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Effect of implementing arrhythmia guidelines on improving myocardial infarction outcomes among patients undergoing primary percutaneous coronary intervention

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Abstract
Background: Coronary artery disease is one of the most common causes of morbidity and mortality worldwide. **Aim:** This study aimed to evaluate the effect of implementing arrhythmia guidelines on improving myocardial infarction outcomes among patients undergoing primary percutaneous coronary intervention. **Design:** A quasi-experimental research design. **Setting:** Study was carried out in the coronary care unit at Assiut University Heart Hospital. **Patients:** A purposive sampling of 150 patients. **Tools:** Three tools were utilized to collect data. **Tool l:** Patient assessment tool; **Tool II:** Prediction of life-threatening arrhythmia post primary percutaneous coronary intervention assessment tool and **Tool III:** Patients' outcomes tool**. Result:** Among study and control groups (12% and 20%, respectively) were high-risk for developing life-threatening arrhythmia; the area under the curve (AUC) of the predictive risk score of life-threatening arrhythmia and prediction model was 0.858 and 0.841, respectively, which demonstrate good accuracy. There were statistically significant differences between the study and control groups regarding discharge criteria and length of stay at CCU (P values of 0.005 and 0.000, respectively). **Conclusion:** The study confirmed that patients' outcomes can be improved through early prediction of complications; scores provide the nurses with a quicker and more reliable predictor of life threatening arrhythmia shortly since the arrival and effective in improving patients' outcomes. **Recommendation:** Implementation of predictive life threatening arrhythmia scores in CCU. An educational program should be made for nurses about the implementation of the predictive life-threatening arrhythmia scores and nursing guidelines in the coronary care unit.

Keywords: Arrhythmia & Guidelines & Myocardial Infarction

Introduction
A life-threatening symptom of coronary heart disease, ACS includes ST-segment elevation myocardial infarction (STEMI). A combination of oral medications and interventional procedures are commonly used to manage patients with STEMI. Percutaneous Coronary Intervention (PCI), which involves balloon dilatation and stenting, is the preferred method of reperfusion therapy for ACS patients. Despite undergoing PCI, a subset of ACS patients continue to experience major adverse cardiovascular events (MACEs), including non-fatal myocardial infarction, non-fatal ischemic stroke, death, and bleeding events **(Lu, et al, 2023).**

Serious life-threatening arrhythmias originating from the ventricle. Malignant ventricular arrhythmia is one of the most common causes of death in patients with acute myocardial infarction (AMI). Early revascularization can significantly improve the prognosis of AMI patients. However, ventricular arrhythmia may still occur due to reperfusion myocardial injury or no-reflow. Thus, early assessment of ventricular arrhythmia risk in AMI patients can help clinicians to take active prevention and treatment measures, thus reducing the risk of in-hospital death and improving the prognosis **(Sun, et al, 2023).**

The worldwide incidence of arrhythmias and ventricular tachycardia (VT) represents a significant contributor to sudden cardiac death and is linked to a considerable escalation in both morbidity and mortality **(Kotake, et al, 2023).**

Nurses in critical care units play a crucial role in the management of arrhythmias. They are experts in symptomatic relief, comfort promotion, and crisis intervention in fatal forms of dysrhythmias. The nurse should perform expert nursing interventions while also monitoring any potential adverse drug responses and side effects when providing medication as directed. To sustain the oxygen supply to essential organs in situations like VF and cardiac arrest, the nurse should administer quick and safe defibrillation as well as additional cardiac life support techniques **(Batal, et al, 2023).**

Therefore, this study was conducted to evaluate the effect of implementing arrhythmia guidelines on improving myocardial infarction outcomes among patients undergoing primary percutaneous coronary intervention in the coronary care unit.

Significant of study

Acute myocardial infarction (AMI) is a leading cause of death and disease burden worldwide, percutaneous coronary intervention (PCI) is the most common therapeutic technique for treating AMI via improving myocardial perfusion. At present, PCI remains the dominant treatment for AMI in many countries (**Jiang, et al, 2020).** PPCI is currently the preferred treatment for STEMI, which can open and drain blood vessels as soon as possible to restore blood flow, thus limiting the range of infarcted myocardium and significantly improving the prognosis of patients **(Zhang, et al, 2022).** Ventricular arrhythmias was a common complication, affecting approximately 5% of patients and increasing the risk of hospital mortality. The risk score derived in this study can help to identify patients exposed to a higher risk of VA (**Auffret, et al, 2022).** Also, according to patient records at Assuit University Heart Hospital, the number of patients' admissions in the CCU with recent myocardial infarction and treated with PPCI is about 240 per six months. Therefore, early detection of complications is essential in guiding treatment and predicting the prognosis. This study will be conducted to evaluate the effect of implementing arrhythmia guidelines on improving myocardial infarction outcomes among patients undergoing primary percutaneous coronary intervention in CCU.

Aim of this study:

To evaluate the effect of implementing arrhythmia guidelines on improving myocardial infarction outcomes among patients undergoing primary percutaneous coronary intervention.

Patients and Method

Study design

A Quazi-experimental research design that was conduct in the present study.

Research Hypothesis:

H (1): Patients with myocardial infarction who participate in the study (study group) would have less complications than control group.

H (2): Patients with myocardial infarction who participate in the study (study group) would have less hospital stay than control group

Setting:

The data was collected from coronary care unit at Assiut University, Heart Hospitals, in Egypt. Which contains 20 beds in 5 separate rooms, 1 examination rooms for cardiac emergency patients, 1 physician, 7 head nurses, 40 staff nurses, and 2 nurse assistants. The flow rate of patients is approximately 6 patients per day, and the nurse-patient ratio is 1:3.

Patients:

A purposive sample of 150 patients in accordance with the inclusion criteria. The statistical program G*power 3.1.9.2 was used to determine the sample size. The 95% confidence interval has 80% study power and Allocation ratio = 1:1. Based on the aforementioned criteria, a sample size of 126 critically ill adult patients were selected computed by using the results of the study of **(Wongthida, et al, 2022)** as a reference. To overcome the drop factors, the sample size increased to 150 patients. Those patients were assigned according to their diagnosis of ST elevation myocardial infarction (STEMI) and treated with PPCI in two groups (the study group and the control group).

Inclusion criteria:

- Adult patients age > 18 years.
- Newly admitted patient at coronary care unit with PPCI.

Exclusion criteria:

- Patients presented with previous life threating arrhythmia at admission.
- Patients treated with thrombolytic therapy.

Study tools:

Three tools were used for data collection, as follows;

Tool I: Patients assessment tool:

This tool developed by the researcher after reviewing related literature and was aimed to determine patients' socio-demographic characteristics this tool consist of:

Socio- demographic data that included**:** the patients' code, age, sex, level of education and marital status.

