.0	1	8	5.38	1.87		
	Satisfactory	8	20.0	9	11	10.13	0.99		
	Total	**40**	**100.0**	**1**	**11**	**6.32**	**2.58**	6.**86**	**0.000****
Indications, contraindications, and complications	Unsatisfactory	34	85.0	0	4	2.21	1.20		
	Satisfactory	6	15.0	5	6	5.67	0.51		
	Total	**40**	**100.0**	**0**	**6**	**2.73**	**1.67**	**6.89**	**0.000****
Nursing care of patient connected with IABP	Unsatisfactory	37	92.5	1	6	3.68	1.31		
	Satisfactory	3	7.5	8	8	8.00	0.00		
	Total	**40**	**100.0**	**1**	**8**	**4.00**	**1.71**	**5.63**	**0.000****
Weaning and removal of IABP	Unsatisfactory	35	87.5	0	3	1.89	0.93		
	Satisfactory	5	12.5	4	5	4.60	0.54		
	Total	**40**	**100.0**	**0**	**5**	**2.22**	**1.27**	**6.31**	**0.000****
Total	Unsatisfactory	36	90.0	7	20	13.78	3.55		
	Satisfactory	4	10.0	25	30	28.75	2.50		
	Total	**40**	**100.0**	**7**	**30**	**15.28**	**5.70**	**8.15**	**0.000****

*Significant $p \leq 0.05$ T Test: T independent T test **Highly significant $p \leq 0.01$

Table 2: Shows that the great majority of the studied nurses had unsatisfactory knowledge regarding description and physiological effects, indications, contraindications, complications, nursing care, weaning and removal of IABP in percentage of 80.0% , 85.0%, 92.5%, 87.5%, with total mean scores of 6.32 $\pm$ 2.58, 2.73 $\pm$ 1.67, 4.00 $\pm$ 1.71 and 2.22 $\pm$ 1.27 respectively with a highly statistically significant difference at P = 0.000, and a mean total knowledge score of $\bar{x}$ $\pm$ SD= 15.28 $\pm$ 5.70 with a highly statistically significant difference at P = 0.000.

Table (3): Total Mean Score of Practice Regarding Care of Patients Undergoing IABP Therapy among the Studied Nurses (N= 40)

Variable		No	%	Min	Max	$\bar{x}$	SD	T test	P value
Preparation and initiation of IABP therapy.	Incompetent	37	92.5	2	16	8.43	3.79		
	Competent	3	7.5	21	24	23.0	1.73		
	Total	**40**	**100.0**	**2**	**24**	**9.53**	**5.34**	**6.54**	**0.000****
Nursing practice during IABP therapy.	Incompetent	38	95.0	6	19	12.37	2.42		
	Competent	2	5.0	21	23	22.0	1.41		
	Total	**40**	**100.0**	**6**	**23**	**12.85**	**3.18**	**5.53**	**0.000****
Nursing practice during weaning and removal of IABP.	Incompetent	37	92.5	0	16	10.19	3.21		
	Competent	3	7.5	20	22	20.69	1.15		
	Total	**40**	**100.0**	**0**	**22**	**10.98**	**4.17**	**5.56**	**0.000****
Total	Incompetent	37	92.5	16	41	30.81	6.23		
	Competent	3	7.5	62	67	64.67	2.51		
	Total	**40**	**100.0**	**16**	**67**	**33.35**	**10.85**	**9.25**	**0.000****

*Significant $p \leq 0.05$ T Test: T independent T test **Highly significant $p \leq 0.01$

Table 3: Show that total score mean and standard deviation of total practice regarding care of patients undergoing IABP therapy among the studied nurses was $\bar{x} \pm SD = 33.35 \pm 10.85$ with a highly statistically significant difference at P = 0.000. Moreover, mean score of practice in relation to preparation and initiation of IABP therapy, nursing practice during IABP therapy and nursing practice during weaning and removal of IABP were 9.53 ± 5.34, 12.85 ± 3.18 and 10.98 ± 4.17 respectively with a highly statistically significant difference at P = 0.000.

