Factors Affecting the Outcomes of Patients with Ischemic Heart Disease at Intensive Care Units

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Abstract

Background: Ischemic heart disease is the leading cause of mortality worldwide, in both high- and low-income countries, according to the latest data of the World Health Organization in a report updated in 2015, the death rate from ischemic heart disease worldwide amounted to 12.8%. **Aim:** This study aimed to assess factors affecting the outcomes of patients with ischemic heart disease at intensive care units. **Design**: A descriptive design was used. **Setting:** the study was carried out at the intensive care units at As-salam International Hospital, Maadi. **Subjects:** A convenient sample of all the available staff nurses (n =100 nurses) and a purposive sample of 400 patients with ischemic heart disease. **Data collection tools:** (1) Patient Interview Questionnaire, (2) Nurses' Interview Questionnaire, (3) Nurses' Practice Observational Checklist (4) Patients' Outcomes Assessment Sheet. **Results & conclusion:** many factors affecting patients' outcomes, patients related factors (demographic and medical data, knowledge the majority of the studied subjects had satisfactory level, more than two thirds of them had satisfactory level of self- reported practice regarding IHD and their management, psychological and beliefs related factors with the mean of 275.75±102.357 and 339.57±60.43 respectively, health care system and medical team related factors with the mean of 318.75±70.25 and 371.91±18.58 respectively, the majority of nurses had satisfactory level knowledge and practice regarding care of patient with ischemic heart disease patients related factors. Also, the study finding related patients outcomes revealed majority of patients had length of stay in intensive care units 1-5 days, modified early warning score was 18% of low score, more than the half of median score and the minority of them had high score, while majority of the studied patients suffered complications, 3.75% of them had readmission within the first 6 months after discharge and 1.25 % of them suffered mortality. **Recommendation:** conducting further studies for studying other factors affecting outcomes of patients with ischemic heart disease, conducting educational and in service training programs for nurses and using of the modified early warning score tool to improve nurses' performance regarding caring for critically ill patients and ischemic heart disease and quality of patients' life.

Key words: Factors affecting the outcomes, Patient, Ischemic heart disease, Intensive care units.

Introduction

All over the world, cardiovascular disease (CVD) is an important of death. By and large, this group of diseases represents a first cause, not only in developing, but also in countries in the process of development. Among CVDs, ischemic heart disease (IHD) and its different clinical manifestations stand out in prominence. The IHD is a group of disease arises from narrowing of coronary arteries over times, It is primary effect is decreasing to complete loss of oxygen and nutrient to myocardial tissues. It encompasses partial loss of myocardial blood and ischemia to complete blockage of coronary artery blood flow without collateral circulation ***(Thomas, 2010)***.

There are many risk factors of IHD; they can be divided into non-modifiable risk factors: hereditary predisposition and family history, low birth weight, age, gender and race. Modifiable risk factors which divided into modifiable medical risk factors; hypertension, diabetes mellitus, hyperlipidemia and personally modifiable risk factors such as overweight or obesity, cigarette, sedentary lifestyles, Excessive alcohol intake and stress.

All of these can trigger the development of IHD disease, if patients already have atherosclerosis and become acutely stressed may experience chest pains caused by the arteries to heart contracting and reducing the blood flow ***(Anderson et al., 2016).***

There are many vital causes of IHD such as; atherosclerosis, dissecting aneurysm, infective vocalists, syphilis**,** congenital defects**,** coronary artery spasm and migrating thrombus from deep venous thrombosis (DVT) ***(Judith, 2013)***.

Outcomes established in the care of a client who is admitted with IHD to the intensive care units (ICUs) focus on early recovery without residual complications, shorter length of stay in the ICUs by turning the reduction of hospitalizations range by supplying resources to be applied to care of those clients to reduce the incidence of IHD, decreasing not only hospitalization and re-hospitalization but also mortality rates ***Ruth, 2013).***

The ICU is an area of a hospital that provides aggressive therapy, using state-of-the-art technology and both invasive and noninvasive monitoring for critically ill and high-risk patients. In these units the patient's physiological variables are reported to the practitioner on a continuous basis, so that titrated care can be provided. Critical care team constitute of attending physician critical care nurses and other healthcare provider, one is likely to exert several hours in these units caring for very sick patients. Care in the ICU must be guided by a thoughtful and organized approach ***(Jesse, 2015)***.