Tool II: prediction of life-threatening arrhythmia post primary percutaneous coronary intervention this tool included of two main parts:

Part (1): prediction of life-threatening arrhythmia (LTA) risk score tool: This tool was aimed to predicate occurrence of life threatening arrhythmia post PPCI and adopted from **(Wongthida, et al, 2022)** which include six items: Sex, Hemoglobin, Pre or intraprocedural respiratory failure, pre or intraprocedural pulseless arrest, intervention time, Intra-Aortic Balloon Pump (IABP) insertion (and Oxygen saturation at CCU.

Scoring system: prediction of life-threatening arrhythmia (LTA) risk score (1) tool was aimed to predicate occurrence of occurrence of life threatening arrhythmia post PPCI which include six items: **Sex** (male or female) which male sex take point (0) and female sex take (1) point, **Hemoglobin**, which ≥12 gm/dL take (0) and <12 gm/dL take (1.5) point, **Pre or intraprocedural respiratory failure** (yes or no, which yes take (1) point and no take (0) point, **intervention time** which ≤60minute (0) and >60minute take (1), **Intra-Aortic Balloon Pump (IABP) insertion** which yes take (2) and no take (0) and **Oxygen saturation** at CCU(≥94 or <94) which

≥94 take (0) and <94 take (2). patient with score <2.5 are low risk, 2.5 to 4 are moderate risk and >4 are high risk. The area under the curve (AUC) of receiver operating characteristic (ROC) was used to evaluate the accuracy of the prediction of ventricular arrhythmias

Part (2): ventricular arrhythmia risk prediction model tool: This tool was aimed to predicate occurrence of life threatening arrhythmia post PPCI and adopted from **(Sun, et al, 2023)** PPCI which include nine items **:** Killip grade ≥3, STEMI patients, LVEF <50%, frequent premature ventricular beats, serum potassium <3.5 mmol/L, type 2 diabetes, and creatinine level (≤ 100 mmol/L or 100 mmol/L Creatinine ≤ 200 or 200 mmol/L Creatinine ≤ 300 mmol/L**)**.

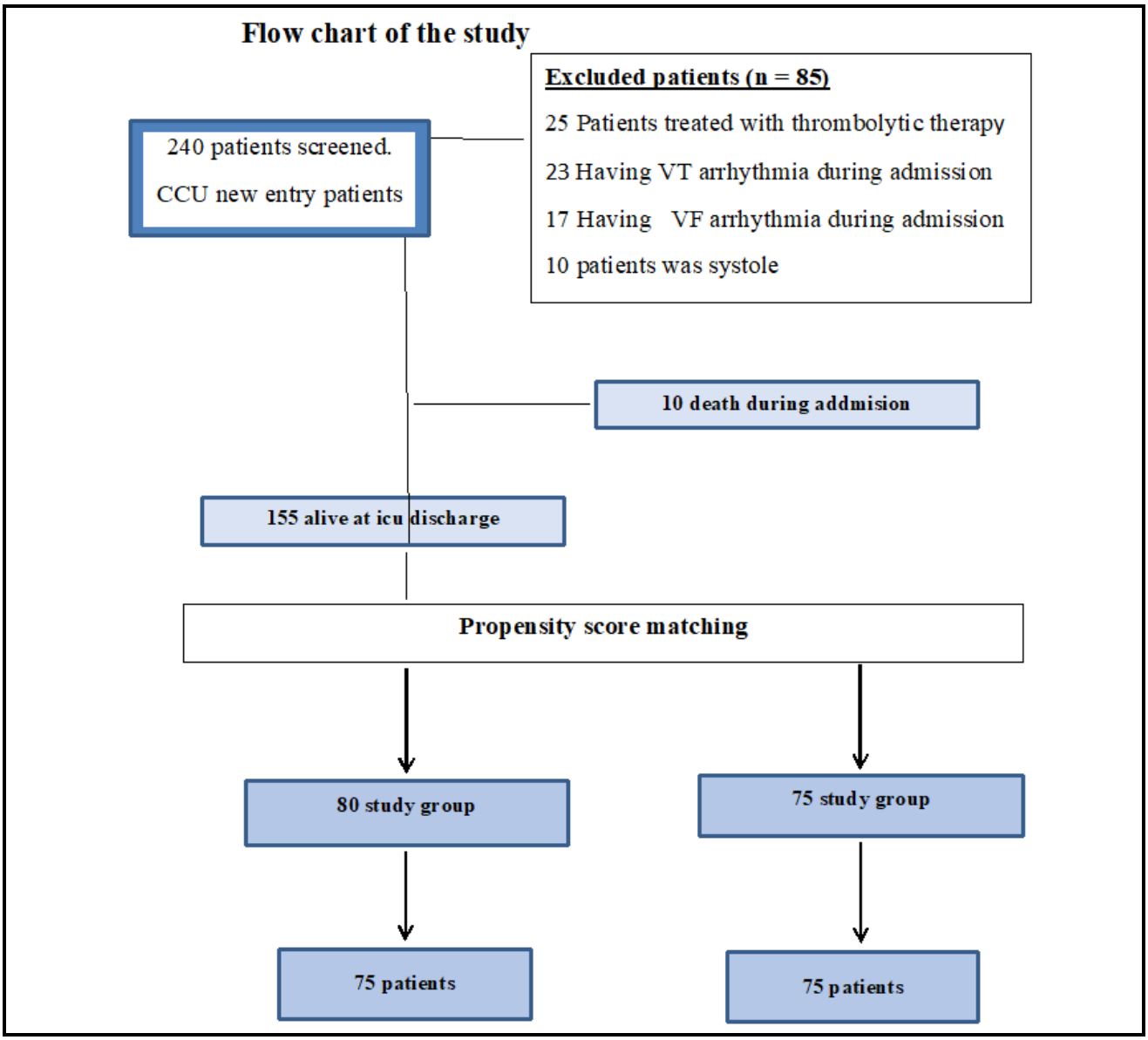
Scoring system: Continuous variables were described using median, 25th and 75th percentile. The area under the curve (AUC) of receiver operating characteristic (ROC) was used to evaluate the accuracy of the prediction model.

Tool III: Patients' outcomes tool: this tool was aimed to evaluate patients' outcomes and adopted from **(Manda, et al, 2018)** which include three parts:

Part (1): Occurrences of complications post PPCI which include: cardiogenic shock, pulmonary edema and lethal dysrhythmia (sustained ventricular tachycardia (VT), ventricular fibrillation (VF), pulseless electrical activity (PEA), and asystole**.**

Part (2): length of stay of coronary care unit.