Figure (3): Percentage Distribution of Total Level of Knowledge and Practice Regarding Care of Patients Undergoing IABP Therapy among the Studied Nurses (N= 40)

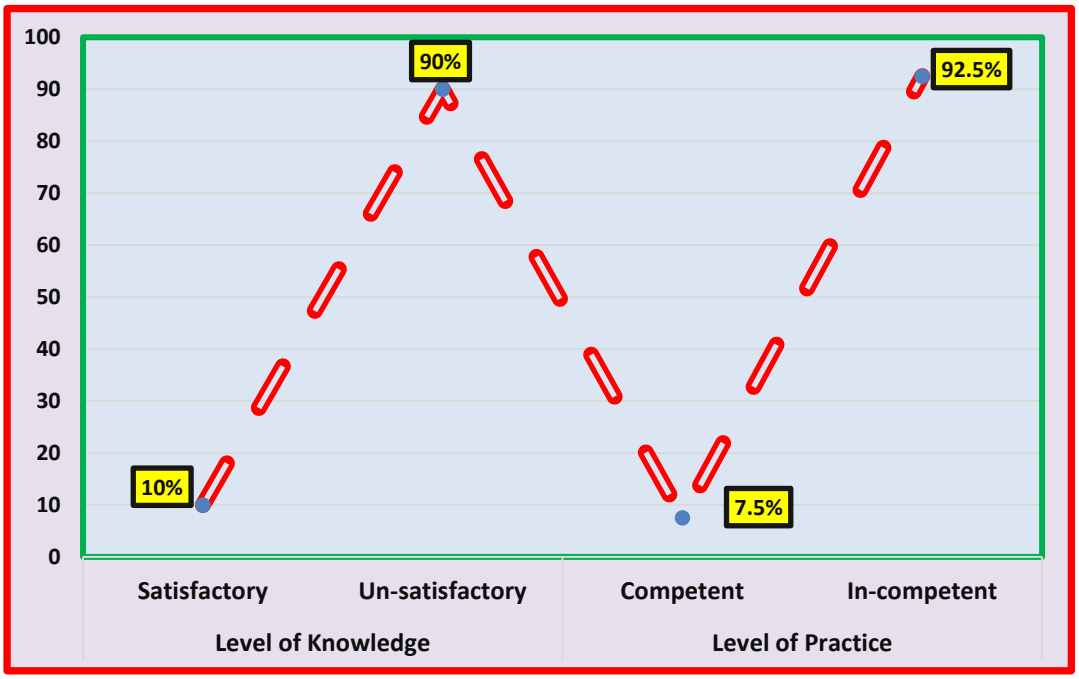

Figure 3: Represents that 90% and 92.5% of the studied nurses had an unsatisfactory level of knowledge and incompetent level of practice regarding care of patients undergoing IABP therapy respectively.

Table (4): Relation between Total Level of Knowledge Regarding Care of Patients Undergoing IABP Therapy and Demographic characteristics Among the Studied Nurses (N=40)

Demographic characteristics		No	Level of knowledge				χ^2	P-Value
			Unsatisfactory		Satisfactory			
			36	90	4	10		
			No	%	No	%		
Age (year)	20 < 30	29	29	72.5	0	0.0	11.7^{F}	0.004^{**}
	30 < 40	11	**7**	17.5	4	10.0		
Gender	Male	17	16	40.0	1	2.5	0.55^{F}	0.426
	Female	23	20	50.0	3	7.5		
Educational level	Bachelor	25	21	52.5	4	10.0	17.7	0.000^{**}
	Technical	8	8	20.0	0	00.0		
	School of nursing	7	7	17.5	0	0.0		
Position	Head nurse	2	0	0.0	2	5.0	24.1	0.000^{**}
	Charge nurse	7	5	12.5	2	5.0		
	Staff	31	31	77.5	0	0.0		

Attendance of training programs	Yes	2	2	5.0	0	0.0	0.23 F	0.808
	No	38	34	85.0	4	10.0		
Years of experience in the field of nursing	1 ≤ 5 Yrs.	26	26	65.0	0	0.0	14.3	0.001**
	6 ≤ 10 Yrs.	13	10	25.0	3	7.5		
	> 10 Yrs.	1	0	0.0	1	2.5		
Years of experience in ICU	1 ≤ 5 Yrs.	33	33	82.5	0	0.0	23.3	0.000**
	6 ≤ 10 Yrs.	6	3	7.5	3	7.5		

***Significant p ≤ 0.05** ****Highly significant p ≤ 0.0** **F: Fissure Exact Test**

Table 4: Represents that, there was a highly statistically significant relation between demographic characteristics "age, educational level, position, and years of experience in the field of nursing & in ICU" and total level of knowledge regarding care of patients undergoing IABP therapy among the studied nurses, at P = ≤ 0.01& P = 0.000.

