- ***Basic Research***

Cardiac dysrhythmias Interpretation: Knowledge Enhancement Nursing Protocol

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Abstract

Introduction: Cardiac dysrhythmias are a major cause of morbidity, increased hospital length and higher economic costs. **Aim:** This study was conducted to evaluate the effect of knowledge enhancement nursing protocol regarding cardiac dysrhythmias interpretation through the following: a) Assess nurses' level of knowledge regarding cardiac dysrhythmias interpretation pre implementation of enhancement nursing protocol. b) Design & Implement knowledge enhancement nursing protocol based on nurses' needs assessment c) Evaluate nurses' level of knowledge regarding cardiac dysrhythmias interpretation post implementation of enhancement nursing protocol. **Study design:** A quasi –experimental design was utilized. Setting: this study was conducted at the intensive care units in El-Demerdash Hospital, which is affiliated to Ain Shams University Hospitals, Cairo-Egypt. **Subjects:** A convenience sample of 60 nurses from the previously mentioned setting was included in this study. **Data collection Tools:** data were collected pre and post knowledge enhancement nursing protocol using cardiac dysrhythmias interpretation assessment questionnaire; Part I: Nurses' Demographic Characteristics and Part II: Nurses' Knowledge Assessment. **Results:** There were statistically significant difference between mean scores of nurses' knowledge regarding cardiac dysrhythmias interpretation pre and post implementation of nursing protocol. **Conclusion:** The finding of the current study proved the hypothesis of this study which stated that implementation of knowledge enhancement nursing protocol will upgrade nurses' knowledge regarding cardiac dysrhythmias interpretation. **Recommendations:** All opportunities for improving nurses' competence for caring of patients with cardiac dysrhythmias as workshops, seminars, conference, and in-service education program regarding ECG interpretation should be utilized periodically.
Key words: cardiac dysrhythmias, enhancement nursing protocol, interpretation.

Introduction

Cardiac dysrhythmias are the most prominent causes of mortality in patients with heart diseases. It causes about 12% of all deaths globally. **(Tavan et al., 2020).** Approximately one-third of people with arrhythmias do not exhibit any symptoms, preventing their timely diagnosis and treatment. In individuals who do experience symptoms, these may include sensations of a racing or pounding heart, chest pain, shortness of breath, dizziness, light headedness, anxiety, losing consciousness, and reduced capacity to exercise, which can impair the quality of life in some cases. Symptoms can be dangerous, and life threatening and may even lead to sudden cardiac death **((Yue et al., 2020).**

Arrhythmias are grouped into brady dysrhythmias, tachy-dysrhythmias & life-threatening dysrhythmias. Patients with ischemic cardiomyopathy (ICM) and nonischemic cardiomyopathy (NICM) are liable to these types of arrhythmias **(Kripa & Jebastine, 2020).**

Life-threatening arrhythmias, including ventricular fibrillation (VF) and ventricular tachycardia (VT) that are major causes of sudden cardiac death. Also, it includes Pulseless electrical activity (PEA), and asystole that represent the less common causes of dysrhythmias 20 % to 30% **(Sharabi & Singh, 2020).** Pulseless electrical activity is also considered a life threating arrythmia which is a clinical condition characterized by unresponsiveness and impalpable pulse in the presence of sufficient electrical discharge. A lack of ventricular impulse often points to the absence of ventricular contraction **(Oliver et al., 2020).**

Electrocardiogram (ECG) is considered the most easy, safe, and useful diagnostic tool used non-invasively to assess the electrical and muscular functions of the heart and a guidance for the nurse to the severity of the arrhythmia **(Coopper, 2020).** Cardiac dysrhythmias may be the presenting complaint in the emergency department and may feature throughout the perioperative period, including at preoperative assessment, during surgery and in the recovery phase**.** Management of patients with cardiac arrhythmias is required rapid and accurate interpretation of ECG. Also, ECG interpretation is an important strategy during the cardiac discipline education **(Chang et al., 2020).**