Part (3): Discharge criteria including: discharge to home, referral to department and death.



Method:

The study was conducted throughout three phases, which are preparatory phase, implementing phase and evaluation phase.

Preparatory phase and administrative design:

- An official letter from the faculty of nursing was sent to the accountable authorities of the hospital, and approval was obtained to conduct this study after an explanation of the nature and aim of the study.
- The tools which used in the present study were developed by the researcher **(I and III)** based on reviewing the relevant literature **(Wongthida, et al, 2022)** and **(Sun, et al, 2023)**

Content Validity:

Content validity index (CVI)

(CVI) should be determined for tool (I and III) to ensure tool validity, by creating the tools, following a comprehensive review of relevant literature and then submitted to a panel of five experts in the fields of critical care and emergency nursing. The suggested modifications were made, and the final versions were ready for use.

CVI for tool I was 0.79 which was acceptable.

CVI for tool III was 0.78 which was acceptable.

Pilot Study:

A pilot study was done to test the feasibility and applicability of the tools, and the necessary modifications were made. The pilot study included 13 patients (10%), with no major modifications made. (The modifications were monitoring complications occurring at admission, at the end of the first day, and before discharge, not every 6 hours until discharge). This group of pilot study not included in the study sample.

Reliability of the study tool:

The reliability of tools was done by using Cronbach's Alpha test to measure the internal consistency of the components of tools.

- The reliability of patient assessment tool was 0.850.
- The reliability of patient outcomes tool was 0.890.which was acceptable.

Ethical consideration:

Ethical approval for this study was granted by the scientific research ethics committee at the Faculty of Nursing, Assiut University. Informed consent was obtained from the participating patients after thoroughly explaining the study's aim and process. The researcher guaranteed the complete anonymity and confidentiality of the participants' data. Additionally, the patients were assured of their right to withdraw from the study at any phase.

Data collection:

- Data were collected in six months, approximately. The study was conducted from August 2023 to January 2024 with 150 patients who presented with STEMI treated with PPCI in the coronary care unit at Assiut University Heart Hospital.

The data were collected from admission, at the end of first and before discharge. Then the data recorded in the developed tools.

2-Impelmentation phase:

- The researcher assigned studied patients (150 patients) to two equal groups (control group and study group).
- At the patients' arrival in the coronary care unit, they were assessed for socio-demographic data by using **Tools I**.
- All patients were assessed for prediction of life-threatening arrhythmia post primary percutaneous coronary intervention **Tool II** part 1 and part 2

Regarding the control group:

The control group was exposed to routine care in coronary care unit as prescribed by the resident physician.

Regarding the study group:

- The study group received arrhythmia guidelines (immediate safety measures) post PPCI at admission **(part 1)**
- The study group received arrhythmia guidelines (arrhythmia monitoring and management) post PPCI according to their score and for patients who actually developed arrhythmia **(part 2)**
- All patients were assessed for outcomes for 48 hours by using **Tool III** including the following:
  - Occurrences of complications post PPCI which include: cardiogenic shock, pulmonary edema and lethal dysrhythmia (sustained ventricular tachycardia (VT), ventricular fibrillation (VF), pulseless electrical activity (PEA), and asystole**.**
  - Length of stay of coronary care unit.
  - Discharge criteria including: discharge to home, referral to department and death.

Arrhythmia guidelines

Consist of two parts:

Part (1): Post PPCI immediate safety measures, which adapted from (**Hussein, et al, 2022)** and modifications were made by the researcher as removing of the following steps **(**Explaining post procedural care, for 4-6 hours after the procedure keep an eye on the extremity where the catheter was inserted straight, Tell the patient that he or she must cough it up and there is some pain in the chest**)**

Part (2): life threatening arrhythmia monitoring and management which was adopted from **(Alkhaqani, 2022**).

Part (1): Post PPCI immediate safety measures:

- Places the patient in the supine position on bed.
- ECG monitoring is used to keep track of the patient.
- Keep monitoring of contrast hypersensitivity and other warning signs.

- Measuring of vital signs every half hours for 4 hours then; thereafter, less frequently
- Measuring of O2 level by ABG.
- Check strength and presence of pulses in the extremities.
- Examine the puncture site for skin's color, any signs of bleeding or hematoma.
- Examine the chest pain for consistency.
- Keep affected leg straight.
- Bed rest with head of the bed not higher than 30 degrees.
- Instruct the patient to drink fluids during the first 12 hours post PPCI.
- if antecubital vessels are used, it immobilizes the arm on the arm board
- When catheters are removed, apply pressure to the insertion site.
- Pressure should be held if the patients puncture site starts to bleed until bleeding stop.
- Monitor intake and output.
- Before discharge, teach the patient how to self-manage at home

Part (2): life threatening arrhythmia monitoring and management:

The intervention applied for high risk patients and for patients who actually developed arrhythmia**:**

- Document any irregular heartbeat in the monitored patient.
- As ordered, obtain an ECG tracing to confirm and identify the type of arrhythmia present.
- Prepare to start cardiopulmonary resuscitation if indicated when a life-threatening arrhythmia occurs.
- Emergency drug administration according to instructions, monitoring of side effect and nursing intervention related to vital signs, hemodynamic monitoring, and laboratory work appropriate to nursing.
- Provides adequate oxygen, reduces the heart load, and maintains a careful balance between metabolism, neurological, respiratory, and hemodynamic conditions as ordered.
- Evaluate the monitored patient's ECG regularly for arrhythmia.
- Monitor the prevalence of factors such as liquid and electrolyte imbalance.
- Prepare crash cards.

Evaluation phase:

All patients post-PPCI are evaluated at admission, at the end of the first day, and before discharge for the occurrence of systemic complications include cardiogenic shock, pulmonary edema and dysrhythmia (sustained ventricular tachycardia (VT), ventricular fibrillation (VF), pulseless electrical activity (PEA), and asystole), discharge criteria (discharge to home, referral to the department, and death), and length of stay at CCU.

Statistical analysis:

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by number and percent (N, %), while continuous variables were described by mean, standard deviation (Mean, SD) and median. To compare categorical variables, the chi-square test and Fisher exact test are used, while continuous variables are compared using the t-test and the ANOVA test. The receiving operating curve (ROC) analysis was carried out. The area under the curve (AUC) with its 95% confidence interval (CI) was calculated. The sensitivity, specificity, positive predictive value (PPV), and negative positive predictive value (NPV) with their 95% CI were calculated A two-tailed $p < 0.05$ was considered statistically significant. All analyses were performed with the IBM SPSS 26.0 software.