Nurses provide care of the critically ill patient have specialized training and skills. Their skills are documented and recorded into the flow sheet which provides around-the-clock information: Accurate vital sign measuring, neurological status assessment, monitoring of hemodynamic parameters, insuring ventilator settings, respiratory parameters, charting inputs and outputs, interpreting laboratory data and administration of medications. The higher critical care nurses' performance result in patient health status showed improvement in cardiac function, reduce the pain, improvement in respiratory status, improvement in electrolyte balance, maintained good nutritional status and improved knowledge about risk factors, signs and symptoms and prevention of complications ***(Perrin & MacLeod, 2012).***

Significance of the Study

The IHD is the leading cause of mortality worldwide, in both high- and low-income countries, according to the latest data of the World Health Organization (WHO) in a report updated in 2015, the death rate from IHD worldwide amounted to 12.8%. Therefore, the study was conducted to assess factors affecting the outcomes of patients with ischemic heart disease at intensive care units ***(Anderson et al., 2016).***

According to statistical records, the prevalence of IHD in As-Salam International Hospital in Egypt during on 2015 were 1419 out of 3719 patients with IHD admitted to its ICUs which represents 38.15% of the total admissions to ICUs for the same period, length of stay vary from 3-5 days, total readmission of them with the same diagnosis within the 6 months of discharge 43 patients Which represent 3.0% and the mortality among them was 81 patients which represent about 5.7%.

The intensive care nurse plays a vital role in the care of patient with IHD. So, this study will carry out in an attempt to examine the nurses' performance and outcomes beyond morbidity and mortality. Accountability for patient outcomes is a fundamental responsibility of professional nurses and the patient outcomes that are sensitive to nursing intervention is essential for efforts to determine the effectiveness and improve the quality of nursing care.

Aim of the study

This study was aimed to assess factors affecting the outcomes of patients with IHD at intensive care units. It was achieved through the following by:

1- Assess the outcomes of patients with ischemic heart disease at intensive care units (length of stay, readmission within 6 months after discharge, complications and mortality).

2- Assess the factors affecting the outcomes of patients with ischemic heart disease.

Research question:

To fulfill the aims of this study the following research questions will be formulated:

1- What are the outcomes of patients with ischemic heart disease at intensive care units (length of stay, readmission within 6 months after discharge, complications and mortality)?

2- What are the factors affecting the outcomes of patients with ischemic heart disease?

Operational definitions:

- **Ischemic heart disease:** Points in patients with cardiac diseases such as angina pain (stable, unstable and variant), acute coronary syndrome (ACS) and myocardial infarction.

- **Factors affecting outcomes include:** patient related factors; demographic characteristics, medical history, patients' knowledge. Health care related factors; relation to the medical team, the availability and accessibility of the health care system and patients' psychological factors (attitude, belief and towards his disease).

- **Nurses' related factors include;** nurses' level of knowledge and practice regarding caring for patients of IHD.

- **The outcomes of patients with IHD include;** length of stay in ICU, complications during staying in ICU (arrhythmias, hypotension and cardiac arrest), **mortality** during staying in ICU and readmission within the first 6 months after discharge (period of study conduction).

Subjects and methods

Subjects and methods included the following four items:

I. Technical design
II. Operational design
III. Administrative design
IV. Statistical design

(I): Technical design: It entails the design, setting, subjects and tools for data collections.

Research design: A descriptive exploratory research design utilized to conduct this study.

Setting: The present study was conducted in the ICUs at As-Salam International Hospital (ASSIH), Maadi plaza, Cairo-Egypt. As selected by the researcher. Also it is a place of the researcher job, where he can find the enough time to collect the needed data from the available subjects for the current study while he is on duty, its also standing as one of the highest ICU beds capacity in the private sector in Egypt and for the characteristics of the patients of this setting, moreover following the updated guidelines and protocols of treatment, also joint commission international (JCI) accredited hospital from joint commission international accreditation (JCIA), moreover had the JCIA accreditation for the clinical pathway acute myocardial infarction (AMI) which ensure the best care for AMI patients since emergency admission till hospital discharge. There were 4 ICUs with 90 beds allocated as the following; 8th floor ICU includes 5 beds, 4th floor ICU includes 46 beds and 3rd ICU includes 15 beds and 2nd floor ICU includes 18 beds, in addition to chest pain unit covers 6 beds.