The interpretation of cardiac rhythm disturbances or dysrhythmias is an essential skill for nurses. The ability to rapidly analyze a rhythm disturbance as well as initiate appropriate treatment improves patient safety and optimizes successful outcomes. The critical care nurse is often the healthcare professional responsible for the continuous monitoring of the patient's cardiac rhythm and has

the opportunity to provide early intervention that can prevent an adverse clinical situation. The purpose of continuing education in nursing is to enhance knowledge, skills, and confidence of professional nurses to provide high- quality, competent, and safe patient care **(Ho, et al., 2021).**

Nurses working in CCU should be highly qualified and able to provide an effective care around -the -clock, with ratio of one nurse to one patient. The intention behind this statement is to ensure high quality performance to recognize and treat arrhythmias to save patient's life. Nurses training should be implemented to help emergency nurses recognize potentially fatal arrhythmias, enabling prompt and appropriate patient treatment**.** Achieving and maintaining ECG interpretation competence by healthcare professionals is recommended by the American Heart Association (AHA) as a patient safety measure **(Rahimpour et al., 2021).** Learning and mastering cardiac arrhythmias are difficult, requiring training and practicing all arrhythmias **(Tavan et al., 2020).**

Significance of the study

Arrhythmias are a major cause of morbidity, increased hospital length and higher economic costs. Nurses should have enough knowledge to carry out these responsibilities so that they can maximize the quality of care and patient outcomes. Nurses should be able to quickly and correctly detect and interpret ECG abnormalities and intervene in a timely manner **(Habibzadeh et al., 2019).** So, the enhancement nursing protocol for interpretation of cardiac arrhythmias is considered an effective strategy to maintain patients' safety and decrease cardiac related morbidity and mortality.

Research hypothesis:

The current study hypothesized that, "implementation of knowledge enhancement nursing protocol will upgrade nurses' knowledge regarding cardiac dysrhythmias interpretation".

Subjects and Methods

Research design: A quasi –experimental (Pretest-Posttest design) was utilized to conduct this study.**Setting:** This study was conducted at the intensive care units (coronary care unit, open heart surgery care unit, medicine care unit and general care unit) at El-Demerdash hospital, which is affiliated to Ain Shams University Hospitals, Cairo-Egypt.

Subjects: A convenience sample of 60 nurses (15 nurses from each previously mentioned setting) was included in this study.

Tools for data collection:

1- ***Cardiac dysrhythmias interpretation assessment questionnaire*:** It involved the following two parts:

Part I: Nurses' Demographic Characteristics**:** This part included age, gender, qualifications, training courses and years of experience.

Part II: Nurses' Knowledge Assessment: This tool was developed by the researchers after reviewing the related literatures **(Clutter, 2015; Hall et al., 2015; Baid et al., 2016; Goldsworthy, 2016 & American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, 2020)** to assess nurses' knowledge regarding cardiac dysrhythmias interpretation**.** It was translated into simple Arabic language. It consisted of four main sections: **electro-cardiac physiology** (12 questions). **Brady dysrhythmias** (sinus brady cardia, sino atrial block and atrio-ventricular block) including 21 questions as following: definitions with total of 3 questions; one questions for each type of brady dysrhythmias; causes 3 questions; one questions for each type of brady dysrhythmias; characteristics of dysrhythmias with total 9 questions: 3 questions for each type of brady dysrhythmias, and management with total 6 questions; 2 questions for each type of brady arrythmias.

Tachydysrhythmias (supraventricular tachycardia, atrial fibrillation and atrial flutter) 21 questions including definitions with total of 3 questions; one questions for each type of tachydysrhythmias; causes 3 questions; one questions for each type of tachydysrhythmias; characteristics of tachydysrhythmias with total 9 questions: 3 questions for each type of tachydysrhythmias, and management with total 6 questions; 2 questions for each type of tachydysrhythmias. **Life threatening dysrythmias** (A systole, pulseless electrical activity, ventricular fibrillation and ventricular tachycardia) 28 questions including definitions with total of 4 questions; one questions for each type of life threatening dysrhythmias; causes 4 questions; one questions for each type of Life threatening dysrhythmias; characteristics of life threatening dysrhythmias with total 12 questions: 4 questions for each type of life threatening dysrhythmias; and management according to American Heart Association guidelines for advanced life support 2020 with total 8 questions; 2 questions for each type of Life threatening dysrhythmias. All questions used were multiple choice questions.