Results:

Table (1): Percent distribution of study and control groups related to personal characteristics data (n= 150).

Socio-demographics data	Study (n= 75)		Control (n= 75)		P-value
	No	%	No	%	
Sex					
Male	60	80.0%	55	73.3%	0.334
Female	15	20%	20	26.7%	
Age (years)					
Mean ± SD	57.87 ± 7.64		55.63 ± 8.79		0.098
Educational level					
Diploma	21	28.0%	26	34.7%	
Bachelor degree	11	14.7%	11	14.7%	0.657
Illiterate	43	57.3%	38	50.7%	
Length of stay: (days)					
Median (Range)	2.0 (1.0-4.0)		2.0 (2.0-6.0)		0.000*

*Data expressed as mean (SD), frequency (percentage) *A Statistically significant p ≤ 0.05*

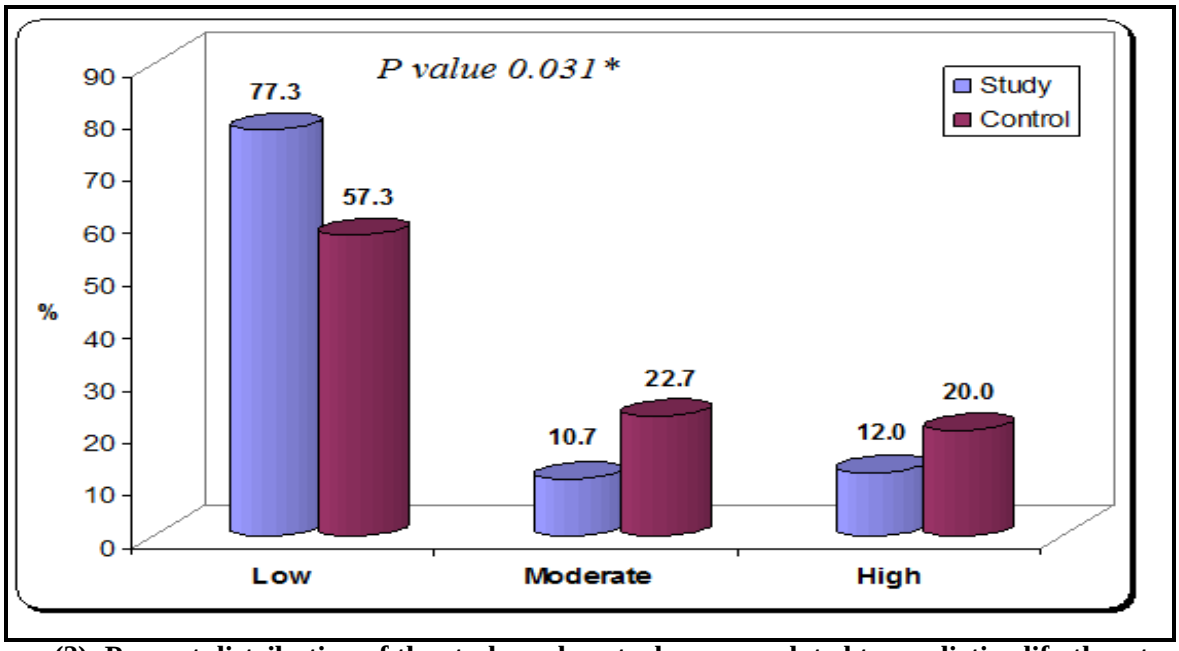


Figure (2): Percent distribution of the study and control groups related to predictive life-threatening score category (n= 150)

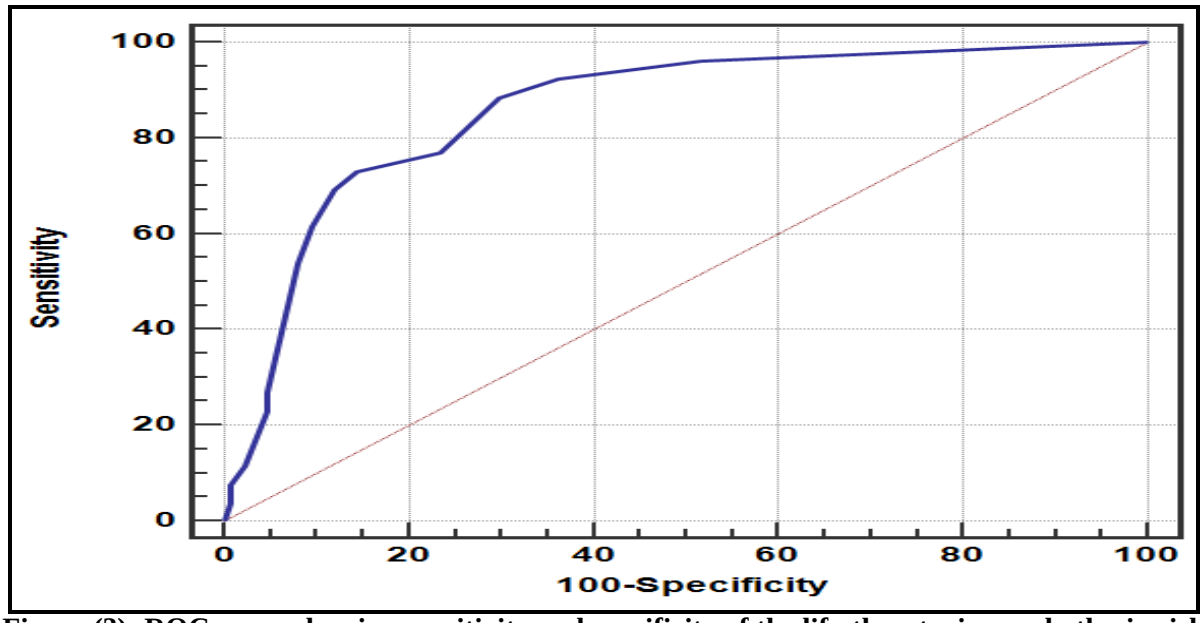


Figure (3): ROC curve showing sensitivity and specificity of the life-threatening arrhythmia risk score (n= 150)

Table (2): Predictive value of the life-threatening arrhythmia risk score (n= 150)

Cut-off	Sensitivity	Specificity	+PV	-PV	AUC
> 1.5	88.46	70.16	38.3	96.7	0.858

+PV: positive predictive value, -PV: negative predictive value, AUC: area under the curve

