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RESEARCH ARTICLE

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Nurses' Performance Regarding Emergency Management of Arrhythmias Post-Cardiac Surgery at Cardiac Centers, Khartoum, Sudan

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ABSTRACT
Arrhythmias are a known complication for heart surgery and are a major cause of morbidity, increased hospital length and higher economic costs. This study was conducted to assess nurses' performance regarding emergency management of arrhythmias post-cardiac surgery at cardiac centers. This is a descriptive cross sectional study hospital based conducted during 2017, included 77 nurses. Data collected using close-ended questionnaire to assess nurses' knowledge and attitude, and an observational checklist to assess nurses' practice. The data was entered into SPSS for windows version (23.0.0) and descriptive and multivariable logistic regression analysis were performed. Statistical level of significance declared at P value< 0.05, and t-test, ANOVA, and chi-square has been used. The data presented in tables and figures. The level of nurses' knowledge toward emergency management of post-cardiac surgery arrhythmias was poor with percent 75.3%, nurses have poor level of practice with percent 57.1%, and nurse's attitude was positive with 84.4% according to the result. P. Value =0.000, there is significant association between qualification level and nurses' knowledge and there is no significant association between duration of experience and nurses' knowledge with P. Value = 0.118. Therefore, there is no significant link between qualification level and the length of nursing P experience. Value = 0.901 and 0.717, respectively. The degree of practice and knowledge are not necessary more efforts to improve knowledge and practice.

ARTICLE HISTORY

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KEYWORDS

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INTRODUCTION

Cardiovascular disorder is the primary cause of death from non-communicable disorders, with 17,5 million fatalities (46% of fatalities from non-communicable diseases). Ischaemic heart disease; 7.4 million deaths were the most common cardiovascular diseases, while 6.7 million were due to strokes(1). High-risk surgery requires diligent preoperative and postoperative monitoring (2). Saving these life-threatening events is intended both to improve hospital outcomes and to improve production for long-term survivors (3).

Arrhythmia is a recognized risk following cardiac operation which is a significant cause of morbidity, prolonged hospital stay which higher cost of economy. Both tachyarrhythmia and arhythmia of Brady that occur after the procedure. Although atrial fibrillation (AF) is the most common cardiac rhythm disorder, ventricular arythmias and disturbances in conduction may also occur (4). Atrial tachycardia (ATs), like atrial fibrillation, is normal and difficult after late after mitral valve (MV) surgery(5). Atrial fibrillation is the most common postoperative arrhythmia in patients with

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cardiovalve surgery, and its prevalence is increasing(6).Arrhythmias develop in 20–40% of patients following heart surgery during coronary artery bypass graft (CABG) operation. (11) Dysrhythmias are disturbances of neural development or conduction (or both). These disorders can cause cardiac rhythm disturbances or both. The hemodynamic changes they produce can initially be shown to be dysrhythmias (for example , changing conduction will alter the pumping action of the heart and decrease blood pressure). Dysrhythmia is defined by the electrocardiographic waveform (ECG) examination. Their treatment is based on the frequency and gravity of the symptoms. Dysrhythmias are referred to as the origin site of the impulse and the training or conduction mechanism involved. An impulse arising in the Sino atrium node (SA) and slowing down is, for example, termed sinus bradycardia.

This study assesses the effectiveness of the nursing education program in Kirkuk's teaching hospitals, Iraq. It was a quasi-experimental design conducted at teaching hospitals in Azady and Kirkuk from 17 January 2011 to 10 June 2012. The software and equipment designed and created for the purpose of the research by the researcher. Purpose surveys of (80) nurses were split into two classes, the research group composed of (40) nurses subjected and the test group consisting of (40) nurses not subjected to the system. The findings of the study shows that the efficacy of the education system with respect to information regarding arrhythmias among nurses is optimistic and consistent. It indicates also that substantial gaps in the research population in the total key areas relevant to nursing skills are developing well. (13).

Postoperative atrial fibrillation (POAF) is the common risk following heart surgery in up to 60 percent of patients. There is an increased risk of cardiovascular mortality, stroke and other arhythmias that can have an effect on early and long-term health outcomes and a health economy. There have been several causes in POAF growth, including heart disease reconstruction, clinical stress, improvements in the atrial pressure and chemical stimulation and sympathetic / parasympathetic reflex activation(7).

The POAF frequency is 10% to 50%, usually 2 to 5 days after the operation. In view of the increased short-term and long-term risks of POAF patients, it is especially important to consider ways of reducing their burden (8). The nurses play a key role in identifying and managing arrhythmia by electrocardiographical (ECG) analysis of clinical perceptions. The nurse will clearly collect additional data; inform the physician based on rhythm awareness. Nurse also performs protocol shock therapy for a specific unit. Throughout ECG interpretation, there is limited information on the expertise of the nurses or the categorisation of arhythmic awareness which is essential for quality professions at different career rates (9).