Scoring system:

For the second part of the questionnaire, the nurse was requested to choose one answer only. The correct answer was given one score, while the

incorrect one was given zero with total score 82 degree (Electro-cardiac physiology (12 degree), Brady dysrhythmias (21 degree), tachydysrhythmias; (21 degree) and life-threatening dysrhythmias (28 degree). The total scores for the whole questionnaire were categorized into satisfactory and unsatisfactory as follow:

- Satisfactory level equal 100% = 82 degree
- Unsatisfactory level less than 100% < 82 degree

Cardiac dysrhythmias interpretation is vital for every nurse working in the critical care unit as it immediately affects patient's survival.

Tool validity: The developed tool was tested for face and content validity through five experts in Critical Care Nursing department, faculty of nursing Ain Shames University. They were requested to give their opinion regarding the tool's content, accuracy, relevancy and appropriateness to the research objective. There was 100% agreement on the first part of the questionnaire, and for the second part, some modification was done related to construction and number of the questions. Finally, the questions were reduced into 82 questions according to experts' opinion.

Tool reliability: Alpha Cronbach test was utilized to measure the internal consistency of the study tool =0.79 which indicated that the tool is reliable.

Pilot study: A pilot study was carried out on 6 nurses. It was done to test the clarity and applicability of the tools. It also helped in the estimation of the time needed to fill out the questionnaire. No modifications were needed and the selected nurses for the pilot study were not excluded from the study sample.

Ethical considerations: Approvals was obtained from the El-Demerdash hospital, Ain Shams University before starting the study. The researchers clarified the objective and the aim of the study to the nurses participated in the study to obtain their permission and cooperation. Oral consent was obtained from them to ensure willingness to engage in the study. The researchers-maintained anonymity of the subjects and confidentiality of the collected data. The nurses were allowed to choose to participate or not and they were informed that they have the right to withdraw from the study at any time.

Field work:

The study was carried out within five months starting from January till the end of May 2021 in the morning and afternoon shifts in the previously mentioned setting. The study was carried out through three phases' preparatory phases, implementation phase and evaluation phase as follow:

Preparatory phase: review of existing recent literatures, preparation of the structured questionnaire, content validity of the tool, testing the reliability of the tool and the pilot study. **Implementation phase:** according to universal precautions of covid-19, the nurses who were willing to participate in the study were grouped into 12 group (3 groups in each previously mentioned settings), each group had five nurses. The pre- test questionnaire was filled out by the nurses under the study as a baseline assessment under researcher supervision. The pre- test questionnaire was completed through two sessions with total time 60 minutes as following: first session was regarding electro-cardio physiology and brady dysrhythmias within 30 minutes, the second session was regarding tachydysrhythmia and life threating dysrhythmias within 30 minutes. Directly after completion of the pre- test, knowledge enhancement nursing protocol was done.

The Knowledge enhancement nursing protocol:

it was designed by the researcher based on nurses needs assessment after reviewing the related literature **(Clutter, 2015; Hall et al., 2015; Baid et al., 2016; Goldsworthy, 2016 &** American **Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, 2020).** It included the following parts; **Part I:** Electro-cardio physiology and interpretation of normal electro cardio-gram. **Part II:** Brady dysrhythmias that included sinus brady cardia, sino-atrial block and atrio-ventricular block with its definition, causes, interpretation (characteristics) and management. **Part III:** Tachydysrhythmia that included supraventricular tachycardia, atrial fibrillation, and atrial flutter with its definition, causes, interpretation (characteristics) and management. **Part IV:** Life threatening dysrhythmias included a systole, pulseless electrical activity, ventricular fibrillation, and ventricular tachycardia with its definition, causes, interpretation (characteristics) and management. The content of the knowledge enhancement nursing protocol was provided by researchers using a power point slides and posters through four sessions included electro-cardio physiology, brady dysrhythmias, tachydysrhythmia and life threating dysrhythmias. Each session took about 45-60 minute for explanation and feedback from the nurses through interpretation of some examples for cardiac dysrhythmias. At the end of the sessions, a booklet about cardiac dysrhythmias interpretation that is prepared by the researchers were given to every nurse participated in the study as a guided reference for them.