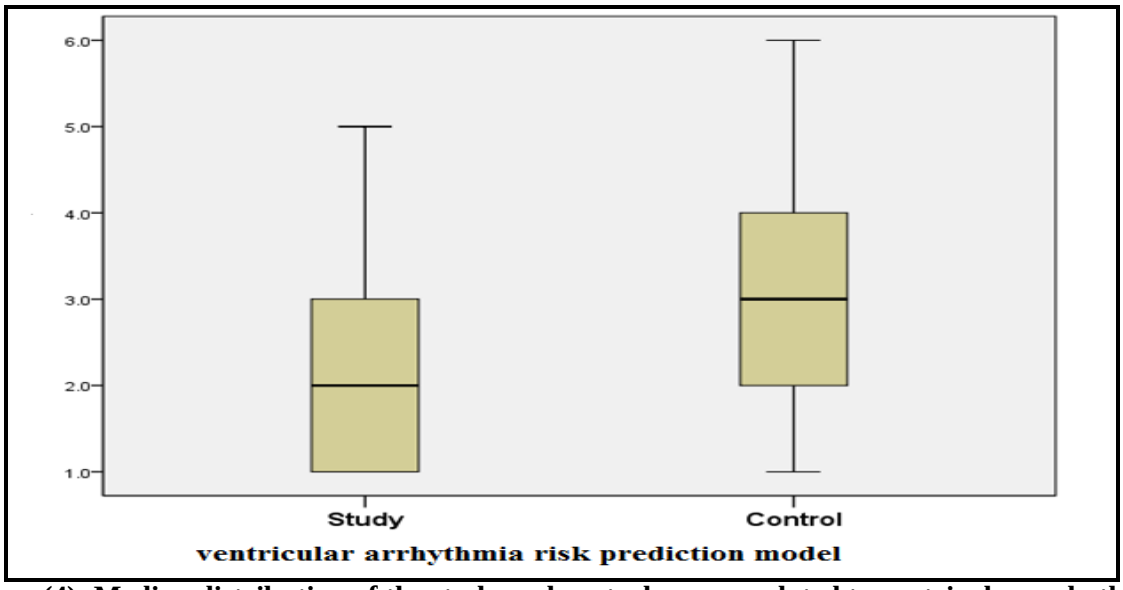


Figure (4): Median distribution of the study and control groups related to ventricular arrhythmia risk prediction model (n= 150)

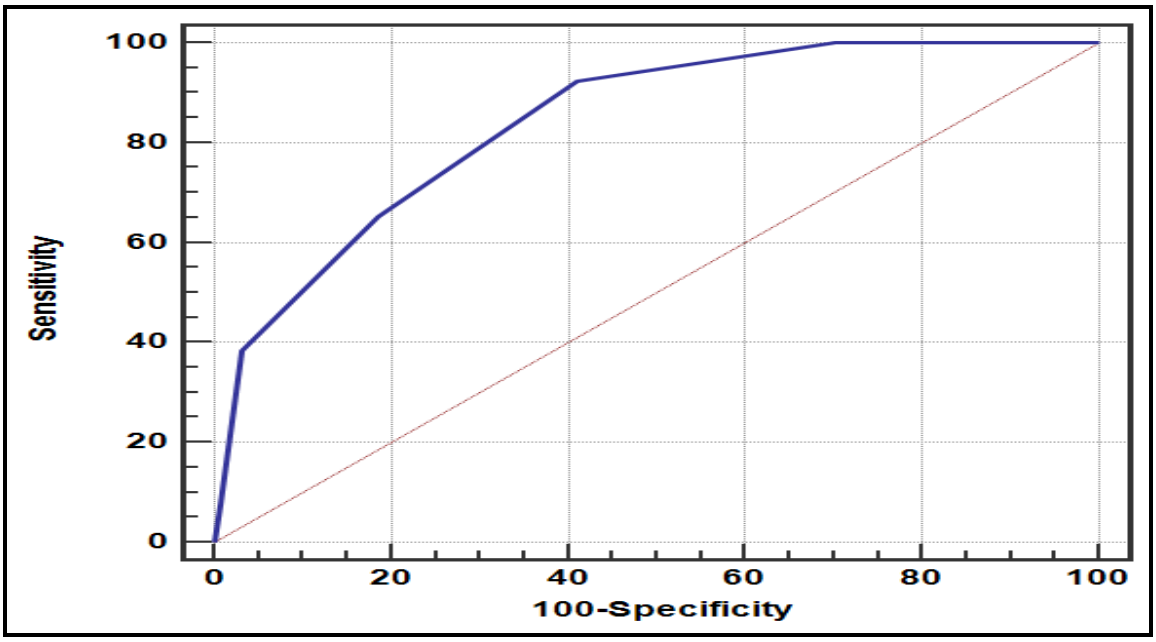


Figure (5): ROC curve showing sensitivity and specificity of the ventricular arrhythmia risk prediction model (n= 150)

Table (3): Predictive value of the ventricular arrhythmia risk prediction model (n= 150).

Cut-off	Sensitivity	Specificity	+PV	-PV	AUC
> 2	92.31	58.87	32.0	97.3	0.841

+PV: positive predictive value, -PV: negative predictive value, AUC: area under the curve

Table (4): Percent distribution of study and control groups related to systematic complications (n= 150)

Systemic complications	Study (n= 75)		Control (n= 75)		P-value
	No	%	No	%	
Cardiogenic shock:					
At admission	6	8.0%	7	9.3%	0.772
End of first day	2	2.7%	10	13.3%	0.016*
At discharge	2	2.7%	8	10.7%	0.050*
Pulmonary edema:					
At admission	0	0.0%	2	2.7%	0.497
End of first day	2	2.7%	11	14.7%	0.009*
At discharge	0	0.0%	0	0.0%	--

Chi square test **A Statistically significant p ≤ 0.05*

Table (5): Percent distribution of study and control groups related to arrhythmia complications (n= 150)

Arrhythmia complications	Study (n= 75)		Control (n= 75)		P-value
	No	%	No	%	
Ventricular tachycardia					
At admission	9	12.0%	16	21.3%	0.125
End of first day	6	8.0%	7	9.3%	0.772
At discharge	0	0.0%	3	4.0%	0.245
Ventricular fibrillation					
At admission	2	2.7%	6	8.0%	0.276
End of first day	1	1.3%	2	2.7%	1.000
At discharge	0	0.0%	2	2.7%	0.497
Premature ventricular contraction					
At admission	6	8.0%	19	25.3%	0.004*
End of first day	1	1.3%	12	16.0%	0.001*
At discharge	1	1.3%	2	2.7%	1.000
Asystole					
At admission	0	0.0%	3	4.0%	0.245
End of first day	1	1.3%	2	2.7%	1.000
At discharge	1	1.3%	2	2.7%	1.000
pulseless electrical Activity					
At admission	1	1.3%	3	4.0%	0.620
End of first day	0	0.0%	0	0.0%	--
At discharge	0	0.0%	0	0.0%	--

