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Effect of Educational Program on Critical Care Nurses' Knowledge and Attitude Toward Life Threatening Arrhythmias

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Abstract

Background: One of the main causes of death for patients with cardiac disease is potentially fatal arrhythmias. Nurses are essential in the prevention, early detection, and emergency treatment of cardiac arrhythmias in critical care settings. **Aim**: The aim was to evaluate the effect of an educational program on critical care nurses' knowledge and attitudes toward life-threatening arrhythmias at the intensive care units (ICUs) in El-Araby Hospital, Egypt. **Subjects and Methods**: **Research Design**: A quasi-experimental design was employed to achieve the study's objectives. **Setting**: The research was conducted at the ICUs of El-Araby Hospital, Egypt. **Sample**: A convenience sample comprising all available nurses working in the ICUs participated in the study. **Tools**: Data were collected using a self-administered questionnaire to assess nurses' knowledge and a separate tool to evaluate their attitudes. **Results**: Approximately three-quarters of the participating nurses were under 30 years of age, and over half were female. The findings revealed statistically significant improvements in both knowledge and attitudes among nurses following the educational program. **Conclusion**: The educational intervention had a significant positive effect on enhancing nurses' knowledge and attitudes related to life-threatening cardiac arrhythmias. **Recommendations**: It is recommended to implement ongoing in-service training programs to refresh and update nurses' knowledge and attitude concerning the management of life-threatening arrhythmias.

Keywords: *Attitude, Educational Program, life threatening arrhythmias, Nurses knowledge*

Introduction:

Life threatening arrhythmias encompass a group of conditions involving irregularities in heart rhythm due to malfunctioning electrical impulses that regulate heartbeat. These abnormalities can result in the heart beating too rapidly (tachycardia), too slowly (bradycardia), or in an erratic pattern. While some arrhythmias may be asymptomatic, they can also manifest through symptoms such as palpitations, abnormal heart rates, chest discomfort, shortness of breath, fatigue, dizziness, excessive sweating, anxiety, and episodes of fainting or near fainting **(Nagpal, et, al., 2024).**

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Life-threatening arrhythmias are the leading global cause of sudden cardiac death, responsible for an estimated 70,000 to 90,000 fatalities annually, with ventricular tachycardia and ventricular fibrillation being the primary contributors **(Aro, Chugh, & ESC, 2018).** In Egypt, around 4 million individuals are affected by cardiac arrhythmias. Over 70% of patients in intensive care units (ICUs) experience disturbances in heart rhythm, with ventricular arrhythmias significantly increasing mortality rates in this population **(Taha, Bayomi, & Metwaly, 2021).**

Life-threatening arrhythmias are broadly categorized into brady-arrhythmias, tachy-arrhythmias, and those with critical clinical implications. Atrial fibrillation (A-fib), atrial flutter (AF), supraventricular tachycardia (SVT), ventricular fibrillation (VF), ventricular tachycardia (VT), and asystole are the most severe types. **(Kotsialou, Makris & Gall, 2024).**

Chen, et, al., (2025) illustrated that the complications associated with life-threatening arrhythmias vary depending on the specific type but commonly include stroke, sudden cardiac death, and heart failure. Prevention strategies primarily focus on lifestyle modifications aimed at reducing the risk of cardiovascular disease, thereby lowering the likelihood of developing severe arrhythmias. A heart-healthy lifestyle involves consuming a balanced diet that is low in salt and fat and rich in fiber, engaging in regular physical activity, maintaining a healthy weight, avoiding tobacco use, limiting or eliminating caffeine and alcohol intake, and managing stress effectively. Additionally, adherence to prescribed medications is essential in reducing risk and managing underlying conditions.

Electrocardiogram interpretation is performed through a systematic series of steps, beginning with assessment of the heart rhythm—determining whether it is regular or irregular—and evaluation of the heart rate, identifying normo-cardia, tachycardia, or bradycardia. The analysis continues with examination of the P wave for its presence, regularity, and morphology, followed by measurement of cardiac intervals, such as the PR interval, and evaluation of the QRS complex in terms of its presence, regularity, and morphology **(Ros et al., 2022).** A P wave comes before each QRS complex, and a QRS complex comes after each P wave. A typical sinus rhythm is defined by a consistent rate of 60 to 100 beats per minute. A heart rate that is beyond this range is called tachycardia, while one that is below it is called bradycardia. Since the rhythm begins in the sinoatrial (SA) node, the name "sinus" indicates that atrial depolarization takes place before ventricular depolarization **(Buluba, He, & Li, 2025).**