Subjects:

A convenient sample of all available staff nurses (100) working on the previously mentioned setting and caring for patients with IHD were recruited.

A purposive sample of (400) adult patients of both genders with IHD were involved in this study from the above mentioned settings. They were selected

according to the statistical sensitive equation (the power analysis were used coherent test using Epicalc 2000 software) using the following equation: (Population size: 1419 - Expected frequency =50% - Acceptable error = 10% -Confidence Co efficient = 99% - Minimum sample size ≈400) within 2017 (from 1st of March to 31st of August) at with the following criteria:

- Conscious adult patients of both gender and willing to participate in the study.

- Patients with non co – morbid conditions (diabetic keto acidosis (DKA,) hypertensive emergency, cancer patient, complicated end stage renal disease, complicated liver disease, etc).

Tools for data collection:

Tool (I) Patients' interview questionnaire: This tool was used to assess the knowledge of patients with IHD about the disease. It was developed by the researcher after reviewing the relevant literatures in a simple Arabic language ***(Joseph & Pilar, 2010;Fineberg & Lavizzo-Mourney, 2013;Khot & Bajzer, 2013; Cyril, 2014;Ho, 2014; Rahman, 2014; Cooper, 2016; Lehwaldt, 2016; Meg, 2016;Gregor, 2017 and Haden, 2017).***

This tool was divided into five parts as follow:

The 1st part included demographic data (age, gender, education, marital status, occupation, residence and cost care ability).

The 2nd part included patients' risk factors; HTN, DM, smoking, alcohol abuse, stressors and obesity as well as physical disability regarding movement and vision that prohibit their compliance to the treatment regimen), it consisted of 14 true/ false questions.

The 3rd part included patients' knowledge regarding IHD; it consisted of 8 multi choice question (MCQ) about (definition, modified and non-modified risk factors and complications).

The 4th part included patients' self reported practice regarding IHD management. It consisted of 12 multiple questions about management of IHD risk factors and warning signs and symptoms.

The 5th part included factors affecting the outcomes of patients with IHD. It consisted of patients' psychological related factors (8 questions), patients' beliefs related factors (7 questions), and health care related factors (4 questions) and for medical team related factors (12 questions); the total number of questions for this part was 31questions.

Scoring system:

- For 2nd part; each question response was given a grade of "yes" =1 and "no" = 0.

- For 3rdpart; correct answer was given one grade and incorrect answer was given zero. Score less than <70% (=<5.6 marks) was considered unsatisfactory and the score equal or more than ≥ 70% (= ≥5.6 marks) was considered satisfactory.

- For 4th part; correct answer was given one grade and incorrect answer was given zero. Score less than 70% (=<8.4 marks) was considered unsatisfactory and the score equal or more than 70% (= ≥8.4 marks) was considered satisfactory.

- For 5th part each respose for question was given "yes" =1 and "no" = 0.

Tool (II): Nurses' interview questionnaire: This tool was developed by the researcher in a simple Arabic language to assess the nurse's level of knowledge regarding IHD, risk factors and nursing care for such group of patients. It was developed after reviewing the most recent and relevant literature ***(Doug & Leanne, 2010; Joseph & Pilar, 2010; Cleland & Hardman, 2013; Fineberg & Lavizzo-Mourney, 2013; Khot & Bajzer, 2013; Cyril, 2014; Ho, 2014; Rahman, 2014; Cooper, 2016; Lehwaldt, 2016; Meg, 2016; Ding et al., 2017; Gregor, 2017and Haden, 2017).***

This tool divided into three parts as follows:

The 1st part included nurses' demographic data included age, gender, educational level, years of experience and related courses.

The 2nd part included nurses' knowledge regarding IHD consisted of 17 MCQ (definition, etiology, modifiable and non-modifiable risk factors, complications, oxygen therapy, vasodilators, pain killer, anticoagulants, heart rate and ECG).