Chi square test **A Statistically significant p ≤ 0.05*

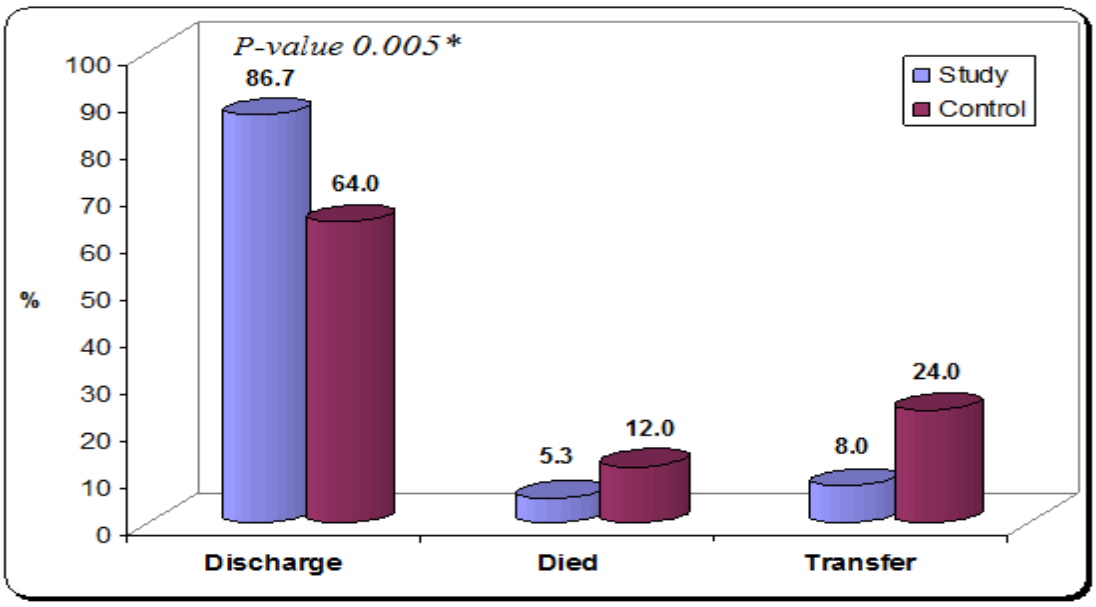


Figure (6): Percent distribution of study and control groups related to discharge criteria (n= 150)

Table (1): Illustrates socio demographic of study and control groups. Regarding to age, it was noticed that the main age in study and control groups (57.87 ± 7.64 and 55.63 ± 8.79) respectively. Regarding to gender, the high percent of patients were male in study and control groups (80.0% and 73.3%) respectively. Regarding to level of education, the high percent of patients were Illiterate in study and control groups (57.3 % and 50.7%) respectively. The length of stay was significantly (P value 0.000) shorter in the intervention group.

Figure (2): Show the percent distribution of the risk category of patients according to the life-threatening arrhythmia risk score it was founded that more than half the studied patients were low risk (77.3% and 57.3%) respectively, less than quarter were moderate and high risk (10.7% and 22.7%) and (12.0% and 20.0%) respectively of the studied patients.

Table (2) and **Figure (3):** Regarding the sensitivity and specificity of LTA risk scores, the results demonstrate that a life-threatening arrhythmia risk score >1.5 correctly predicted occurrence of life-threatening arrhythmia with sensitivity and specificity of 88.46 and 70.16 respectively.

Figure (4): Show median distribution of the study and control groups related to ventricular arrhythmia risk prediction model. The median score for the "study" group appears to be slightly lower than the median score for the "control" group group2.0 (1.0-5.0) and 3.0 (1.0-6.0) respectively. Interquartile range: The interquartile range (IQR), which represents the spread of the middle 50% of the data, is similar between the two groups. Outliers: There are a few outliers (data points outside of the whiskers) in both groups, but they are more prominent in the "control.

Table (3) and **Figure (5)**: Regarding the sensitivity and specificity of risk scores, the results demonstrate that a ventricular arrhythmia risk prediction model score > 2 correctly predicted occurrence of ventricular arrhythmia with sensitivity and specificity of 92.31and 58.87 respectively.

Table (4): Regarding systematic complications of the study and control groups. As regarding cardiogenic shock, pulmonary edema: it was observed that there was a statistical significant difference between study and control groups (P value 0.012 and 0.009) respectively.

Table (5): Regarding arrhythmia complications of the study and control groups for premature ventricular contraction it was observed that there was a statistical significant difference between study and control groups (P value 0.000. As regarding ventricular tachycardia, ventricular fibrillation, asystole and pulseless electrical activity it was observed that there was no a statistical significant difference between study and control groups (P value > 0.05)

Figure (6): Regarding outcomes of study and control groups it was noticed that (86.7% and 64.0%) of patients were discharged to home, (8.0% and 24.0%) were transferred to department respectively and (5.3% and 12.0%) died respectively and for length of stay it was mentioned that median (range) was 2.0 (2.0-4.0) and 2.0 (2.0-6.0) days respectively and there was a statistical significant difference between study and control groups (P value 0.005**).**

Discussion:

Primary percutaneous coronary intervention (PPCI) has become the cornerstone for the management of patients presenting with ST elevation myocardial infarctions (STEMI). When compared to fibrinolysis, PPCI has shown significant reductions in morbidity, mortality, and the risk of mechanical and arrhythmic complications **(Shakhgeldyan, et al, 2024).**

The study aimed to evaluate the effect of implementing arrhythmia guidelines on improving myocardial infarction among patients undergoing primary percutaneous coronary intervention. The findings indicated significant improvements in patient outcomes, which can be attributed to the implementation of specific nursing interventions.

The findings of the present study regarding the demographic characteristics of the study populations show that the majority of the study populations were males. Consistent with the findings of the present study, **(Khederlou, et al, 2023) & (Iqbal, et al, 2023)** mentioned in their studies that a large proportion of study populations were male. This observation can be attributed to several factors associated with gender differences in coronary artery disease prevalence. Men are generally more susceptible to coronary artery disease compared to women, which could be due to various reasons, including hormonal differences and lifestyle factors such as smoking, stress, and activity level, which can increase the workload on the heart and contribute to the development of coronary artery disease and subsequently undergoing cardiac catheterization.

The mean age of the patients was (57.87 and 55.63) years respectively, with a standard deviation of ± 7.64 and 8.79 years **(Islam, et al, 2022) &** (**Iqbal, et al, 2023)** report that the mean ages of the study populations were (59.0 and 53.7) and (55.3 and 61.5), respectively, with a standard deviation of ± (13.5 and 10.6), and ± (1.02 and 1.5) years, respectively.