The process of interpreting the ECG involves a series of calculations, including determining whether the heart rhythm is regular or irregular. rhythm of the heartbeat; bradycardia, normocardia, or tachycardia. Evaluation of the P wave: presence, morphological, regular. evaluating PR-Intervall, or heart intervals. The QRS-complex: Present, regular, morphological. **(Ros, et, al., 2022).** There is a P wave before every QRS complex and a QRS after every P wave in the sinus rhythm, which normally varies between 60 and 100 beats per minute. Bradycardia are the slowest heartbeats, whereas tachycardia are the quickest. By the sinus concept, the heartbeat begins at the sinoatrial (SA) node, and the atrial depolarization happens before the ventricular depolarization. **(Buluba, He & Li, 2025).**

The primary role of the critical care nurse centers on alleviating symptoms and enhancing patient comfort. This includes continuous monitoring of patients connected to cardiac monitors and promptly identifying any changes

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in the ECG. In the event of cardiac dysrhythmias, the nurse is responsible for initiating emergency measures, such as examining the irregular heartbeat, obtaining a 12-line ECG to identify the kind of arrhythmia, and administering oxygen to lessen the heart's workload. Additionally, when administering prescribed medications, the nurse should be closely aware of any potential adverse drug reactions and provide specific care interventions if needed **(Ghareb & Elbqry, 2023).**

The study's significance

Arrhythmias are a common occurrence in critical care settings, often presenting following ischemic events or electrolyte imbalances. Any deviation from a normal sinus rhythm is classified as an arrhythmia. Prompt and accurate interpretation of these rhythm disturbances is crucial, particularly for frontline responders in the coronary care unit (CCU) or intensive care unit (ICU), most commonly the nursing staff. Patients may either be admitted with arrhythmias or develop them while under monitoring, including ECG surveillance. When nurses are able to accurately recognize and differentiate between various arrhythmias—especially those that are life-threatening—and respond appropriately, their actions can be directly life-saving **(Kılıç, G., 2025).** Consequently, this study aims to enhance patient outcomes by updating nurses' knowledge and improving their attitudes toward managing life-threatening arrhythmias through the accomplishment of an educational program.

Aim of this study

Evaluate the effect of educational program on critical care nurses' knowledge, and attitude toward life threatening arrhythmia at intensive care unit in El_Araby Hospital. **Through the following objectives:**

1. Assess critical care nurses' knowledge and attitude toward life threatening arrhythmia.
2. Design and implement educational program on critical care nurses' toward life threatening arrhythmia.
3. Evaluate the effect of educational program on critical care nurses' knowledge, and attitude toward life threatening arrhythmia.

Research hypothesis:

The following hypotheses were the foundation of this study:

H1: Critical care nurses who received an educational program will have progress in their knowledge regarding life threatening arrhythmia after implementing program than before.

H2: Critical care nurses who received educational program will have progress in their attitude regarding life threatening arrhythmia after implementing program than before.

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Subjects and Methods:

Study design: A quasi-experimental design was utilizing a pre-test/post-test approach was employed to achieve the study's aim. In this study, the educational program served as the independent variable, while the nurses' knowledge and attitude in managing patients with arrhythmias represented the dependent variables. A quasi-experimental design shares certain characteristics with true experimental designs; however, it is missing important elements like participant assignment at random and often does not include a control group. Despite these limitations, it remains a valuable method for evaluating interventions in real-world clinical settings where full experimental control may not be feasible **(Rohlfing, 2012***)*.

Setting: The present study was conducted at critical care unit in El_Araby Hospital. The Intensive Care Units (ICUs) contains 24 beds divided into 3 main units, First medical ICUs, surgical ICUs and cardiac ICUs.

Subject: A convenient sample of all available nurses (50 nurses in intensive care units divided into 28 females and 22 males) who worked in the aforementioned units at the time of the study.