Evaluation phase: after finishing the knowledge enhancement nursing protocol sessions, the nurses participated in the study were asked to refill out the same pre

-test questionnaire as a posttest to evaluate nurses' level of knowledge regarding cardiac dysrhythmias interpretation.

Statistical analysis:

The collected data were organized, categorized, tabulated, and statistically analyzed using the Statistical Package for Social Science (SPSS) version (20). Data were presented in tables and graph. The statistical analysis included percentage, mean, standard deviation (SD), quantitative data was analyzed using Paired T test.

Results:

Table (1): Frequency and percentage distribution of the studied nurses according to their demographic characteristics (N=60).

Characteristics	No.	%
Age (years)		
<30	39	65.0
30<40	18	30.0
≥40	3	5.0
Gender		
Male	9	15.0
Female	51	85.0
Academic Qualifications		
Diploma education	11	18.3
Technical Nursing Institute	31	51.7
Bachelor of Nursing	18	30.0
Years of experience		
≤5 yrs.	25	41.7
> 5 years	35	58.3
Training courses		
Yes	0	0.0
No	60	100

Regarding demographic characteristics of the studied nurses, table 1 showed that 65% of the nurses, their age was less than 30 years old and 85% of them were females. In addition to 51.7% of the studied nurses were graduated from technical nursing institute and 58.3% of them had an experience more than 5 years. Moreover, none of the studied nurses received training courses about cardiac dysrhythmias interpretation.

Table 2. The difference between mean scores of nurses' total knowledge regarding cardio-electrophysiology pre and post nursing protocol implementation.

Knowledge Items (Score)	Pre		Post		Paired T test	P value
	Mean	SD	Mean	SD		
▪ Conducting system anatomy (4)	2.1	0.8	2.6	1.2	4.92	0.033
▪ Electrical impulses flow (1)	0.4	0.1	1	----	4.37	0.000
▪ p waves characteristics (1)	0.2	0.1	1	----	4.02	0.001
▪ QRS complex characteristics (1)	0.3	0.1	1	----	4.92	0.033
▪ ST segment characteristics (1)	0.3	0.2	1	----	4.84	0.001
▪ PR intervals characteristics (1)	0.2	0.1	1	----	4.94	0.051
▪ Calculate the ventricular rate (2)	0.2	0.1	1.3	0.7	2.44	0.043
▪ Regularity of cardiac rhythm (1)	0.3	0.1	1	----	4.84	0.001
Total knowledge score (12)	4	1.6	9.9	1.9	16.54	0.000

*P ≥ 0.05 non significant ,** P< 0.05significant

Table (2) showed that, there were a statistically significant differences in mean scores of nurses' total knowledge regarding cardio-electrophysiology pre and post knowledge enhancement nursing protocol implementation

Table 3. The difference between mean scores of nurses' total knowledge regarding interpretation of Brady dysrhythmias pre and post nursing protocol implementation.

Knowledge Items (Score)	Pre		Post		Paired T test	P value
	Mean	SD	Mean	SD		
▪ Sinus brady cardia 7	3.40	2.3	7.00	0.00	8.53	0.001**
▪ Sino atrial block 7	2.30	0.74	6.77	0.27	10.05	0.002**
▪ Atrio-ventricular block 7	1.60	0.80	5.40	0.56	12.24	0.003**
Total knowledge score (21)	7.3	3.84	19.17	0.83	14.65	0.000**

*P ≥ 0.05 non significant ,** P< 0.05significant

Table (3) revealed that there was a statistically significant difference between mean scores of nurses' knowledge regarding interpretation of brady arrhythmias pre and post knowledge enhancement nursing protocol implementation.