The researcher's point of view is that the age of the studied populations is a very important variable to be detected, as the literature suggests that increasing age brings more cardiovascular disease risks to

individuals due to degenerative changes in the human vasculature.

In terms of educational level, it was evident that slightly more than half of the study populations were illiterate. In agreement with the current study **(Ibrahem et al, 2024), (Jabr et al, 2022)** and **(Mustafa & Hassan, 2020),** which observed that more than half of the study populations were illiterate.

The level of education is believed by many studies to play a major role in the outcome of different medical conditions. Individuals with lower levels of education have a higher incidence of CAD than those with higher education levels. Individuals with low socioeconomic status and education tend to exhibit a higher prevalence of drug abuse, smoking, diabetes, hypertension, and hyperlipidemia as risk factors for CVDs.

In the present study, the predictive life-threatening arrhythmia score was specifically designed for the population with STEMI treated with PPCI. The results show that the majority of studied populations were low-risk; less than a quarter were moderate and high-risk for devolving ventricular arrhythmia. This result is supported by **(Wongthida, et al, 2022),** who demonstrated in their study that the majority of studied patients were at low risk, slightly more than a quarter were at moderate and high risk for developing LTA.

It is worth noting that the predictive life-threatening arrhythmia score was at the cutoff of 1.5 points and correctly predicted life-threatening arrhythmia cases with sensitivity and specificity of 88.46% and 70.16%, respectively. LTA risk score showed good performance in discriminating patients with and without LTA (AuROC 0.858); this result was supported by. The favorable results of the present study confirm other previous studies **(Wongthida, et al, 2022)** who demonstrated on his study that LTA risk score showed good performance in discriminating patients with and without LTA (AuROC 0.90 vs. 0.93).

On the other hand, the ventricular arrhythmia risk prediction model scored a cutoff of 2 points and correctly predicted VA cases with sensitivity and specificity of 92.31% and 58.87%, respectively. The current study showed good performance in discriminating patients with and without LTA (AuROC 0.841). This was similar to the study of **(Sun, et al, 2023)** who found that the VA risk prediction model scores showed good performance in discriminating patients with and without VA (AuROC 0.815).

As regarding systematic complications post PPCI regarding cardiogenic shock, it was observed that there was a statistically significant difference between study and control groups (P value 0.012), and this result is on the same line with **(Wongthida, et al, 2022)** who found that all of the study populations demonstrated cardiogenic shock approximately post life threatening arrhythmias.

Ventricular arrhythmias post PPCI The present study results demonstrate that slightly less than a quarter (22%) of the studied populations demonstrate lethal arrhythmias (VT and VF) at admission, This was in agreement with **(Rymer, et al, 2024), (Khederlou, et al, 2023), (siddiqui , et al, 2023)** and **(Shah, et al, 2021)** who found that less than a quarter (11.3%), slightly more than a quarter (26.4%), and more than half (61.11%) and (53.6%) respectively of the studied patients had lethal arrhythmia post PPCI Although there was no statistically significant difference in the most common arrhythmia variable of complications between the study and control group, this is due to arrhythmia not being preventable.

Ventricular premature complex (PVCs) was most common arrhythmia, between studied populations observed in slightly more than quarter, and there as a statistical significant difference between studied populations, this result was supported by **(SINGH, et al, 2020)** who found that more than a quarter (29.2%) of the studied patients developed PVCs post PPCI.

The incidence and mortality of VA are high in the early stage of AMI. Therefore, it has become the focus of clinical research to find an effective predictor of VTA and to carry out risk stratification. The incidence of malignant VTA in patients with acute myocardial infarction was 1.9%–10.2%, and the risk of death was six times higher than that in patients without VTA after AMI. The incidence of VTA in the early stage of AMI was 20.0%, and its mortality was 3.3 times that in the non-VTA patients **(Rymer, et al, 2024) & (Li, et al, 2021)**

For these low-risk patients, standard post-procedural monitoring is adequate. Transferring these low-risk patients to general medical wards or referring them back to their catchment hospitals for the continuation of care might be safe, especially when the ICUs are overcrowded with higher-risk patients. On the contrary, patients with LTA scores >4 carried a significantly high risk of LTA. These patients should be closely monitored or placed close to the nurse station. The team should also be cautiously prepared and equipped for performing ACLS so with the prediction of complications and application of the nursing guidelines, patient outcomes can be improved.

The current study shows that there was a statistically significant difference between study populations regarding discharge criteria. The length of stay was significantly (P value 0.000) shorter in the study group. In-hospital mortality was significantly higher

in the VA populations than in the non-VA populations. This means that arrhythmia guidelines can improve patients outcomes, and this is supported by **(Sun, et al, 2023)** who found that the morality rate was higher in the VA patients than in the non-VA patients and in agreement with **(Shah, et al, 2021)** who found that the in-hospital mortality rate was higher with a significant association with the development of lethal arrhythmias within 24 hours of the procedure.

In general, the arrhythmia guidelines was effective in improving myocardial infarction patient outcomes. The study group not only showed fewer complications but also had better overall outcomes, including lower mortality rates and shorter hospital stays. These outcomes are significant as they highlight the effectiveness of structured nursing guidelines in enhancing the quality of care provided to patients undergoing PPCI.

Clinical Implications

It is important to use the predictive life threatening arrhythmia scores and nursing guidelines in the identification of high-risk patients for leathal arrhythmia (VT and VF) in the cardiac care unit. This may be useful in reducing hospitalizations, length of stay, and cost.

Limitation of the study

This was a single institutional study, and the major limitation of this study was the sample size a large sample size acquired from different geographical areas in Egypt.

Conclusion:

So, the arrhythmia guidelines had a positive effect on improving myocardial infarction outcomes. The study findings also revealed a statistically significant difference regarding discharge criteria and length of stay at CCU. In this study, the prediction scores are easy to use, perform well, and can be used to guide clinical practice. The LTA score and ventricular arrhythmia risk prediction model showed good discriminative ability for predicting LTA during the post-procedural period with good accuracy. Predicting the probability of LTA in patients with STEMI after PPCI might be beneficial to attending critical care nurses and cardiologists to plan optimal post-procedural monitoring and reduce in-hospital mortality. Finally, implementation of arrhythmia guidelines has succeeded in improving patients' outcomes regarding complications.