The 3rd part included nurses' knowledge regarding nursing care for patients with IHD in ICU consisted of 13 multiple choice questions (measuring vital signs, conscious level, intravenous access, bed rest, blood sample, cardiac profile, diet, blood glucose level, ICU monitor screen, body mass index (BMI), health teaching and outpatient follow up protocol)

Scoring system:

- The total score of the knowledge was 30 marks. It classified as follows; correct answer was given one grade and incorrect answer was given zero. Total score classified as the following:
- ≥80% = satisfactory level of knowledge = ≥ 22.4 marks
- <80% = unsatisfactory level of knowledge = <22.4 marks.

Tool (III): Nurses' practice observational checklist: it was used to evaluate nurses' level of practice regarding the care of patients with IHD. It was concerned with (Patient assessment, nursing intervention and discharge care plan). It was adapted from recent and relevant literatures; it consisted of 27 steps ***(Benner, 2009; Doug & Leanne, 2010; Joseph & Pilar, 2010; Cleland & Hardman, 2013; Fineberg & Lavizzo-Mourney, 2013; Khot & Bajzer, 2013; Cyril, 2014; Ho, 2014;Rahman, 2014; American Nurses Association, 2015; Brown, 2015; Thatcher and Hemavathy, 2015; Cooper, 2016; Lehwaldt, 2016; Meg, 2016; Aiken, 2017; Ding et al., 2017; Gregor, 2017 and Haden, 2017).***

Scoring system:

- The total score of practice was 27 marks. The response to each item in the procedure was categorized into (done correctly and not done) and one grade was given for each correct step and zero for each incorrect or not done. Total score classified as the following:

- ≥80% = satisfactory level of practice = ≥ 21.6 marks

- <80% = unsatisfactory level of practice = < 21.6 marks.

Tool (IV): Patients' outcomes assessment sheet: it was used to assess the outcomes of patients with IHD including: LOS, health status either improvement or clinical deterioration by using the standard tool MEWS, complications rate in ICU, mortality rate during stay in ICU and readmission rate within 6 months of discharge.

Scoring system:

Patients' MEWS which calculated by nurses. Each of the answers provided to the five criteria in the MEWS, weighs a number of point, from 0-3. Once all the answers have been chosen, the calculator will sum them to provide the final result; which will be the MEWS score. The MEWS scores classified into the following:

- 0-1: (low score) this score illustrates the patient is stable and reassess on normal interval time.
- 2-4: (median score) this score illustrates the patient is still controlled but in need for close monitoring and to be assessed hourly.
- ≥5: (high score) this score illustrats the patient is in need for immediate intervention and monitoring as a life saving situation.

(II) Operational design: It included the preparatory phase, content validity, reliability, ethical consideration, pilot study and field work.

Preparatory phase: In this phase the study tools were developed and content was consistent with the related literatures (nursing

textbooks, journal and internet source) about IHD to develop the tools for data collection.

Tools validity: The tools were revised by a panel of 7 experts from Faculty of Nursing – Ain Shams University (3 professors, 2 assistant professors and 2 lecturers of medical-surgical nursing) who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance, scoring and items recording. Modifications of tools were done according to the panel's judgment.

Tools reliability: The Cronbach's alpha model which is a model of internal consistency was used in the analysis of data collection tools; patients' interview questionnaire, nurses' interview questionnaire, nurses' practice observational checklist and patients' outcomes assessment sheet (0.806, 0.8681, 0.791and 0.671 respectively). Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values (more than 0.7) were denoted acceptable reliability.

Ethical consideration:

It includes the following:

- Approval was obtained from the ethical committee of the Faculty of Nursing – Ain Shams University.
- Objectives and aim of the study were clarified to the studied patients and nurses.
- Assuring and maintaining anonymity and confidentiality of patients and nurses and their right to withdraw from the study at any time.
-The researcher clarified that all information would be used for scientific research and for the patients and nurses' benefits.

Pilot study: A pilot study was applied on (10%) of total study subjects (40 patients with IHD and 10 staff nurses caring of patients with IHD. In order to ensure the clarity of questions, applicability of the tools and the time needed to complete them, minor modifications were done. So the subjects whom shared in the pilot study were included in the main study sample.

Field work: Data collection of this study was carried out once permission was granted to proceed with the study. Subjects were involved in the study were interviewed and assessed four days per week on (Wednesday, Thursday, Friday and Saturday) in the morning and afternoon shifts. Data collection lasted for 6 months, from 1st of March 2017 to 31st of August 2017. Patients with IHD who fulfilled the inclusion criteria and staff nurses who provide care for them were recruited. The purpose of the study was explained to each eligible patient and staff nurse who agreed to participate in the study prior to any data collection.