Table 4. The difference between mean scores of nurses' total knowledge regarding interpretation of Tachydysrhythmia's pre and post nursing protocol implementation.

Knowledge Items (Score)	Pre		Post		Paired T test	P value
	Mean	SD	Mean	SD		
▪ Supraventricular tachycardia (7)	2.40	1.65	6.33	0.67	10.91	0.030**
▪ Atrial fibrillation (7)	2.67	1.80	6.40	0.32	8.53	0.000**
▪ Atrial flutter (7)	1.40	0.21	5.27	1.22	16.54	0.000**
Total knowledge score (21)	6.47	3.66	18	2.21	16.91	0.030**

*P ≥ 0.05 non significant ,** P< 0.05significant

Table (4) revealed that there was a statistically significant difference between mean scores of nurses' knowledge regarding interpretation of Tachydysrhythmia's pre and post knowledge enhancement nursing protocol implementation.

Table 5. The difference between mean scores of nurses' total knowledge regarding interpretation of life threatening dysrhythmia's pre and post nursing protocol implementation.

Knowledge Items (Score)	Pre		Post		Paired T test	P value
	Mean	SD	Mean	SD		
▪ A systole (7)	7.00	0.00	7.00	0.00	-----	-----
▪ Pulseless electrical activity (7)	2.23	1.74	7.00	0.00	13.04	0.001**
▪ Ventricular fibrillation (7)	3.40	2.31	7.00	0.00	21.11	0.001**
▪ Ventricular tachycardia (7)	2.50	1.11	7.00	0.00	13.04	0.001**
Total knowledge score 28	15.13	5.16	28	0.00	15.018	0.001**

*P ≥ 0.05 non significant ,** P< 0.05significant

Table (5) revealed that there was a statistically significant difference between mean scores of nurses' total knowledge regarding interpretation of life-threatening dysrhythmias pre and post knowledge enhancement nursing protocol implementation.

Figure 1: percentage distribution of nurses with satisfactory level of total knowledge regarding cardiac dysrhythmias interpretation pre and post knowledge enhancement nursing protocol implementation.

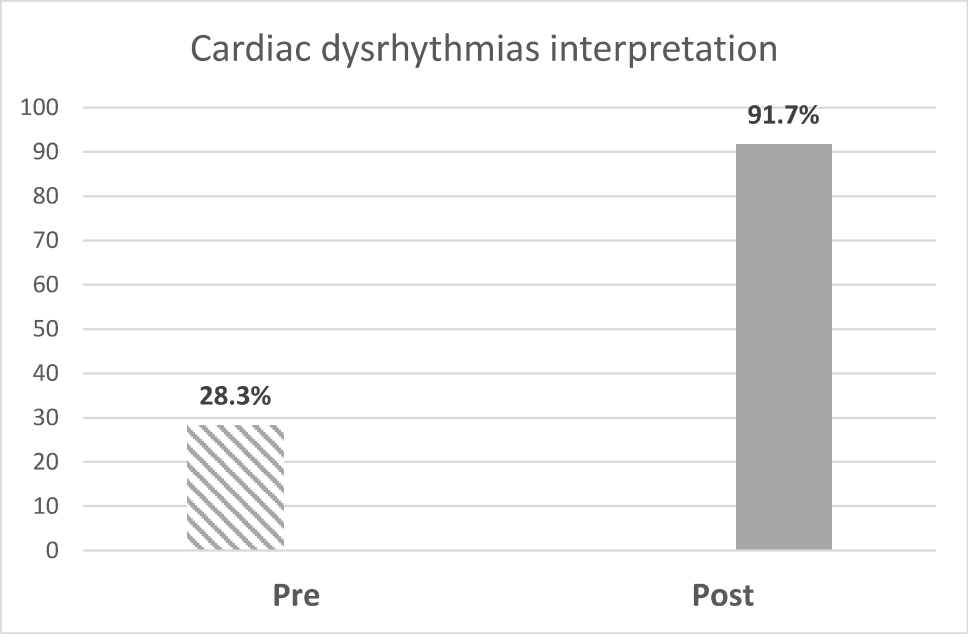

Figure (1) shows that 91.7% of the studied nurses had satisfactory level of total knowledge regarding cardiac dysrhythmias interpretation post knowledge enhancement nursing protocol implementation.