Recommendations

The study recommended the implementation of predictive life threatening arrhythmia scores in the cardiac care unit for predicting life-threatening arrhythmia in STEMI patients post PPCI. High risk patient should monitored closely for improving patient's outcomes. An educational program should be made for nurses about the implementation of the predictive life-threatening arrhythmia scores in the CCU**.**

Further research are needed to assess the accuracy and effectiveness of the predictive life-threatening arrhythmia scores**.**

References:

- **Alkhaqani, A. (2022):** Recognizing and management of arrhythmia: Overview of nurses' role. Int J Nurs Heal Sci, 4(1), 33-40
- **Auffret, V., Bourenane, H., Sharobeem, S., Leurent, G., Didier, R., Gilard, M., & Le Breton, H. (2022):** Early and late complicating ST-segment elevation myocardial infarction. Archives of Cardiovascular Diseases, 115(1), 4-16.
- **Batal, M., Mohammad, S., & Sobeh, D. (2023):** Effect of an Educational Program Regarding Cardiac Arrhythmias on Nurses' Practices in Critical Care Units. Port Said Scientific Journal of Nursing, 10(3), 351-374
- **Hussein, A., Dawood, S., & Mohammed, A. (2022):** Nurses' Knowledge and Practice toward Post Cardiac Catheterization Patients' Safety. BNIHS Journal.[Internet], Hilla University, 4(1), 919-924
- **Ibrahem Shalaby, Y., Abdelwahab Abdelfatah, D., Omran, A., & Abdelkader Habiba, A. (2024):** Clinical Outcomes and Satisfaction Level among Patients Undergoing Diagnostic Cardiac Catheterization. Egyptian Journal of Nursing and Health Sciences, 5(1), 102-118
- **Iqbal, N., Butt, Z., Dasti, M., Memon, F., Khan, A., & Rizvi, S. (2023):** Outcomes of Primary Percutaneous Coronary Intervention in Patients with a Thrombolysis in Myocardial Infarction Score of Five or Higher. Pakistan Journal of Medical & Health Sciences, 17(04), 554-55
- **Islam, A., Munwar, S., Reza, A., Bhuiyan, A., Ahmed, T., Rahman, K. & Tanvir, H. (2022):** Primary Percutaneous Coronary Intervention of ST-segment Elevated Myocardial Infarction-Experiences in a Tertiary Care Hospital. Cardiovascular Journal, 14(2), 111-120
- **Jabr, E., Taha, N., & Metwally, E. (2022):** Nurses' Knowledge and Practice Regarding Care for Patients Undergoing Cardiac Catheterization. Zagazig Nursing Journal, 18(1), 1-15.
- **Jiang, W., Feng, M., C., Li, & Wang, W. (2020):** Effect of a nurse-led individualized self-management program for Chinese patients with acute myocardial infarction undergoing

percutaneous coronary intervention. European Journal of Cardiovascular Nursing, 19(4), 320-329.

- **Khederlou, H., Pirsaraei, S., Rabbani, E., & Motedayen, M. (2023):** Correlations between Cardiovascular Risk Factors and Ventricular Arrhythmias Following Primary Percutaneous Coronary Intervention in Patients with ST-Elevation Myocardial Infarction. The Journal of Tehran University Heart Center, 18(2), 122.
- **Kotake, Huang, Bennett, De Silva, Bhaskaran, Kanawati, & Kumar, (2023):** Efficacy and safety of catheter ablation as first-line therapy for the management of ventricular tachycardia. Journal of Interventional Cardiac Electrophysiology, 66(7), 1701-1711
- **Li, G., Liu, S., Jin, J., Ding, K., & Qian, C. (2021):** Risk factors associated with the incidence of ventricular arrhythmias complicating acute myocardial infarction and prognosis analysis. Journal of Nanomaterials, 2021, 1-7
- **Lu, Wang, & Zhou. (2023):** Predicting long-term prognosis after percutaneous coronary intervention in patients with acute coronary syndromes: a prospective nested case-control analysis for county-level health services. Frontiers in Cardiovascular Medicine, 10
- **Manda, Y., & Baradhi, K. (2018):** Cardiac catheterization risks and complications.
- **MUSTAFA, & HASSAN, D. (2020):** Effectiveness of Nursing Intervention on Early Complications for Patients undergoing Coronary Catheterization. International Journal of Pharmaceutical Research, 12(2)
- **Rymer, J., Wegermann, Z, Wang, T., Li, S., Smilowitz, N., Wilson, B. & Tamis-Holland, J. (2024).** Ventricular Arrhythmias After Primary Percutaneous Coronary Intervention for STEMI. JAMA network open, 7(5), e2410288-e2410288.
- **Shakhgeldyan, K., Kuksin, N., Domzhalov, I., Rublev, V., & Geltser, B. (2024):** Interpretable machine learning for in-hospital mortality risk prediction in patients with ST-elevation myocardial infarction after percutaneous coronary interventions. Computers in Biology and Medicine, 170, 107953
- **Shah, J., Naz, F., Kumar, R., Hassan, M., Shah, G., Ahmed, K., & Karim, M. (2021):** Incidence of cardiac arrhythmias in acute myocardial infarction patients undergoing primary percutaneous coronary intervention and associated outcomes during the first 24 hours. Cureus, 13(1)
- **Siddiqui, F., Khubaib, S., Kumar, H., Kumar, H., & Aslam, M. (2023):** Frequency of Arrhythmias in ST-Segment Elevation Myocardial Infarction Patients During Primary Percutaneous Coronary Intervention (PPCI) Till 48 hours Post PPCI in NICVD. Pakistan Journal of Medical & Health Sciences, 17(01), 524-524
- **SINGH, M., GHAI, M., & Ramakrishnan, S. (2020):** A Study of Arrhythmias in First 48 Hours of Acute Myocardial Infarction in a Tertiary Care Hospital. Journal of Clinical & Diagnostic Research,
- **Sun, L., Han, B., Wang, Y., Zhu, W., Jiang, J., Zou, A., & Tang, L. (2023):** A new scoring system for predicting ventricular arrhythmia risk in patients with acute myocardial infarction. Clinical Interventions in Aging, 283-292
- **Wongthida, T., Lumkul, L., Patumanond, J., Wongtheptian, W., Piyayotai, D., & Phinyo, P. (2022):** Development of a Clinical Risk Score for Prediction of Life-Threatening Arrhythmia Events in Patients with ST Elevated Acute Coronary Syndrome after Primary Percutaneous Coronary Intervention. International Journal of Environmental Research and Public Health, 19(4), 1997.
- **Zhang, Y., Chen, G., Huang, D., & Luo, S. (2022):** Clinical Nursing Pathway Improves Therapeutic Efficacy and Quality of Life of Elderly Patients with Acute Myocardial Infarction. Computational and Mathematical Methods in Medicine, 2022.