Data Collection Tools: During the pre and post phases of this study, the following tool was used to collect data:

Tool I: Structured Interview Questionnaire (pre –post)

The tool, which was developed by the researcher after researching relevant literature, was written in plain Arabic and assessed nurses' knowledge concerning life-threatening arrhythmias in intensive care units both before and after the program. It included two sections, which were as follows:

The first part covered nurses' characteristics: The questionnaire, which focuses on evaluating the demographics of nurses, contains eight closed-ended questions concerning age, gender, marital status, education, years of ICU experience, attendance at training programs about life-threatening arrhythmias, the benefits of training, and the need for additional training.

The second part included knowledge regarding life threatening arrhythmias: This tool was adapted from **Autel, (2012), Madapaddy, (2014), Jones, (2020) and Baird, (2023)**, It included 58 multiple-choice questions about the anatomy and physiology of the heart, the definition of the ECG, the steps involved in connecting the ECG device, the components of a heartbeat, the steps involved in interpreting the ECG, life-threatening cardiac arrhythmia, nursing care for patients with such arrhythmias, emergency IV medications, defibrillation (DC shock), cardiopulmonary resuscitation, crash cart, and ECG interpretation.

Scoring system: The researchers' model key answer was used to assess the response in terms of nurses' knowledge. The score for the "incorrect answer" was zero, while the score for the "correct answer" was one. A percentage score of 80% or more indicated satisfactory knowledge, while a score of less than 80% indicated unsatisfactory knowledge. Predicated on statistical analysis **(Alsalman, Mansour & Almobarak, 2023).**

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Too II: A Likert-type Rating Scale for assessing nurses' attitudes about caring for patients with life threatening arrythmia: The researcher updated it from **Ibrahim et al. (2017)** to assess nurses' attitudes on nursing care for patients with life-threatening arrhythmias before and after an educational program. It covers 16 points, including the importance of nurses having a positive attitude toward patients, the need to respect their privacy during ECG procedures, the need to explain the steps to patients, and the fact that a calm atmosphere for patients plays a significant role in the improvement of their health.

Scoring System: A three-point Likert scale of agreement was used to analyze nurses' answers to 16 closed-ended questions on a Likert type rating scale that measures their attitudes regarding caring for patients with life-threatening cardiac arrhythmias. Nurses with a score of 70 or more take positive attitudes, while those with a score of less than 70 take negative attitudes. Nurses who choose to agree and agree substantially take one point, while those who choose to disagree will receive zero points with a total score of 16 degrees (**Al-Quraan, Al-Quraan, & Al-Quraan, 2022).**

Content validity: A jury consisting of five professors from Zagazig University's Medical-Surgical specialty Faculty of Nursing reviewed the tools' content validity for comprehensiveness, clarity, ease of use, and relevance. Based on their assessment, changes were made by rewording or rephrasing the tools.

Reliability: The Cronbach's alpha coefficient test was applied to evaluate the internal consistency of the tools utilized in this study. The knowledge tool's reliability score was 0.934, while the attitude tool's score was 0.91. The instruments showing a high level of reliability.

Pilot study: Five nurses, or 10% of the research sample overall, participated in the tool's pilot trial after it was developed. The purpose of the pilot research was to assess the study tools' applicability, clarity, and practicality as well as to gauge how long it would take to finish them. Additionally, it assisted in identifying any issues and barriers that would impede the collecting of data. The results of the pilot research were used to make the necessary adjustments. In the primary study sample, the pilot sample was not included.

Ethical consideration: The Faculty of Nursing's Research Ethics Committee, Zagazig University code no. (NUR. 0291), granted approval. Prior to gaining written agreement to participate in the study, participants were informed of its aim. Participants were assured that all information collected would be kept completely secret and utilized only for the study after a brief description of the study was provided. They were told that they might leave the research at any moment or choose not to participate. For identifying purposes, code numbers were utilized in place of the participants' names. This precaution made sure the participants would not be identified in public reporting.

Field work: From early August 2024 until the end of December 2025, the study was conducted, and the researcher was accessible three days a week from 9 a.m. to 2 p.m. The study was conducted in four stages: assessment, planning, implementation, and evaluation.

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Assessment Phase: After visiting the study setting and making arrangements with the nursing director to carry out the study, the researchers assessed each study setting classroom with consent from the directors. After interviewing the nurses and introducing herself, the researchers asked them to take part. Once they consented to participate, their participation was attempted through written consent. The researcher gave an explanation of the study's goal. Within 30 to 45 minutes, the study tools were filled out and explained. Lastly, in order to help the researchers, prepare the educational program, the researcher evaluated the educational needs of nurses.