Voluntary participation and confidentiality were assured by the researcher for each study subject through clarifying to them that all information would be used for scientific research only.

Upon agreement to participate, the researcher filled the observational checklist during actual nurses work hours caring for the patients with IHD. The observational checklist was used prior to administration of the questionnaire to ensure the maximal realistic observations of the nurses' performance and minimize the possibility of bias. The nurses' practice was assessed by the researcher while they care for patients of IHD. The time consumed to fill out the practice checklist ranged from 30 to 45 minutes it varies according to each procedure. The questionnaires for both nurses and patients were read, explained, and choices were recorded by the researcher. The time consumed to fill out each questionnaire ranged from 30-45 minutes, so the collection of the data for both studied groups ranged from 4-5 patients and 1-2 nurses daily in the selected ICUs the previously mentioned 4days per week. The ICUs were quiet and the most patients and staff nurses were cooperative with the researcher. In addition to data related to patients outcomes assessment sheet filled by the researcher from observation and reviewing the patients' files.

(III) Administrative design: An official litters including the title and the purpose of the study were sent from the Dean of Faculty of Nursing Ain-shams University to the director of the As-Salam International Hospital and to get their approval for data

collection, and to obtain the statistical data about of the patients with IHD and staff nurses caring for them.

(IV) Statistical analysis: The collected data was scored, tabulated and analyzed by personal computer using statistical package for the social sciences (SPSS) program version 20. The statistical analysis included:

- Percentages (%), mean and standard deviation (SD): were used for quantitative continuous variables
- Chi-square (X2): test was used to compare groups and relations as regards qualitative data.
- Coefficient of correlation (r): test was used to measure the strength of the association between two variables.
- The observed differences associated were considered as follows:

Not Significant p> 0.05
Significant p< 0.05
Highly Significant p>0.001

Results

Part I: Patients' demographic characteristics and medical data: Table 1shows that: 56.2%, of the studied patients were males as well as the mean age of the studied group was 55.23 + 9.69 and ranged from 34 to 70 years. As regards to marital status83.5% were married, 53.8% were living in rural areas, and 50.3% had mental occupations. Concerning to education and financial status: none of the studied group was illiterate. However, 43.2% had secondary level and46.8% had high qualification. Furthermore, 100%of the studied patients had cost care ability for the treatment.

Table 2 reveals that the studied patients had past medical history of (diseases or risk factors): hypertension 92.5%, DM 90%, obesity 88%, smokers 62.5% and not following any anti stressors specific measures 93.75%. As well as none of studied patients had alcohol abuse or physical disability factors prohibits their compliance of the treatment program.

Part II: Patients' Knowledge and self reported practice regarding the ischemic heart disease management.

Table 3 clarifies that 85.25%of the studied patients had satisfactory level of knowledge regarding IHD. While: 14.75 % of the studied patients had unsatisfactory level of knowledge regarding IHD.

Table 4 illustrates that 82.75% of the studied patients had satisfactory level of self reported practice regarding IHD managment. While: 17.25% of them had unsatisfactory level of practice.

Part III: Factors affecting the outcomes of patients with IHD

Table 5 explained that the studied patients regarding their psychological and beliefs related factors agreed with the mean 275.75+102.375 and 339.57+ 60.43 respectively as revealed that feeling upset with their medical condition, feeling worried about their medical condition and welling to continue the treatment regimen were 87.5%, 86.5% and 100% of the patients respectively. As well as, nearby all the studied subjects regarding beliefs related factors; medications important for their medical condition, affirming the importance of doing regular ECG and believing in the importance of follow up were 100%, 90% and 90% respectively.

Table 6 clarifies that, nearby all of the studied patients agreed with items regarding health care system and medical team related factors with the mean 318.75+ 70.25and 371.91+18.58 respectively.

Part IV: Nurses' demographic characteristics.

Table 7 shows that 55 % of studied nurse were females. The mean age of nurses included in the study 27.37+ 5.359 and ranged from 18 to 40 years. Concerning the nurses' educational level, 70% of the studied nurses had a bachelor degree. As well as, 37% had 5-10 years of experience in nursing. Besides that 50% had 1-5 years of experience years in ICU, 55%of studied nurse had general training courses for caring of critically ill patients and 30% of them had attended specific training courses for caring of IHD patients.