Table 6. Correlation between nurses' total knowledge regarding interpretation of cardiac dysrhythmia's post knowledge enhancement nursing protocol implementation and their demographic characteristics.

Items	Knowledge	
	r value	P value
Age	.629	0.001**
Gender	.71	0.001 **
Educational level	.52	0.05**
Years of experience	.513	0.015**

*P ≥ 0.05 non-significant ,** P< 0.05significant

Table (6) reveals statistically significant positive correlation between nurses' total knowledge regarding interpretation of cardiac arrhythmia's post knowledge enhancement nursing protocol implementation and their age, gender, educational level and years of experience.

Discussion:

Cardiac dysrhythmias are the important cause of cardiovascular morbidity and mortality, particularly in those with structural heart disease. Disorders that are potentially life threatening require expert clinical judgement and vigilance on the part of the nurse. So, it is fundamental importance for nurses to recognize normal and pathological electrocardiographic tracings and allowing the adoption of appropriate and immediate interventions **(El-Sayed et al., 2020).**

Regarding demographic characteristics, the current study revealed that about two third of the studied nurses aged less than 30 years old. This may be due to they are newly graduated. This is in accordance with **El-Sayed et al., (2020)** who reported that the majority of the studied nurses their age between 20-29 years old in their study entitled "Nurses' Performance Regarding Life Threatening Ventricular Dysrhythmias among Critically Ill Patients"

Most of the studied nurses were female. This may be due to nursing education for males start recently and also because of decreasing flow of male admission for this job. This go in the same line with the results of **Coll-Badell et al., (2017)** who found that majority of the nurses were female in their study entitled "Emergency Nurse Competence in Electrocardiographic Interpretation in Spain: A Cross-Sectional Study.

In relation to educational level, this study showed that more than half of the studied nurses were technical institute of nursing. This result contradicted with **Al-Ahdal & Makki (2020)** whom study revealed that 94.80% of sample have Bsc in nursing in their study entitled "Nurses' Performance Regarding Emergency Management of Arrhythmias Post-Cardiac Surgery at Cardiac Centers, Khartoum, Sudan".

As regard to years of experience, this study showed that near than three fifth of the studied sample had more than five years of experience. This is contradicted with **Al-Ahdal & Makki (2020)** who found that most of the studied sample had experience less than five years. Finding of this study clarified that the all of the studied nurses hadn't attend any training courses regarding cardiac dysrhythmias

interpretation. This may be due to that, near half of the studied nurses were newly graduated. This result is in accordance with **Weheida et al., (2016) who revealed** that all of the studied sample had no in service training courses related to ECG in their study "Effect of Application of Training Program about Electrocardiogram on Nurses Competency Level and Expected Clinical Outcome of Cardiac Patients". However, this result is contradicted with **El-Sayed et al., (2020) who stated that** majority of studied nurses had previously attended training course in ICU and CCU regarding dysthymias interpretation.

As regards to nurses' knowledge regarding electro-cardio physiology, there was statistically significant difference in mean scores pre and post knowledge enhancement nursing protocol implementation. This improvement might be related to the fact that the majority of the studied nurses were young and enthusiastic to learn. This finding showed that the nursing protocol had a good impact in improving nurses' knowledge, which could be due to the concise presentation of each session using simple language and clear educational methods and instructional media. This result goes in the same line with **Hassan & Hassan (2012)** in their study **"**Effectiveness of nursing education program on nurses knowledge toward Arrhythmia in Kirkuk's teaching hospitals" who revealed that there was highly significant differences between study and control groups at posttest in items (Heart Anatomy, Time duration for impulses transition and reading ECG paper).

Regarding nurses' knowledge toward brady dysrhythmias and tachydysrhythmias there were statistically significant difference in mean scores pre and post knowledge enhancement nursing protocol implementation. Nurses must expand their knowledge through journals and seminars and through teaching programs for nursing staff. These programs should be designed to aid nursing staff in developing and enhancing their knowledge needed to provide high standards of care to their patients.