Planning phase: During this phase, the researcher prepared a plan for carrying out the educational program. The educational program booklet on cardiac arrhythmias was translated into Arabic by the researcher. The nurses were given the evaluation data and relevant literature by **Doenges et al. (2019), Ferri et al. (2020), Ackley et al. (2020), Bittner et al. (2021), Bowie (2021) & Baird (2023).** Knowledge of the heart's anatomy and physiology, the definition of an ECG, how to connect an ECG device, the components of a heartbeat, how to interpret an ECG, life-threatening cardiac arrhythmia, nursing care for patients with such arrhythmias, emergency IV medications, defibrillation (DC shock), cardiopulmonary resuscitation, crash cart, and ECG interpretation are all included**.**The same group of experts that approves the study tools also validates this information. The booklet was divided into sections on attitude and theory. Additionally, images and colors were included to provide additional illustration and aid in the nurses' comprehension of the material. To help them, each participant received a booklet that summarized the topics covered in cardiac arrhythmia training sessions. By choosing the best teaching technique, the educational program's teaching approach was established: Using the right instructional resources, handouts, multimedia materials, and actual objects, as well as conducting active lectures, small group discussions.

Implementation phase: The nurses under study were first divided up into 10 groups. There were 4 to 5 nurses in each group. Since each group was allowed to select the best time to receive the educational program, the five sessions lasted two weeks for each group. The meeting was held at the time that worked best for the people in attendance, which was throughout the morning and afternoon work hours. An explanation of the significance of the educational program was provided at the inception of its implementation. Each group received a distinct explanation of the learning objectives and the educational program design. Each nurse received a copy of the handout to help them recall the knowledge when the theoretical aspect of caring for patients with life-threatening arrhythmias was explained.

Before every session began, the previous content was briefly reviewed. This change was followed by a statement outlining the goals of the current session. A theoretical knowledge presentation, videos, and sharing thoughts and emotions on the class topic were all part of each session.

The nurses were questioned at the conclusion of each session on any information that was unclear and required clarification. The researchers made it clear that this session was intended for education rather than evaluation, therefore errors and forgetfulness were accepted and promptly fixed.

Finally, the researchers concluded by providing her with feedback, beginning with both positive and negative aspects. In order to prevent other nurses from making the same mistakes, any errors or missing information were fixed right

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away. Additionally, feedback from nurses was requested. The following four sessions comprised the program's implementation for nurses.

The first sessions included anatomy and physiology of the heart, and life threatening arrythmia. **The second session** addressed the definition of an ECG, an ECG paper, the components of the heartbeat, the stages involved in interpreting and defining an ECG, the forms of cardiac arrhythmias that can be fatal (AF, SVT, VT, VF, and a systole), and their causes. **The third session** included going over the clinical signs and symptoms of cardiac arrhythmias as well as the complications of potentially fatal cardiac arrhythmias. **The fourth session** suggested immediate IV medication and nursing care to patients with potentially fatal cardiac arrhythmias. **The fifth session** covered defibrillation (DC shock), cardiopulmonary resuscitation, crash cart, interpretation of ECG.

Evaluation phase: Using the same data collecting tools, each nurse in the study had two evaluations. This was carried out both before and just after the recruiting the test.

Statistical Design: All of the data was collected, arranged, tabulated, and statistically analyzed using SPSS 20.0 for Windows (SPSS Inc., Chicago, IL, USA 2011). Conversely, quantitative information was communicated using the median (interval) and the median ± SD, but qualitative data was communicated using absolute frequencies (number) and relative percentages (%). Two separate sets of data were compared using the McNemar test, sometimes called the Test of Homogeneity Marginal. Two sets of dependent variables with non-normal distributions were examined using the Wilcoxon test of signed ranges. The proportions of the categorical variables were compared using the Fisher exact test.

Results:

Table 1 reveals that, with a mean ± SD of 28.32±3.38 years, 76% of the nurses in the study were under 30. More over half (56%) of the nurses in the research were female, and more than two-thirds (68%) were married. A nursing technical institute was attended by 84% of the nurses in the survey. Furthermore, just 60% of the study's nurses had more than five years of experience working in an intensive care unit. Additionally, about half of the study's nurses (48%) took ECG training classes. Half of the nurses who took these classes said the instruction was beneficial. Additionally, any nurse who has been studied (100%) must do additional ECG courses.