During the execution of correct nursing and medical responses, information of arrhythmia categorisation and eventual confirmation of nurse expertise is important to the secure effective practice because of the crucial role of the nurse in liaisoning the rhythm band with the patient's clinical condition (4). The study of cardiac nurses' knowledge, attitude, and practice regarding postoperative arrhythmias and its management is very important because this case is threatening life and may develop to a systole during a minutes and the awareness of nurses about arrhythmias assists to improve the emergency management and the interventions in the suitable time.

Nurses' knowledge and skills in providing emergency management of arrhythmia is a great importance in improving patient outcomes. Nurses should have knowledge, experience and information toward patient with arrhythmia and specifically with shockable rhythm, because the patient is usually unresponsive and pulseless and need critical care that provided by skilled work team**.** The nurse is liable, on the basis of knowledge gathered from the manager, for all technological elements of monitoring and professional decision taking. The healthcare practitioners require adequate expertise to undertake these roles to optimize treatment efficiency and patient results.(10) Due to nursing experience, the nurse wants to be in a strong position to provide patients with guidance and instruction in all facets of self-management. The shortage of expertise of ambulance nurses has been reported as leading to the inadequate outcomes of cardiac arrest patients.

Objectives of the Study

This study assessed the nurses' performance regarding emergency management of arrhythmias post-cardiac surgery. It specifically aims to: (1) to assess the nurses' knowledge regarding arrhythmias post-cardiac surgery and its emergency management; (2) to identify the nurses' attitude regarding emergency management of arrhythmias post-cardiac surgery; (3) determine the nurses' practice regarding emergency management of arrhythmias post-cardiac surgery; (4) find relation between nurses' knowledge and practice with selective socio-demographic data (qualification and years of experience).

Materials and Methods

Research Design

This is a descriptive cross sectional study hospital based. The study has been conducted at governmental cardiac centers in Khartoum state, which include Ahmed Qasim Hospital, and Alshaab

Hospital. This study has been carried out for about nine months.

Respondents Sampling Criteria and Ethical Consideration

It has covered nurses in governmental cardiac centers including Ahmed Qasim Hospital, and Alshaab Hospital. The following are the inclusion criteria: (1) Nurses who have BSc, and MSc; and (2) Nurses who have more than six months experience. Consequently, exclusion criteria are those Nurses who have diploma in Nursing Science. The following are the ethical protocols: (1) Approval from University of Medical Sciences and Technology (UMST); (2) Approval from Institutional Review board of Khartoum State Ministry of Health, research department; (3) Approval obtained from Institutional Review board of Ahmed Gasim and Alshaab Hospitals; (4) Research purpose and objectives explained to participants in clear simple words; (5) Participant has a right to withdraw at any time without any deprivation; (6) Participant has a right to gain benefit from the researcher knowledge and skills; and (7) Data collected at rest time of participant, consent obtained from each participant who accept to be involve in the study after explanation of objectives and outcome.

Research Instruments

The researcher used structure questionnaire with open and closed questions to assess nurses' knowledge and attitude. Questionnaire contain two sections, first section for demographic data, and the second section for assessment of nurses' knowledge and attitude. In addition, Checklist was filled by the researcher for assessment of nurses' practice.