Table (5): Relation between Total Level of Practice Regarding Care of Patients Undergoing IABP Therapy and Demographic characteristics among the Studied Nurses (N= 40)

Demographic characteristics		**No**	**Level of Practice**				χ^2	**P-Value**
			Incompetent		**Competent**			
			37	**92.5**	**3**	**7.5**		
			No	**%**	**No**	**%**		
Age (year)	20 < 30	29	29	72.5	0	0.0	8.5 F	0.017**
	30 < 40	11	8	20.0	3	7.5		
Gender	Male	17	17	42.5	0	0.0	2.3 F	0.179
	Female	23	20	50.0	3	7.5		
Educational level	Bachelor	25	22	55.0	3	7.5	12.9	0.002**
	Technical	8	8	20	0	0.0		
	School of nursing	7	7	17.5	0	0.0		
Position	Head nurse	2	0	0.0	2	5.0	27.6	0.000**
	Charge nurse	7	6	15.0	1	2.5		
	Staff nurse	31	31	77.5	0	0.0		
Attendance of training programs	Yes	2	2	5.0	0	0.0	0.17 F	0.854
	No	38	35	87.5	3	7.5		
Years of experience in the field of nursing	1 ≤ 5 Yrs.	26	26	65.0	0	0.0	15.6	0.000**
	6 ≤ 10 Yrs.	13	11	27.5	2	5.0		
	> 10 Yrs.	1	0	0.0	1	2.5		
Years of experience in ICU	1 ≤ 5 Yrs.	33	33	82.5	0	0.0	20.7	0.000**
	6 ≤ 10 Yrs.	6	4	10.0	2	5.0		
	> 10 Yrs.	1	0	0.0	1	2.5		

***Significant p ≤ 0.05** ****Highly significant p ≤ 0.01** **F: Fissure Exact Test**

Table 5: Represents that, there was a highly statistically significant relation between demographic characteristics "age, educational level, position, and, years of experience in the field of nursing & in ICU" and total level of practice regarding care of patients undergoing IABP therapy among the studied nurses, at P = ≤ 0.01 & P = 0.000.

Table (6): Correlation between Total Score of Knowledge Regarding Care of Patients Undergoing IABP Therapy and Demographic characteristics among The Studied Nurses (N= 40)

Demographic characteristics	Total Knowledge	
	r	P
Age	0.944	0.000**
Years of experience in the field of nursing	0.784	0.000**
Years of experience in the ICU	0.939	0.000**

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

Table 6: Represents that, there was a highly statistically significant strong positive correlation between demographic characteristics (age, years of experience in the field of nursing & in ICU) and total level of knowledge regarding care of patients undergoing IABP therapy among the studied nurses, at r = 0.944, 0.784 and 0.939 & P = 0.000 respectively**.**

Table (7): Correlation between Total Score of Practice Regarding Care of Patients Undergoing IABP Therapy and Demographic characteristics among the Studied Nurses (N= 40)

Demographic characteristics	Total Practice	
	r	P
Age	0.898	0.000**
Years of experience in the field of nursing	0.743	0.000**
Years of experience in the ICU	0.932	0.000**

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

Table 7: Represents that, there was a highly statistically significant strong positive correlation between demographic characteristics (age, years of experience in the field of nursing & in ICU) and total level of practice regarding care of patients undergoing IABP therapy among the studied nurses, at r = 0.898, 0.743 and 0.932 & P = 0.000 respectively**.**

Table (8): Correlation between Total Score of Knowledge and Practice Regarding Care of Patients Undergoing IABP Therapy among the Studied Nurses (N= 40)

Item	Total Knowledge	
	r	P
Total practice	0.973	0.000**

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

Table 8: Represents that, there was a highly statistically significant strong positive correlation between total level of knowledge and practice regarding care of patients undergoing IABP therapy among the studied nurses, at r = 0.973 & P = 0.000.

Discussion

The intra-aortic balloon pump is a mechanical hemodynamic support device that uses counter pulsation to provide temporary circulatory assistance ***(Holcomb, 2022).*** The current study was conducted to assess nurses' performance regarding care of patients undergoing intra-aortic balloon pump therapy. This aim was achieved through the following; **(1)** Assess nurses' level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump therapy**. (2)** Assess nurses' level of practice regarding care of patients undergoing Intra-Aortic Balloon Pump therapy.