Table 2 shows that nurses' knowledge of the anatomy and physiology of the heart, the definition of an ECG, the steps involved in connecting an ECG machine, the components of a heartbeat, the steps involved in interpreting an ECG, nurses' understanding and nursing care of life-threatening cardiac arrhythmias, emergency IV medications, defibrillation, CPR, crash cart, and ECG interpretation improves with a highly statistically significant difference between the pre and post test ($P<0.001$).

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Table 3 explains that, with a mean± SD of 49.36±6.30 in the post-test compared to 20.22±5.03 in the pre-test, there was a very statistically significant improvement in the overall satisfactory nurse's knowledge. Additionally, a P value <0.001 indicated a highly statistically significant difference after the test.

Table 4 indicates that about half of the nurses (48%) concurred that a calm atmosphere for the patient plays a significant influence in the patient's condition improvement during the pre-test. The post-test showed that this proportion increase to 80%. The difference's P value was less than 0.001, making it extremely statistically significant. Furthermore, during the program's pre-test, over half of nurses (52%) felt that it is important to do certain things that make the patient feel comforted and confident in the nurse, as well as to take steps that decrease the pain experienced by the patient.

Following the test, these percentages rose to 88% and 82%, respectively. P value <0.001 indicated that the difference was extremely statistically significant. A third of nurses (32%) agreed that a sense of teamwork among nursing staff is essential to ensuring the effectiveness of nursing care during the pretest; in the post, the percentage increased to 78%. P value <0.001 indicated that the difference was extremely statistically significant.

Table 5 clarifies that the mean± SD of the post-test attitude of the total number of satisfied nurses was 41.14±5.29, which was an extremely statistically significant increase from the pre-test attitude of 38.84±6.35. Additionally, a very statistically significant difference was found after the test, with a P value of 0.017.

Table 6 displays the relationship between the overall level of satisfaction with nurses' knowledge and their demographics during the study's phases. P value >0.05 indicated that there was no statistically significant correlation between the demographic characteristics of the nurses and their overall level of satisfaction with their knowledge.

Table 7 illustrates the relationship between nurses' positive attitudes and their demographic characteristics during study phases. In the post-test, it was discovered that the positive attitude of nurses was statistically significantly correlated (P value <0.05) with their age and level of education.

Table 1: Frequency and Percentage Distribution of Demographic Characteristics of the Studied Nurses' (n=50).

Demographic Characteristics	No.	%
Age (year)		
<30	38	76.0
≥30	12	24.0
Mean± SD	28.32±3.38	
Range	22-34	

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Gender		
Male	22	44.0
Female	28	56.0
Marital status		
Single	12	24.0
Married	34	68.0
Widow	0	0.0
Devoiced	4	8.0
Academic qualifications		
Nursing technical institute	42	84.0
Bachelor of nursing	8	16.0
Years of experience in ICU		
<5	20	40.0
≥5	30	60.0
Mean± SD	5.16±1.99	
Range	2-8	
Attending ECG training courses		
Yes	24	48.0
No	26	52.0
Did you benefit from the course (n=24)		
Yes	12	50.0
No	12	50.0
Like to attend other ECG courses		
Yes	50	100.0
No	0	0

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Table 2: Frequency and Percentage Distribution of Satisfactory Nurses' Knowledge Level regarding Life Threatening Arrhythmia throughout Study Phases (n=50).

Items	Satisfactory Nurses' knowledge ≥ 80				
	Pre Test		Post Test		MC p
	No.	%	No.	%	
Heart anatomy and physiology	3	6.0	40	80.0	<0.001**
ECG definition	6	12.0	49	98.0	<0.001**
Procedure of ECG machine connection	7	14.0	27	54.0	<0.001**
Heartbeat Components	2	4.0	21	42.0	<0.001**
ECG interpretation Steps	2	4.0	15	30.0	<0.001**
Life-threatening arrhythmia	2	4.0	36	72.0	<0.001**
Care of life-threatening arrhythmia	2	4.0	31	62.0	<0.001**
Emergency IV medications	3	6.0	25	50.0	<0.001**
Defibrillation	2	4.0	21	42.0	<0.001**
Cardiopulmonary Resuscitation	2	4.0	33	66.0	<0.001**
Crash Cart	3	6.0	33	66.0	<0.001**
ECG Interpretation	2	4.0	41	82.0	<0.001**

MC: Mcnemar test; **: statistically highly significant (p<0.001)

Table 3: Total Nurses' Knowledge Level regarding Life Threatening Arrhythmias throughout Study Phases (n= 50).