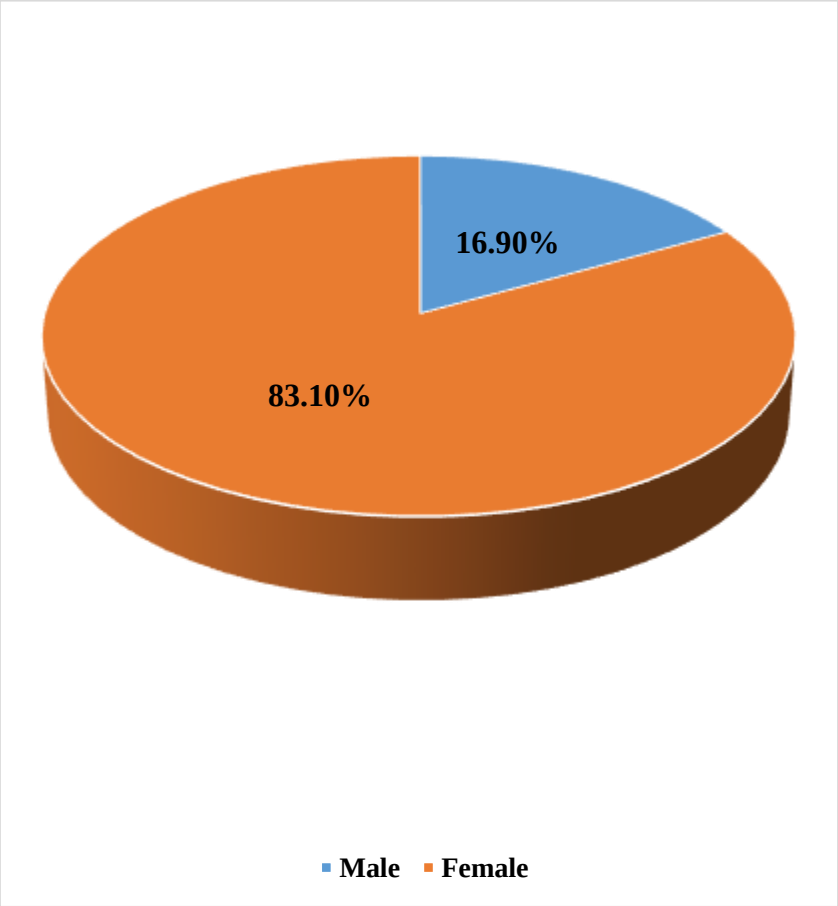

Figure (1): Distribution of sample according to gender N=77

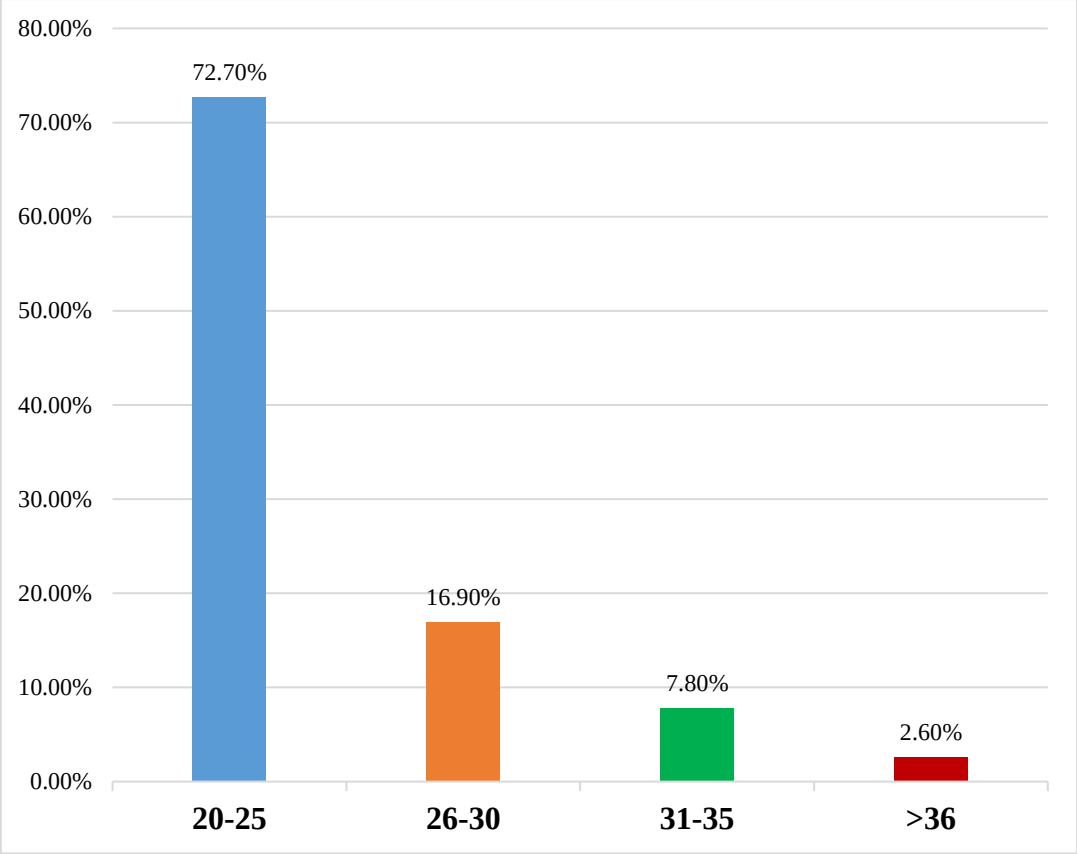

Figure (2): Distribution of sample according to age. N=77

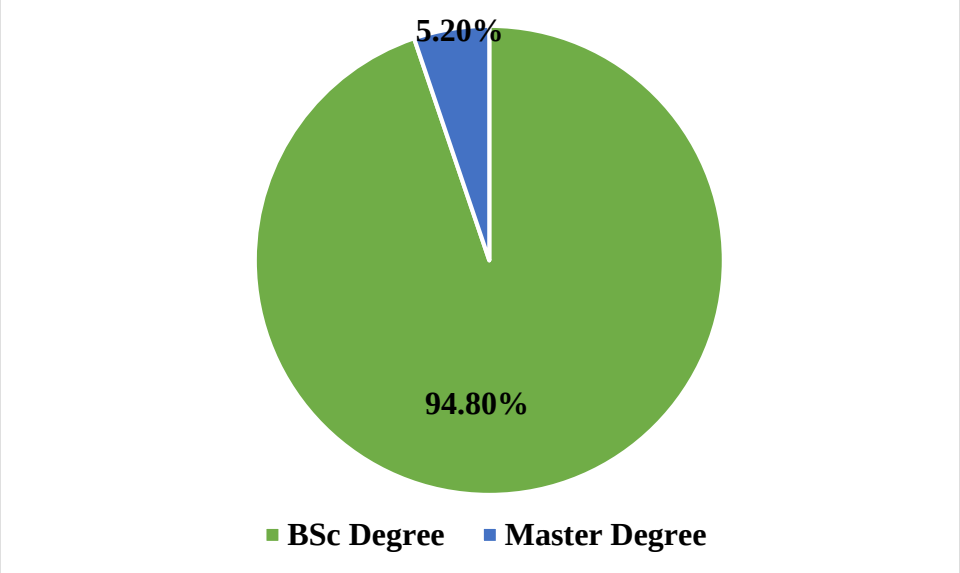

Figure (3): Distribution of sample according to qualification level. N=77

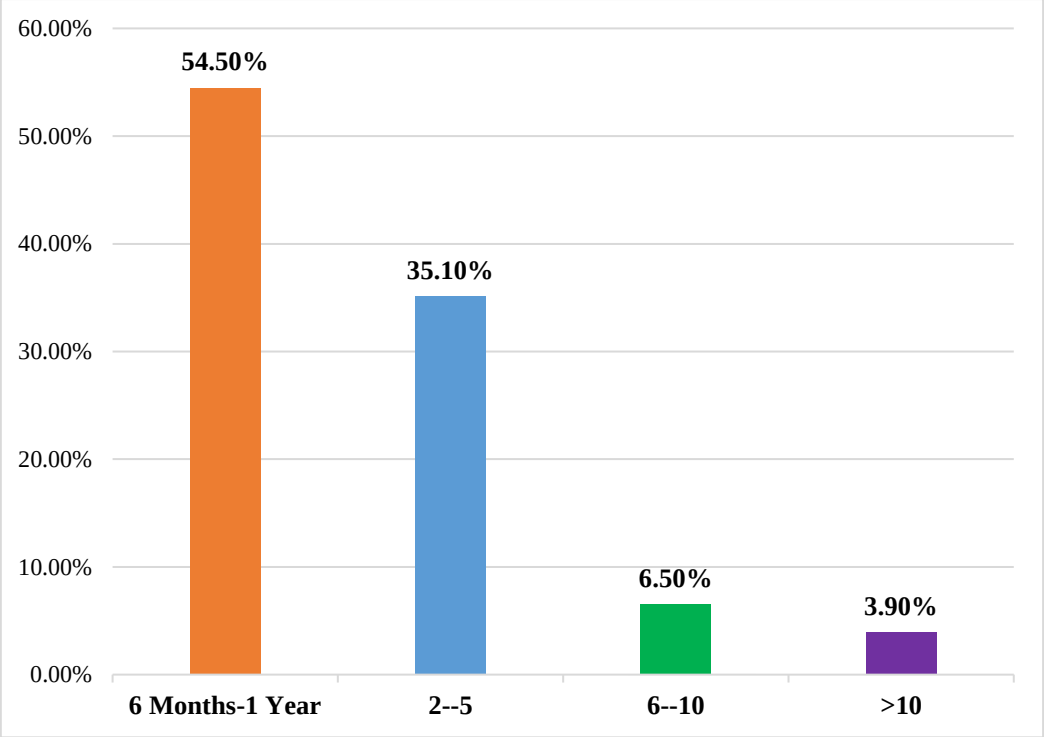

Figure (4): Distribution of sample according to experience. N=77

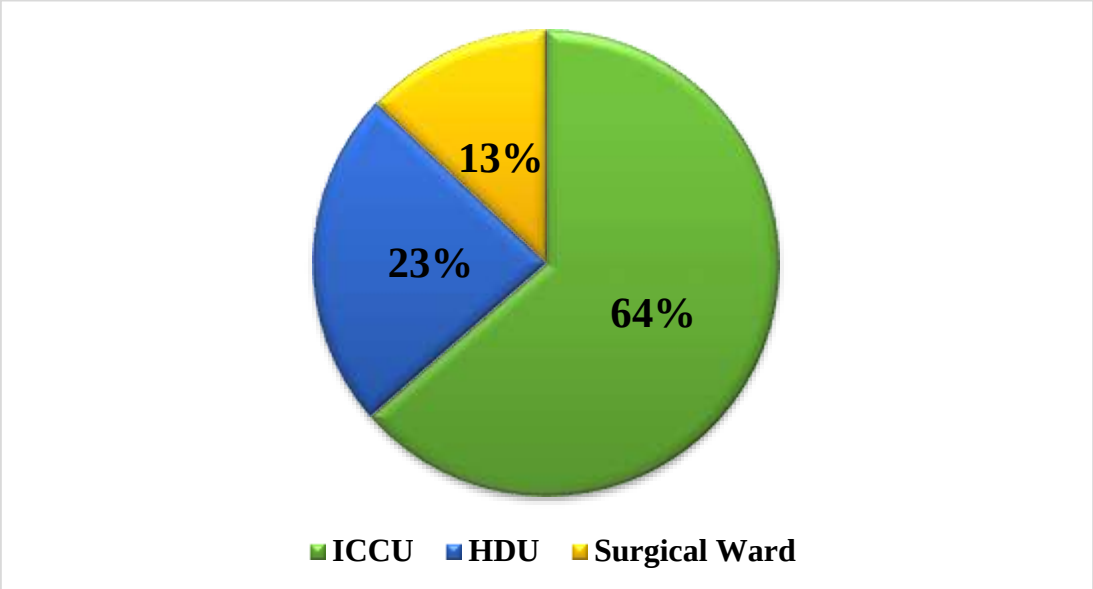

Figure (5): Distribution of sample according to work department. N=77

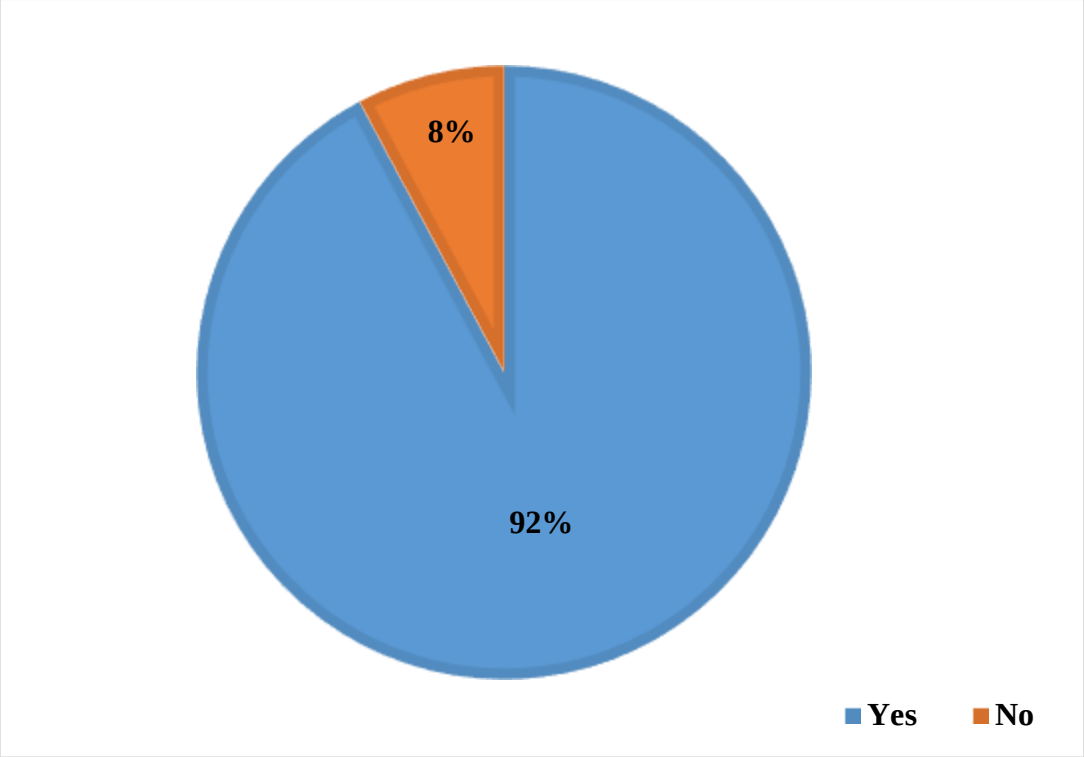

Figure (6): Distribution of sample according to CPR attendance. N=77

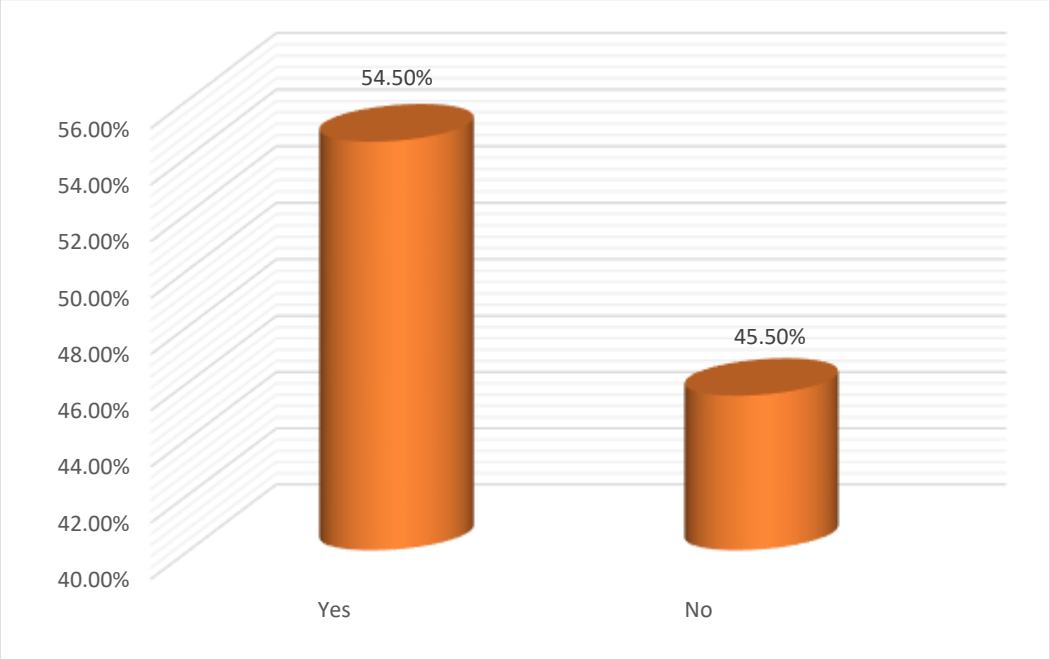

Figure (7): Distribution of sample according to cardiac course attendance. N=77

Table (1): Distribution of sample according to knowledge grade. N=77

Knowledge	Poor Knowledge		Fair Knowledge		Good Knowledge	
	n	%	n	%	n	%
ECG	59	76.6%	16	20.8%	2	2.6%
CPR	13	16.9%	47	61.0%	17	22.1%