Discussing the findings of the current study in categorized under **four main parts**. **The first part** is concerned with demographic characteristics of the studied nurses. **The second part** concerned with assessing nurses' level of knowledge regarding care of patients undergoing intra-aortic balloon pump therapy. **The third part** concerned with assessing nurses' level of practice regarding care of patients undergoing intra-aortic balloon pump therapy. **The fourth part** concerned with relational and correlational findings between variable under the study.

The First Part: Concerned with demographic characteristics of the studied nurses

Regarding the age of the studied nurses, more than two thirds of the studied nurses were their age ranged between 20 < 30 years, the mean ± SD of age is 27.9 ± 4.55.

This result was agreed with **Khaliel, et al, (2022).** Who conducted study entitled "Evaluate Nurses' Performance regarding Safety Measures in Cardiac Catheterization Unit at Benha University Hospital and Suggested Guidelines" and revealed that more than half of the studied nurses were 20 ≤ 30 years. From investigator point of view, this explains that, most of nurses were newly graduated.

Regarding gender of the studied nurses, the current study revealed that more than half of the studied nurses were females. This result was agreed with **(*Abdel Sabour*, et al., 2019),** Who conducted study entitled "Nurses' Knowledge and Practice Regarding Hemodynamic Monitoring for Patients with Cardiothoracic, Vascular Surgery and Patient Outcome", and revealed that the majority of the studied sample was females, From investigator point of view, this may be due to the nursing profession in Egypt was exclusive for females only until few years ago.

Regarding to Educational Level of the studied nurses, the current study revealed that more than half of the studied nurses had bachelor nursing degree. This result was agreed with **Ahmed, et al., (2016),** who conducted study, entitled "Assessment of Nurses' Performance Regarding Invasive Hemodynamic Monitoring at Critical Care Units in Sudan", and revealed that the majority of nurses had a bachelor's degree, from investigator point of view; this may be as a result of the spread of nursing colleges in all governorates of Egypt.

This result was disagreed with **Ghonem, et al., (2022),** who conducted study entitled "Assessment of Nurses' Knowledge and Practice Regarding Thrombolytic Therapy among Patients with Acute Myocardial Infarction", and revealed that more than two thirds of the studied nurses had technical degree.

Regarding to years of experience of the studied nurses, the current study revealed that nearly two third of the studied nurses had years of experience ranged from 1 ≤ 5 years old in the nursing field, and more than four fifth had yearly experience ranged from1 ≤ 5 years in ICU, and the majority of nurses studied not attending training programs about IABP.

This Result was agreed with **Neelavathi, (2018),** who conduct study entitled "Effectiveness of capacity building program regarding care of patient with Intra-Aortic Balloon Pump upon the level of knowledge and practice among Nurses", and revealed that More than half of them had up to 2 years, experience in ICU and most of them had previous experience in the care of patient with IABP, From investigator point of view, because the nurse young adult and new graduated, may be because lack of hospital financial resources for training or shortage of nursing staff and work overload which considered as barrier for nurses to leave the work and attend training course.

The Second Part: Concerned with assessing nurses' level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump Therapy.

Focusing on level of knowledge of studied nurses, the results of current study revealed that the majority of studied nurses who are working in critical care units had unsatisfactory level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump therapy.

Result of this study was support by **Rasaria & Sawant, (2019),** who conducted study entitled "A Quasi-experimental Study to Assess the Effect of Planned Teaching Programme on Knowledge and Practice Regarding Management of Patient with Intra-Aortic Balloon Pump among Staff Nurses Working in Intensive Care Unit of Selected Hospital", and revealed that the most of nurses had poor knowledge regarding the management of the patient with IABP among staff nurses working in selected hospitals.

From investigator point of view, the reasons for lack nurses' level of knowledge about IABP may be related to lack of; continuing educational programs or courses about this therapeutic intervention, supervision, continuous evaluation of nurses' practice, and cooperation between multidisciplinary health care team members (nurses- physicians).

Regarding to total mean score and standard deviation of total knowledge regarding care of patients undergoing IABP therapy among the studied nurses, the results of current study revealed that great majority of the studied nurses had unsatisfactory knowledge regarding description and physiological effects, indications, contraindications, complications, nursing care, weaning and removal of IABP respectively with a highly statistically significant difference at P = 0.000, and a mean total knowledge score of $\bar{x} \pm$ SD= 15.28 $\pm$ 5.70 with a highly statistically significant difference at P = 0.000.