This result congruent with **Ibrahim et al., (2017)** who stated an obvious improvement in the total mean knowledge scores of nurses after NCS implementation as compared with pre-implementation scores, which was highly statistically significant in their study entitled "Effect of nursing care standards on nurses' performance in caring for patients with cardiac arrhythmias". Also, this result matching with the result of **Bazrafkan & Hemmati (2018)** in their study **"**The effect of cardiac arrhythmias simulation software on the nurses' learning and professional development" who stated that nurses who have been trained

have a higher mean score than nurses who attended the per-test only so the intervention or training was effective in diagnosis of cardiac arrhythmias.

In relation to nurses' knowledge regarding life threatening dysrhythmias (A systole), there was no statistically significant difference in mean scores pre and post knowledge enhancement nursing protocol implementation (all of the study sample had satisfactory level regarding a systole interpretation pre and post nursing protocol implementation. This result may be due to that a systole is differ from the way that ECG like and it is easy for nurses to interpret it easily. This result is not compatible with **Al-Ahdal & Makki (2020)** who found that the nurses' knowledge regarding A systole was 40.3% only with good Knowledge.

In relation to nurses' knowledge regarding life threatening dysrhythmias (VF, VT and pulseless electrical activity), there were statistically significant difference in mean scores pre and post knowledge enhancement nursing protocol implementation. This result goes in the same line with **Al-Ahdal & Makki (2020)** who reported that the nurses' knowledge regarding ventricular tachycardia VT was 76.6% with Poor Knowledge and for VF was 61% with Poor Knowledge. However, this result incongruent with **Ruhwanya, (2017)** in his study entitled "Assessment of the Knowledge and Skills in Caring for Life Threatening Arrhythmias among Nurses working in Critical Care settings at Muhimbili National Hospital, Dar-es Salaam, Tanzania" who stated that the majority of the participants (60%) were identified as having high knowledge for life-threatening arrhythmia.

As regard to total knowledge regarding cardiac dysrhythmias interpretation, the study revealed that the majority of the study nurse had unsatisfactory level of total knowledge pre knowledge enhancement nursing protocol implementation, this may be due to nurses' exhaustion due to increased work load which may hinder their ability to read and update their knowledge and lack of accessible training courses. Moreover, the nurses in Egypt are not used the independent self-learning and absence of clear guidelines among critical care nursing regarding cardiac dysrhythmias interpretation but there was improvement post knowledge enhancement nursing protocol implementation as the majority of studied nurses had satisfactory level of knowledge regarding cardiac dysrhythmias interpretation. This might be due to positive impact of the knowledge enhancement nursing protocol on improving nurses' knowledge regarding cardiac dysrhythmias interpretation.

This finding is concurrent with the finding of the study done by **Nabil et al., (2018)** in their study "Effect of an Education Program on Nurses Performance

Regarding Electrocardiography" who found that, there was improvement post program implementation whereas the majority of nurses had satisfactory level of knowledge regarding ECG. Also, **Tubaishat and Tawalbeh, (2015)** supported the result finding in their study **"**Effect of Cardiac Arrhythmia Simulation on Nursing Students' Knowledge Acquisition and Retention". The results demonstrated that students in the experimental group who were subject to simulation-based teaching showed significant improvement in their arrhythmia knowledge score posttests. **Tavan et al., (2020)** supported the study finding in their study "Teaching Cardiac Arrhythmias Using Educational Videos and Simulator Software in Nurses: An Educational Interventional Study" who found means total arrhythmia diagnosis scores were 9.9 and 15.68 before and after educations, respectively (P value = 0.022).