AF	49	63.6%	25	32.5%	3	3.9%
A Flutter	62	80.5%	10	13.0%	5	6.5%
DC	43	55.8%	28	36.4%	6	7.8%
VT	59	76.6%	13	16.9%	5	6.5%
VF	47	61.0%	23	29.9%	7	9.1%
A systole	20	26.0%	26	33.8%	31	40.3%
Total	**58**	**75.3%**	**18**	**23.4%**	**1**	**1.3%**

Table (2): Distribution of sample according to knowledge. N=77

Knowledge	Educational Level	
	BSc	Master
	Mean±SD	Mean±SD
ECG	4.53±2.71	6.50±2.38
CPR	2.64±1.15	4.25±0.96
AF	3.77±1.93	5.50±2.08
A Flutter	0.82±0.90	1.25±0.50
DC	1.48±1.18	2.25±1.26
VT	4.96±2.47	7.00±4.08
VF	2.23±1.39	3.50±2.89
A systole	2.00±1.02	2.50±0.58
Total	22.44±9.08	32.75±10.90

Table (3): Distribution of sample according to practice grade. N=77

Practice	Poor Practice		Fair Practice		Good Practice	
	n	%	n	%	n	%
Total	44	57.1%	32	41.6%	1	1.3%

Data Analysis

In order to determine the continuous variables (mean ±SD used for comparisons), t test and ANOVA t tests used for detection of significant differences, the data were analyzed using the Social Science Statistical Package (SPSS) version 23.0.0.0 .. A chi-square test has been used for categorical variable comparisons between classes.