Total Nurses' knowledge	Total Nurses' Knowledge				MC p
	Pre Test		Post Test		
	No.	%	No.	%	
Satisfactory level ≥ 80%	2	4.0	35	70.0	<0.001**
Unsatisfactory level<80%	48	96.0	15	30.0	
Mean± SD	20.22±5.03		49.36±6.30		
Median (range)	19.5(12-34)		49(37-66)		

MC: Mcnemar test **: statistically highly significant (p<0.001)

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Table 4: Frequency and Percentage Distribution of Nurses' Attitudes regarding Care of Patients with Life Threatening Arrhythmia throughout study Phases (n=50)

Items	Time	Agree	Agree to Somewhat	Disagree	MHp-value
Good attitude of nurses' towards the patient.	Pre	47 (94.0)	3 (6.0)	0 (0.0)	0 .527
	Post	47 (94.0)	3 (6.0)	0 (0.0)	
Ensure patient privacy and dignity are maintained throughout the ECG procedure	Pre	44 (88.0)	5 (10.0)	1(2.0)	0 .317
	Post	46 (92.0)	4 (8.0)	0 (0.0)	
Essential to explain each step of the ECG procedure to the patient to ensure understanding and cooperation.	Pre	26 (52.0)	21 (42.0)	3 (6.0)	0 .182
	Post	34 (68.0)	13 (26.0)	3 (6.0)	
Calm atmosphere has an effective role in the progress of the patient's condition.	Pre	24 (48.0)	25 (50.0)	1 (2.0)	<0.001**
	Post	40 (80.0)	10 (20.0)	0 (0.0)	
Sleep, day or night, should not be disturbed when providing nursing care to patient.	Pre	32 (64.0)	14 (28.0)	4 (8.0)	0 .248
	Post	36 (72.0)	12 (24.0)	2 (4.0)	
Necessary did not leave the patient alone during the period of pain and try to reduce it.	Pre	26 (52.0)	19 (38.0)	5 (10.0)	0 .001**
	Post	44 (88.0)	4 (8.0)	2 (4.0)	
Explaining the surrounding environment to the patient in the hospital can reduce his anxiety.	Pre	28 (56.0)	16 (32.0)	6 (12.0)	0 .002
	Post	40 (80.0)	10 (20.0)	0 (0.0)	****
Importance of helping the patient to adapt with his disease.	Pre	22 (44.0)	22 (44.0)	6 (12.0)	0 .025*
	Post	36 (72.0)	9 (18)	5 (10.0)	
The nurse need to do some things that help the patient to be reassured and confident.	Pre	26 (52.0)	19 (38.0)	5 (10.0)	0 .004**
	Post	41 (82.0)	8 (16.0)	1 (2.0)	
The patient's socio-economic status affects the nurse patient relationship and the nursing care.	Pre	22 (44.0)	20 (40.0)	8 (16.0)	0 .617
	Post	34 (68.0)	12 (24.0)	4 (8.0)	
Dealing with cardiac patient is easy	Pre	21 (42.0)	18 (36.0)	11 (22.0)	0 .789
	Post	26 (52.0)	16 (32.0)	8 (16.0)	
Necessity of a team spirit among the nursing staff to ensure the efficiency of the nursing care	Pre	16 (32.0)	24 (48.0)	10 (20.0)	<0.001**
	Post	39 (78.0)	10 (20.0)	1 (2.0)	
Feeling bored when the patient repeats the same complaints and questions.	Pre	21 (42.0)	21 (42.0)	8 (16.0)	0 .015*
	Post	10 (20.0)	11 (22.0)	29 (58.0)	

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Necessary to guide the patient to special centers for follow-up.	Pre	24 (48.0)	19 (38.0)	7 (14.0)	0 .680
	Post	27 (54.0)	16 (32.0)	7 (14.0)	
Necessary to explain the complications of life threatening cardiac arrhythmia to the patient.	Pre	28 (56.0)	10 (20.0)	12 (24.0)	0 .058
	Post	32 (64.0)	14 (28.0)	4 (8.0)	
ICU nurse should be high qualified.	Pre	23 (46.0)	26 (52.0)	1 (2.0)	0 .048 *
	Post	37 (74.0)	9 (18.0)	4 (8.0)	

MH: Marginal Homogeneity Test; *: statistically significant (p<0.05); **: statistically highly significant (p<0.001)

Table 5 Total Nurses' Attitudes of Caring Patients with Life Threatening Arrhythmia throughout Study Phases (n= 50).