Part V: Nurses' knowledge and practice

Table 8 shows that, 80% of the studied nurses had a satisfactory level of knowledge regarding IHD while 20% of the studied nurses had unsatisfactory level of knowledge regarding IHD.

Table 9 shows that, 83%of the studied nurses' had satisfactory nurses' level of knowledge regarding caring of patients with IHD while 17% of the studied nurses had unsatisfactory level of knowledge.

Table 10 reveals that 91.6%of the studied nurses had satisfactory level of total practice regarding caring for patients with IHD, while 8.4% of them had unsatisfactory level of total practice.

Part VI: Patients' outcomes:

Table 11 revealed the outcomes of the studied patients where as: 88.8% of them had<5 days length of ICU stay with a mean 8.86+ 3.848.18% of them with MEWS score (≥ 5) were in need for immediate intervention and close monitoring as life saving situation (cardiac arrest, arrhythmias and death). 64% of the studied patients with MEWS score (2-4) were controlled but need close monitoring and to be assessed hourly, 18% of them of wit MEWS score (0-1) were stable and reassess on normal interval. 82 % of them suffered from complications: arrhythmias 65%, hypotension14.25%, and cardiac arrest 1.5% with mean (98.75+96.258). While3.75%of them had readmission within the first 6 months after discharge and the mortality rate among them was1.25%.

Table (1) Percentage distribution of demographic characteristics of the studied ischemic heart disease patients (n=400).

Items	N	%
Gender:		
Male	225	56.2
Female	175	43.8
Age:		
34<45	80	20
45<55	84	21
55<65	132	33
65-70	104	26
$\bar{x} \pm$ SD	55.23 + 9.69	
Marital status:		
Single	20	5
Married	334	83.5
Divorced	30	7.5
Widow	16	4
Level of education:		
Cannot read or write	0	0
Read & write	40	10
Secondary level	173	43.3
High qualification	187	46.8
Type of Occupation:		
Mental	201	50.3
Muscular	145	36.3
Normal daily activity	54	13.5
Place of residence:		
Urban	185	46.3
Rural	215	53.8
Cost care ability		
Able	400	100
Not able	0	0

Table (2): Percentage distribution of the studied ischemic heart disease patients' regarding their medical data (n=400).

Items	N	%
A- Past medical history (diseases or risk factors)		
Hypertension	372	92.5
Diabetes mellitus	360	90
Obesity (According to BMI >24.9).	353	88.25
Other cardiac diseases	89	22.25
Smoking	250	62.5
Lack of exercise practice	260	65
Anti stressors specific measures	375	93.75

Table (3): Percentage distribution of the studied patients' level of knowledge regarding the ischemic heart disease (n=400)

Items	Satisfactory		Unsatisfactory	
	N	%	N	%
Definition of IHD	340	85	60	15
Risk factors of IHD	350	87.5	50	12.5
High potential risk factors of IHD	355	88.75	45	11.25
Modifiable risk factors	330	82.5	70	17.5
Non modifiable risk factors	360	90	40	10
Symptoms of IHD	345	86.25	55	13.75
Characteristics of chest pain	325	81.25	75	18.75
Complications of IHD	324	81	76	19
Total	341	85.25	59	14.75

Table (4): Percentage distribution of the studied patients' self reported practice regarding the ischemic heart disease management (n=400).

Items	Satisfactory		Unsatisfactory	
	N	%	N	%
Chest pain management	328	82	72	18
Coronary vasodilators adverse effects	333	83.25	67	16.75
Normal blood cholesterol level control measures	355	88.75	45	11.25
Diet rich in cholesterol	350	87.5	50	12.5
Diet low in cholesterol	320	80	80	20
Normal blood glucose level control measures	328	82	72	18
HTN control measures	320	80	80	20
Stressors effect on IHD	324	81	76	19
Stressors control measures	347	86.75	53	13.25
Resuming work	324	81	76	19
Resuming normal daily activity	324	81	76	19
Warning signs and symptoms for seeking medical help	320	80	80	20
Total	331	82.75	69	17.25

Table (5): Percentage distribution of the studied patients regarding their psychological and beliefs related factors (n=400)