Finally, regarding correlation between nurses' total knowledge regarding interpretation of cardiac arrhythmia's post knowledge enhancement nursing protocol implementation and their age, gender, educational level and years of experience the study finding revealed statistically significant positive correlation between nurses' total knowledge regarding interpretation of cardiac arrhythmia's post knowledge enhancement nursing protocol implementation and their age, gender, educational level and years of experience. This finding could be attribute to their younger age, high qualification (more than half of the studied nurses were technical institute of nursing) and increase years of experience in ICU promote nurses' knowledge as a result of increased number of cases with cardiac dysrhythmias, years of experience had impact on nurses' knowledge, and experience. This result in accordance with **El-Sayed et al., (2020)** who showed that there was a statistically significant relationship between total nurses' knowledge of LTVD and nursing qualification and years of experience in ICU. Also, this result is similar to finding of **Ho et al., (2021)** who stated that Gender, nursing experience, and had significant associations with mean score in their study "Capability of emergency nurses for electrocardiogram interpretation**"**.

Conclusion:

The finding of the current study proved the hypothesis of this study which stated that implementation of knowledge enhancement nursing protocol will upgrade nurses' knowledge regarding cardiac dysrhythmias interpretation.

Recommendations:

Based on the findings of the present study, the following recommendations are proposed:

- All opportunities for improving nurses' competence for caring of patients with cardiac dysrhythmias as workshops, seminars, conference, and in-service education program regarding ECG interpretation should be utilized periodically.
- The importance of establishing nursing protocol for critical care nurses regarding ECG interpretation.

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الملخص العربي

تفسير اضطراب ضربات القلب: برتوكول تمريضي لتعزيز المعرفة

مقدمة: يعد اضطراب ضربات القلب من امراض القلب المنتشرة وسبب رئيسي لدخول المستشفى، وزيادة مدة الإقامة بها وارتفاع التكاليف.

الهدف من الدراسة: أجريت هذه الدراسة لتقييم تأثير بروتوكول لتحسين مستوي معرفه التمريض عن تفسير خلل انتظام ضربات القلب من خلال ما يلي: أ) تقييم مستوى معرفة التمريض فيما يتعلق بتفسير خلل انتظام ضربات القلب قبل تنفيذ البروتكول ب) تصميم وتنفيذ بروتوكول لتحسين مستوي المعرفة للتمريض عن تفسير خلل انتظام ضربات القلب بناءً على تقييم احتياجات التمريض ج) تقييم مستوى معرفة التمريض فيما يتعلق بتفسير خلل انتظام ضربات القلب بعد تنفيذ البروتوكول لتحسين مستوي المعرفة لدي التمريض تصميم الدراسة: تم استخدام تصميم شبه تجريبي.

مكان الدراسة: أجريت هذه الدراسة في وحدات العناية المركزة بمستشفى الدمرداش التابع لمستشفيات جامعة عين شمس بالقاهرة - مصر. عينة الدراسة: تضمنت عينة ملائمة من 60 ممرض وممرضه من الأماكن المذكور سابقًا في هذه الدراسة.

أدوات جمع البيانات: تم جمع البيانات قبل وبعد تنفيذ بروتوكول لتحسين مستوي معرفه التمريض عن تفسير خلل انتظام ضربات القلب باستخدام استبيان تقييم عدم انتظام ضربات القلب. الجزء الأول: الخصائص الديموغرافية للتمريض والجزء الثاني: تقييم مستوي المعرفة للتمريض **النتائج:** كان هناك فروق ذات دلالة إحصائية بين متوسط درجات معرفة التمريض فيما يتعلق بتفسير خلل انتظام ضربات القلب قبل وبعد تنفيذ بروتوكول الخاص بتحسين مستوي المعرفة لدي التمريض.

الخلاصة: أثبتت نتائج الدراسة الحالية فرضية هذه الدراسة التي تنص على أن تطبيق بروتوكول لتحسين مستوي المعرفة لدي التمريض سوف يكون له تأثير ايجابي في رفع مستوي معرفاتهم عن تفسير خلل انتظام ضربات القلب.

التوصيات: اوصت الدراسة بانه يجب استخدام جميع الفرص لتحسين كفاءة التمريض في رعاية المرضى الذين يعانون من خلل ضربات القلب مثل ورش العمل والندوات والمؤتمرات والبرامج التعليمية أثناء الخدمة فيما يتعلق بتفسير مخطط كهربية القلب بشكل دوري