Attitude	Total score of Nurses' Attitude				MC p
	Pre Test		Post Test		
	No.	%	No.	%	
Negative < 70%	20	40.0	8	16.0	
Positive ≥ 70%	30	60.0	42	84.0	0.017*
Mean± SD	38.84±6.35		41.14±5.29		
Median (range)	39.50 (29-48)		43 (30-48)		

MC: Mcnemar test *: statistically significant (p<0.05)

Table 6: Relation between Total Satisfactory Nurses' Knowledge Level and their Demographic Characteristics throughout Study Phases (n=50).

Demographic characteristics	Total Satisfactory nurses' knowledge level ≥80%				FET ([1]p-value)	FET ([2]p-value)
	Pre Test (n=2)		Post Test (n=35)			
	No	%	No	%		
Age per years .						
<30	2	100.0	26	74.3	1.00	1.00
>30	0	0.0	9	25.7		
Gender						
Males	0	0.0	17	48.6	0.497	0.367
Females	2	100.0	18	51.4		

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Marital status						
Married	1	50.0	23	65.7	0.542	0.746
Not married	1	50.0	12	34.3		
Academic qualifications						
Technical nursing institute	2	100.0	29	82.9	1.00	1.00
Bachelor of nursing	0	0.0	6	17.1		
Years of experience in ICU						
<5	1	50.0	13	37.1	1.000	0.547
>5	1	50.0	22	62.9		
Attending ECG training courses						
Yes	1	50.0	14	40.0	1.00	0.124
No	1	50.0	21	60.0		

FET: Fisher exact test, p^1: for pre test, p^2: for post test

Table 7: Relation between Positive Attitude of Nurses' and their Demographic Characteristics throughout Study Phases (n=50).

Demographic characteristics	Positive attitude of nurses' ≥70%				FET (^{1}p-value)	FET (^{2}p-value)
	Pre Test (n=30)		Post Test (n=42)			
	No	%	No	%		
Age per years.						
<30	23	76.7	35	83.3	1.00	0.014*
>30	7	23.3	7	16.7		
Gender						
Males	11	36.7	16	38.1	0.251	0.116
Females	19	63.3	26	61.9		
Marital status						
Married	18	60.0	28	66.7	0.216	1.00
Not married	12	40.0	14	33.3		
Academic qualifications						
Technical nursing institute	26	86.7	38	90.5	0.697	0.016 *
Bachelor of nursing	4	13.3	4	9.5		

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Years of experience in ICU						
<5	15	50.0	18	42.9	0.140	0.450
>5	15	50.0	24	57.1		
Attending ECG training courses						
Yes	15	50.0	20	47.6	0.779	1.00
No	15	50.0	22	52.4		

FET: Fisher exact test; *: statistically significant ($p<0.05$); p1: for pre test; p^2: for post test

Discussion:

Heart arrhythmias are irregular heartbeats spurred on by malfunctions in the heart's automaticity or conduction. These problems change heart rate and reduce cardiac output, which affects tissue perfusion. An irregular heartbeat and heart rate might result from any pulse that comes from anywhere other than the Sinoatrial node. Arrhythmias may lead to a range of symptoms, including as complete asymptomatic, loss of consciousness, and rapid heart death. More severe symptoms are often more likely to appear when systemic heart disease is present (**Batal, et al, 2023).**

Based on the results, approximately three-quarters of the nurses surveyed were under 30 years of age, with a mean age of 28.32 ± 3.38 years. This finding aligns with the study by **Ameen, Maarouf, and Khalifa (2021)** in Egypt, titled "Cardiac Dysrhythmia Interpretation Knowledge Enhancement Nursing Protocol," which reported that two-thirds of the participating nurses were also under the age of 30. In contrast, a study by **Haristiani and Tanrewali (2021),** "Nurses' Competencies of ECG Interpretation in Emergency Settings: A Literature Review," found that more than two-thirds of the nurses were aged 30 years or older.