Psychological related factors	N	%
Feeling upset with medical condition	350	87.5
Considering medical condition as punishment of God	70	17.5
Feeling worried about medical condition	346	86.5
Willing for continuing the treatment regimen	400	100
Interfering the medical condition with favorite activities	325	81.25
Comparing his health status with others	72	18
Having difficulty in starting new job	333	83.25
Disclosing others about his medical condition	310	77.5
x^-+ SD	275.75+102.375	
Beliefs related factors:		
Thinking that medications necessary for his medical condition	400	100
Affirming the importance of doing regular ECG	380	90
Believing in the importance of follow up	380	90
Viewing the needed healthy relation with the treating medical team	350	87.5
Convincing with the physician instructions regarding the followed therapeutic regimen	347	86.75
Having faith in the family role regarding treatment of his medical condition	320	80
Thinking of existed difficulties with joining to new physical activity	200	50
x^-+ SD	339.57+ 60.43	

Table (6): Percentage distribution of the studied patients regarding healthcare system and medical team related factors (n=400)

Items	N	%
Health care system related factors:		
Hospital nearby	180	45
Well equipped ICU	380	95
Patients education received	325	81.25
Satisfied ICU services	390	97.5
x^-+ SD	318.75+ 70.25	
Medical team related factors:		
Giving sympathy	390	97.5
Providing emotional support	390	97.5
Keening on the patients' health	382	95.5
Informing about medical condition	380	95
Involveing discussion the treatment plan	320	80
Explaining physician related informations	380	95
Giving chance to express fears	371	92.75
Answering all inquires	370	92.5
Encouraging outpatient follow-up	370	92.5
Teaching how to counte radial pulse	370	92.5
Providing clear instructions	380	95
Using teaching material	360	90
x^-+ SD	371.91+18.58	

Table (7): Percentage distribution of demographic characteristics of the studied nurses (n=100)

Items	N	%
Gender:		
Male	45	45
Female	55	55
Age		
18<20	10	10
20<30	68	68
30-40	22	22
$\bar{x}$ + SD	27.37 + 5.359	
Qualification		
Nursing school	0	0
Technical institute	20	20
Bachelor of nursing	70	70
Post graduate studies	10	10
Years of experience in nursing:		
1<5	23	23
5<10	37	37
10<15	18	18
15<20	20	20
20-25	2	2
$\bar{x}$ + SD	9.51 + 4.687	
Years of experience in ICU:		
1<5	50	50
5<10	28	28
10-15	22	22
$\bar{x}$ + SD	7.32 + 4.124	
Specific training courses for caring of IHD.	30	30
General training courses for critically ill patients	55	55

Table (8): Percentage distribution of nurses' level of knowledge regarding the ischemic heart disease (n=100)

Items	Satisfactory		unsatisfactory	
	%	%	N	%
Definition of IHD	85	85	15	15
Etiology of IHD	75	75	25	25
Risk factors of IHD	83	83	17	17
Non modifiable risk factors	77	77	23	23
Modifiable risk factors	86	86	14	14
Complications of IHD	74	74	26	26
Rational of administering O2	81	81	19	19
Side effect of O2 therapy	79	79	21	21
Nitroglycerin in IHD	82	82	18	18
Side effect of Nitroglycerin	78	78	22	22
Administering Morphine with chestpain	83	83	17	17
Side effects of Morhine administration	77	77	23	23
Administering anticoagulant drug	82	82	18	18
Adverse effect of the anticoagulant	78	78	22	22
Nurses notify the physician if heart rate changed	82	82	18	18
Importance of performing regular ECG	80	80	20	20
Total knowledge level	80	80	20	20

Table (9): Percentage distribution of nurses' level of knowledge regarding caring of patients with ischemic heart disease (n=100).