Results and Discussion

Knowledge and practice were classified and categorized into three groups as bellow based on percentage of scores obtained: Good knowledge and good practice are above 75%, fair knowledge and fair practice are 50 -75%, and poor knowledge and poor practice are below 50%. [27], [28], [29], [30]\ Study out come with 83.10% of participant were female and 16.90% were male, its compatible with study conducted in multi centers in United States that 89% were female and 11% of them were male[14], also other study which conducted in Botswana that's 86.3% were females and 13.7% were males[25], and not compatible with study which conducted in Baghdad teaching hospitals/Iraq that's 64% are male and 36% was female[19], in addition that not compatible with the study which conducted in Maysan governorate Iraq that's 60% and in the control group 56.7% were males[31]. In study findings the majority sample are female becouse the females are more intersted in nursing than male in sudan, in addition, the males are prefer immigration.

72.70% of sample aged between 20-25 years old, 16.90% between 26-30, 7.80%between 31-35, and 2.60% more than 36 years old. The result of the study showed that 94.80% of sample have Bsc in nursing and 5.20% have master degree in nursing, that compatible with the study which conducted in Baghdad teaching hospitals/Iraq that's high percentage of sample was graduated bachelor degree 62% [19]. In experience, 54.50% of samle have experient period from 6-12months, 35.10% with 2-5 years, 6.50% with 6-10 years and 3.90% are more than 10 years of experience, it's not compatible with the Distribution of sample according to knowledge grade. N=77study which conducted in Baghdad teaching hospitals that is

76.0% of studied sample have experience within 1-4years category[19].