According to the study's findings, more than half of the participating nurses were female. This trend reflects the historical perception of nursing as a predominantly female profession, where female continue to represent the majority of the workforce. This result is consistent with the findings of **Jacob (2018)**, whose thesis titled "Assess the Effect of Planned Teaching Program on Knowledge Regarding Interpretation of Cardiac Arrhythmias and its Management among Staff Nurses in Selected Hospitals of Pune City" also reported that the majority of the nurses surveyed were female.

In the current study, less than two-thirds of the nurses had worked in an intensive care unit for more than five years. In contrast, **Spiva et al. (2021)** found that most nurses had one to three years of experience in their study "The Effectiveness of Nurses' Ability to Interpret Basic Electrocardiogram Strips Accurately Using Different Learning Modalities."

The results of this study showed that nurses' knowledge levels before and after program phases differed more statistically significantly. The majority of the nurses in the study, however, had un satisfactory knowledge prior to obtaining the program. The lack of knowledge among nurses in this crucial field preprogram may be caused by their

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fatigue from an increased workload, which may make it difficult for them to read and stay current on their knowledge. Although less than three-quarters of the nurses in the study had a satisfactory level of knowledge, there was an improvement in their understanding after the program was implemented.

This improvement may be due to the fact that most of the nurses in the study were young and eager to learn. Also, since each session is presented succinctly, using simple language, educational techniques, and instructional materials. This result is consistent with that of **Malk et al. (2018)**, who found that most study nurses had inadequate knowledge of ECG prior to the program, while most study nurses had adequate knowledge of ECG following the program. Their study was titled "Effect of an Education Program on Nurse's Performance regarding ECG."

In contrast, **Ruhwanya, Tarimo, and Ndile (2018)** found that nearly two-thirds of the nurses in their study, "Life Threatening Arrhythmias: Knowledge and attitude among Nurses Working in Critical Care Settings at Muhimbili National Hospital, Dar es Salaam, Tanzania," had adequate knowledge life threatening arrthymia.

Regarding the attitudes of the nurses under study, the current study found a significant statistical difference between the attitudes of the nurses before and after the program phases. However, prior to receiving the education, less than half of the nurses in the study had a negative attitude.

Lack of knowledge among nurses may be the cause of this, as it affects their attitude. However, post-program implementation was better, and most nurses in the study had a positive attitude about caring for patients with life-threatening cardiac arrhythmias. These results are consistent with those of **Tiryag (2024),** who found that attitudes toward pacemakers were primarily negative in his study on "Nurses' Knowledge and Attitudes Toward Pacemaker," with 81.5% of nurses showing low enthusiasm for the device, while 11% and 7.5% showed intermediate and high attitudes, respectively.

Concerning the relationship between the nurses' demographic characteristics and their level of satisfaction after completing an educational program, the study's findings revealed that there was no statistically significant correlation between the demographic characteristics of the nurses and their overall level of satisfaction with their knowledge. This could be because different work conditions require higher levels of knowledge and performance as a result of experience and education. This finding is supported by **Shehab and Shaaban's (2021)** investigation of nurses' performance in treating patients who have angina attacks in emergency and critical care units, which found no statistically significant correlation between nurses' demographic characteristics and their level of knowledge.

As regards relationship between nurses' positive attitudes and their demographic characteristics, The current study showed that, there was a statistically significant correlation between the positive attitude of nurses and their age and academic qualification. This finding disagrees with **Sanad (2017)** who reported that no correlations of statistical significance could be revealed between nurses' knowledge or attitude scores areas and their age, qualification, or experience years.

Conclusion: It can be concluded that the educational program significantly enhanced nurses' knowledge and attitudes concerning life-threatening arrhythmias, demonstrating its effectiveness in improving their clinical competence in this critical area.

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

- Ongoing assessment of nurses' knowledge to identify educational gaps and address their specific learning needs.
- Encouraging nurses to participate in workshops and conferences to enhance their knowledge and attitudes toward managing life-threatening arrhythmias.
- Implementation of continuous in-service training programs focused on life-threatening cardiac arrhythmias to support knowledge reinforcement and updates.
- Development of a comprehensive guideline booklet specifically designed for critical care nurses, providing evidence-based information on the recognition and management of life-threatening cardiac arrhythmias.

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