This result was agreed with **Rushdy, et al, (2015),** who conduct study entitled "Nurses' knowledge and practice regarding care of patients connected to intra-aortic balloon pump at Cairo university hospitals", and revealed that the great majority of the studied sample had unsatisfactory knowledge regarding description and physiological

effects, nursing care, indications, contraindications, complications, weaning and removal of IABP, respectively and a mean total knowledge score of 9.45+2.94.

This findings data answered the first research question it states what is nurses' level of knowledge regarding care of patients undergoing Intra-Aortic Balloon Pump Therapy?

The Third Part: Concerned with assessing nurses' level of practice regarding care of patients undergoing intra-aortic balloon pump therapy.

Focusing on level of practice of studied nurses, the results of current study revealed that the majority of studied nurses who are working in critical care units had incompetent level of practice regarding care of patients undergoing Intra-Aortic Balloon Pump therapy..

This result was agreement with **Ghafoor, et al., (2022),** who conducted study, entitled "The Effect of Teaching Programme on Knowledge and Caring Practice of Intra-Aortic Balloon Pump Patient Among ICU Staff Nurses", and revealed that most of the studied sample had poor level of practice regarding assessment of nurses' practice was done during preparation for insertion, caring of patient connected to IABP and during weaning and removal of IABP with highly statistical significant differences before teaching program. From investigator point of view, the reasons of incompetent practice level in the current study may be relevant to increased number of patients and increase work load; In addition, nurses' practices were based on traditions and imitations.

The current study findings that answered the second research question, it states "What is nurses' level of practice regarding care of patients undergoing Intra-Aortic Balloon Pump therapy?

The Fourth Part: Concerned with relational and correlational findings between variable under the study.

Regarding to relation between mean knowledge scores and demographic characteristics The current study revealed that there was highly statistically significant relation between demographic characteristics (age, educational level, position, and in ICU and total level of knowledge regarding care of patients undergoing IABP therapy among the studied nurses. However, the mean knowledge scores didn't differ significantly in relation to gender.

This result was disagreed with **Rushdy, et al, (2015),** who studied "Nurses' knowledge and practice regarding care of patients connected to intra-aortic balloon pump at Cairo university hospitals" and revealed that comparison of mean knowledge scores in relation to gender in the current study revealed that females had higher mean knowledge scores than males. However, the mean knowledge scores didn't differ significantly in relation to age.

The current study represents that, there was a highly statistically significant relation between demographic characteristics (age, educational level and position, years of experience in the field of nursing & in ICU) and total level of practice regarding care of patients undergoing IABP therapy among the studied nurses**.**

This result agreed with **Abdulrdha, & Mansour, (2019),** who conducted a study, entitled **"**Effectiveness of an Instructional Program on Nurse's Knowledge and practice

concerning Patients Discharge Planning post Cardiac Surgery at Cardiac Centers and hospitals in Baghdad City", and revealed that, there was a highly statistical significant association between educational levels with nurses' practice. In addition, **Nakano, et al, (2021),** conducted a study on "Improving Quality and Patient's Safety" who revealed that the years of experience had a positive impact on the quality of care provided.

Conclusion

In the light of the present study findings, it can be concluded that, the majority of the studied nurses had unsatisfactory total level of knowledge regarding care of patients undergoing intra-aortic balloon pump therapy, and also the majority of studied nurses had incompetent total level of practice regarding care of patients undergoing intra-aortic balloon pump therapy. There was a highly statistically significant relation between total level of knowledge & practice and demographic characteristics regarding age, educational level, position, years of experience in the field of nursing & in ICU and total level of knowledge and practice regarding care of patients undergoing IABP therapy among the studied nurses, while, there no significant relation between total level of knowledge & practice with gender, Also, there was highly statistically significant strong positive correlation between total level of knowledge and practice regarding care of patients undergoing IABP therapy among the studied nurses.

Recommendations

- **Based on finding of the present study, the followings are recommended:**

1) Updating for critical care nurses' knowledge and practice through carrying out continuing educational programs about IABP.
2) Strict observation of nurse's practice when caring of patients connected with IABP.
3) Providing nurses with periodic training sessions to improve their practices regarding assessments and management of patients connected with IABP
4) Availability of written guidelines, posters and algorithms about nursing management of patients connected with IABP.

Recommendations for further researches:

1) Replication of the study on a larger probability subjects from different geographical locations in Egypt.
2) Compare nurses' practice for care of patients connected with IABP in different work settings among nurses with different educational background.

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