Table (4): Distribution of sample according to practice. N=77

Practice	Done		Need Correction		Not done	
	n	%	n	%	n	%
Close monitor monitoring	8	10.4%	43	55.8%	26	33.8%
Quick response to rhythm changes	14	18.2%	62	80.5%	1	1.3%
Assessment of circulation, airway, and breathing	14	18.2%	48	62.3%	15	19.5%
Able to determine the rhythm which treated with anti-arrhythmias only	1	1.3%	24	31.2%	52	67.5%
Give anti-arrhythmias medication	49	63.6%	27	35.1%	1	1.3%
Differentiate between shockable and non shockable rhythm	1	1.3%	16	20.8%	60	77.9%
Call resuscitation team	4	5.2%	67	87.0%	6	7.8%
CPR	2	2.6%	74	96.1%	1	1.3%
CPR rate, and rhythm	5	6.5%	44	57.1%	28	36.4%
Chest compression	1	1.3%	61	79.2%	15	19.5%
Patient position undergo CPR	69	89.6%	6	7.8%	2	2.6%
Arrangement patient emergency crash cart	10	13.0%	66	85.7%	1	1.3%
Preparation of defibrillator	0	0.0%	69	89.6%	8	10.4%
First shock	3	3.9%	37	48.1%	37	48.1%
Chang CPR provider every 2 minutes(1 cycle)	0	0.0%	68	88.3%	9	68.3%
Resume CPR and complete cycle	0	0.0%	77	100%	0	0.0%
Second shock	3	3.9%	41	53.2%	33	42.9%
reassess of circulation, airway, and breathing	3	3.9%	66	85.7%	8	10.4%
Controlled oxygenation and ventilation	28	36.4%	47	61.0%	2	2.6%
12-lead ECG	8	10.4%	58	75.3%	11	14.3%
Treating precipitating causes	72	93.5%	5	6.5%	0	0.0%
Temperature control/ therapeutic hypothermia	0	0.0%	71	92.2%	6	7.8%
Close monitoring of the patient	9	11.7%	35	45.5%	33	42.9%
Privacy of the patient	1	1.3%	20	26.0%	56	72.7%
Dealing with the patient	13	16.9%	64	83.1%	0	0.0%
Dealing with the co-patient	1	1.3%	67	98.7%	0	0.0%
Hand hygiene and put on PPE(glove and face mask), if indicated	8	10.4%	65	84.4%	4	5.2%
Nurse general appearance	3	3.9%	39	50.6%	35	45.5%
documentation	0	0.0%	0	0.0%	77	100%

Table (5): Distribution of sample according to Attitude grade. N=77

Attitude	Frequency **n**	Percent **%**
Positive attitude	65	84.4%
Negative attitude	12	15.6%

Table (6): Comparison between qualification level and experience with knowledge grade. N=77

Items		Knowledge						Significant Test
		Poor Knowledge		Fair Knowledge		Good Knowledge		
		n	%	n	%	n	%	
qualification level	BSc	56	76.7%	17	23.3%	0	0.0%	X^2 =18.614 P 0.000*
	Master	2	50.0%	1	25.0%	1	25.0%	
Experience	6months-1y	33	78.6%	9	21.4%	0	0.0%	X^2 =16.140 P 0.013*
	2-5	21	77.8%	6	22.2%	0	0.0%	
	6-10	2	40.0%	2	40.0%	1	20.0%	
	>10	2	66.7%	1	33.3%	0	0.0%	

In study findings that is 64% of sample working in ICCU, 23% working in HDU while 13% working in surgical ward. In regarding cardiac courses that's 92% of sample recived CPR training course, while 8% did not recived CPR training course, it's not compatible with the study which conducted in Botswana that is 70% had received no CPR training after completion of their basic training[25].

In the present study finding reported that only one out of seventy seven with percentage1.3% had good knowledge regarding emergency management of post cardiac surgery arrhythmias, this finding match with study conducted in Kirkuk's teaching hospitals, Iraq which showed that is poor knowledge and the effectiveness of educational program regarding nurses' knowledge toward arrhythmia is a positive and clear [13]. In the knowledge grade, regarding ECG that is two with percentage 2.6% with Good Knowledge, sixteen with percentage 20.8% with Fair Knowledge, and fifty-nine with percentage 76.6% with Poor Knowledge, this findings are match with study conducted in multi centers in United States, which its result showed that is low nurses' knowledge regarding ECG interpretation and that's knowledge is improved after implementation of American Heart Association (AHA) practice standards for ECG monitoring.[14]

The nurses' knowledge regarding cardio pulmonary resuscitation CPR that is seventeen with percentage 22.1% with Good Knowledge, forty-seven with percentage 61% with Fair Knowledge, and therein with percentage 16.9% with Poor Knowledge, this findings are match with study conducted in Kegalle district, SriLanka, which its result showed that is only 45.08% of doctors and 36.75% of nurses had adequate core knowledge on cardio pulmonary resuscitation CPR and the knowledge deteriorate with time[26], and match with the study which conducted in the Asahikawa Medical College Hospital, the study was concluded with that the cardio pulmonary resuscitation CPR knowledge of both the nursing staffs and the student nurses was not sufficient, indicating the necessity of cardio pulmonary resuscitation CPR education for both nursing staffs and student nurses[32].

The nurses' knowledge regarding atrial fibrillation AF that is three with percentage 3.9% with Good Knowledge, twenty-five with percentage 32.5% with Fair Knowledge, and forty-nine with percentage 63.6% with Poor Knowledge, this findings are match with study conducted among Nurses throughout New South Wales, Australia and nursing members of the Cardiac Society of Australia and New Zealand (CSANZ) which showed that's poor knowledge and practice in the areas of AF and anticoagulation[17].

The nurses' knowledge regarding Atrial flatter that is five with percentage 6.5% with Good Knowledge, ten with percentage 13% with Fair Knowledge, and sixty-two with percentage 80.5% with Poor Knowledge.

The nurses' knowledge regarding DC shock that is six with percentage 7.8% with Good Knowledge, twenty-eight with percentage 36.4% with Fair Knowledge, and forty-three with percentage 55.8% with Poor Knowledge. The nurses' knowledge regarding ventricular tachycardia VT that is five with percentage 6.5% with Good Knowledge, thirteen with percentage 16.9% with Fair Knowledge, and fifty-nine with percentage 76.6% with Poor Knowledge, this findings are match with study conducted in Baghdad teaching hospitals and Ghazi Al-Hareeri for specialized surgeries hospital Iraq which showed that's high percentage 66.0% of nurses their knowledge less than 50%. [19]

The nurses' knowledge regarding ventricular fibrillation VF that is seven with percentage 9.1% with Good Knowledge, twenty-three with percentage 29.9% with Fair Knowledge, and forty-

seven with percentage 61% with Poor Knowledge, this findings are match with study conducted in Baghdad teaching hospitals and Ghazi Al-Hareeri for specialized surgeries hospital Iraq which showed that's studied sample's knowledge regarding ventricular fibrillation was within low level [19].

Finally The nurses' knowledge regarding A systole that is thirty-one with percentage 40.3% with Good Knowledge, twenty-six with percentage 33.8% with Fair Knowledge, and twenty with percentage 26% with Poor Knowledge.

In total nurses' knowledge, there is high percentage of studied sample fifty-eight with percentage 75.3% had poor level of knowledge and about eighteen with percentage 23.4% have had Fair Knowledge. Regarding total nurses' practice, showed about more than half of sample forty-four with percentage 57.1% had Poor Practice, in other hand only one with percentage 1.3% of sample had Good Practice, and thirty-two with percentage 41.6% with Fair Practice. Most domains of practice are need correction, 77.9% of sample are unable to differentiate between shockable and non-shockable rhythm, 67.5% of sample are unable to determine the rhythm that treated with anti-arrhythmias only, and all sample don't have had any information about documentation.

This finding is a combination of a study by nurses across New South Wales, Australia and nursing professionals from the Cardiac Society of Australia and New Zealand (CSANZ) that has demonstrated lack of knowledge and practice in AF and anticoagulation(17), and this finding corresponds with a study conducted in multiple centers in the USA. It has shown that the knots of nursing infants are low.

The high percentage of poor practice is resulting of lack in nurse's knowledge and lack of cardiac training courses, or ineffective courses if it done. Regarding of distribution of sample according to Attitude grade, the findings refer to high percentage of sample 84.4% had positive attitude, and 15.6% of sample are negative attitude. There were statistical significant between qualification level and knowledge grade, and there were statistical significant between experience and knowledge grade. There were statistical significant between qualification level and total knowledge, and there were not statistical significant between experience and total knowledge. There were not statistical significant between qualification level and practice grade, and there were not statistical significant between experience and practice grade. There were not statistical significant between qualification level and total practice, and there were not statistical significant between experience and total practice. There were not statistical significant between qualification level and attitude, and there were not statistical significant between experience and attitude.

Conclusion

According to findings of the study concluded the following: (1) The total evaluation of knowledge was poor. In the knowledge grade, regarding ECG that is fifty-nine with percentage 76.6% with Poor Knowledge. The nurses' knowledge regarding cardio pulmonary resuscitation CPR that is therein with percentage 16.9% with Poor Knowledge. The nurses' knowledge regarding atrial fibrillation AF that is forty-nine with percentage 63.6% with Poor Knowledge. The nurses' knowledge regarding ventricular fibrillation VF that is forty-seven with percentage 61% with Poor Knowledge. Finally The nurses' knowledge regarding A systole that is thirty-one with percentage 40.3% with Good Knowledge. :2) Total evaluation of practice was poor. Most domains of practice are need correction, 77.9% of sample are unable to differentiate between shockable and non-shockable rhythm, 67.5% of sample are unable to determine the rhythm that treated with anti-arrhythmias only, and all sample don't have had any information about documentation. There were statistical significant between qualification level and experience with knowledge grade. There were statistical significant between qualification level and total knowledge, and there were not statistical significant between experience and total knowledge. There were not statistical significant between qualification level and experience with practice grade. There were not statistical significant between qualification level and experience with total practice. In addition, total evaluation of attitude was positive.

Recommendations

On the basis of the findings of the present study, the following recommendations are proposed: It is important to design a training program to improve nursing skills in post-cardiac arhythmia emergency management and in other arrhythmic fields. Offer clinical guidelines for arrhythmia to prevent complications during post-cardiac procedures and improve patient outcomes. Further studies are required to evaluate the knowledge and practice of nurses in various areas of health in relation to the emergency management of post-cardiac arrhythmias.

Strengths and Limitations of the Study

There were numerous drawbacks to this report. Second, the cross-sectional nature is a possible drawback of this analysis, which renders it impossible to relate to the causality of depression. The causal association between depression and risk

factors established in the present research will be defined through a follow-up analysis in the future. Secondly, the amount of participants who did not cause the findings to be replicated and this may have affected the results found, since no substantial variation between certain test variables was reported, which can be due to the limited power of the study involved. Thirdly, because of the nature of the measures exclusively self-reported, the results of this study must be interpreted with caution. However, this study ensures confidentiality through the use of anonymous reports and notes that no sanctions are associated with the replies. The technique will every the risk of dishonesty.

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