Items	Satisfactory		unsatisfactory	
	N	%	N	%
Following the vital signs assessment schedule	85	85	15	15
Monitoring the patients conscious level assessment	78	78	22	22
Attaching the ICU monitor to the patients	84	84	16	16
Maintaining bed rest for the patients'	87	87	13	13
Inserting IV access during the patients' care	85	85	15	15
Aspirate necessary blood laboratories.	85	85	15	15
Calculating the patients' BMI	77	77	23	23
Following up the blood glucose level	80	80	20	20
Following up cardiac enzymes and troponine	88	88	11.5	11.5
Knowing that patients' diet must be low in fat and salt.	81	81	19	19
Explaining to the patient about his health status	90	90	10	10
Giving the patients' information about the disease	78	78	22	22
Following up the patients after discharge	85	85	15	15
Total knowledge level	83	83	17	17

Table (10): Percentage distribution of nurses' practice regarding caring for patients with ischemic heart disease (n=100)

Items	Done correctly		Done incorrectly / not done	
	N	%	N	%
Patient assessment				
Assess temperature accurately.	100	100	0	0
Assess pulse accurately.	100	100	0	0
Assess respiration accurately.	100	100	0	0
Assess blood pressure accurately.	100	100	0	0
Assess level of consciousness	92	92	8	8
Monitor blood oxygen level through obtaining arterial sample	90	90	10	10
Assess patient medical history.	92	92	8	8
Calculate body mass index (BMI) accurately.	95	95	5	5
Assess pain level on numerical pain scale (1 – 10).	98	98	2	2
Assess capillary refill time accurately.	86	86	14	14
Assess intake and output accurately.	86	86	14	14
Monitor PTT, PT, PC and INR.	92	92	8	8
Calculate MEWS accurately.	85	85	15	15
Nursing intervention				
Administer O2 therapy according to results of arterial blood gases according physician prescription.	87	87	13	13
Monitor arterial blood gases periodically	92	92	8	8
Administer pain killer as prescribed correctly	85	85	15	15
Obtain and interpret 12 leads ECG correctly.	98	98	2	2
Administer anticoagulant as prescribed correctly	84	84	16	16
Observe signs of bleeding (epistaxis, gums, hematuria, etc.)	92	92	8	8
Monitor drug side effects if happened.	94	94	6	6
Monitor capillary blood glucose level.	100	100	0	0
Ensure patient safety by side rails raised.	90	90	10	10
Measure CVP if available.	85	85	15	15
Document nursing interventions accurately and timely.	93	93	7	7
Report for any abnormality on time.	94	94	6	6
Discharge care plan				
Provide health education about IHD (change in anatomic structure or function, signs and symptoms and complications)	90	90	10	10
Describe ongoing regimen (diet, exercise, medications as physician prescription and avoid any aggressive emotional and physical activity).	90	90	10	10
Interprete patient blood sampling and lab investigations	90	90	10	10
Promote psychological support	95	95	5	5
State time and date of follow up appointment.	90	90	10	10
Total satisfactory level	91.6	91.6	8.4	8.4

Table (11): Percentage distribution of ischemic heart disease patients regarding the studied outcomes and modified early warning score (MEWS) (n=400).

Patient Outcomes	N	%
Length of ICU stay (Day)		
1<5	355	88.8
5<7	31	7.8
7-15	14	3.5
x^-+ SD	8.86+ 3.848	
MEWS		
0-1(Low score)	72	18
2-4(median score)	256	64
≥ 5(high score)	72	18
x^-+ SD	133.333+75.116	
Complications rate:		
Suffered	328	82
Not suffered	72	18
x^-+ SD	200+ 181.01	
Types of complications:		
Arrhythmias	260	65
Hypotension	57	14.25
Cardiac arrest	6	1.5
None	72	18
x^-+ SD	98.75+96.258	
Readmission rate within the first 6 months after discharge	15	3.75
Mortality rate among studied IHD patients.	5	1.25

Discussion

Part I: Patients' demographic characteristics and medical data:

As regards studied patients' age, the present study showed that more than half of studied patients' age was more than 50 years with means (55.23 + 9.69); this may be due to the aging process and the related physiological changes in the vascular system. This finding was supported by **Seef, Jepsson, and Stafström, (2013),** who reported that more than two third were less than 45 years old in the study entitled "People's knowledge about CHD, attitude towards prevention and main risk reduction barriers in Ismailia, Egypt". Oppositely, **Atweh, et al. (2018),** mentioned that less than two third of the study sample were more than 60 years and stated that the risk factors for the development of CAD increase with age in the study entitled" Demographic and CAD risk factors associated with dementia: The result of a cross-sectional study from Lebanon". Also, **Ammar, (2015),** supporting the finding of this study when he found that, the majority of patients' age category were more than 50 years in the study entitled "Effect of educational program on compliance of patients with lower limb ischemia regarding therapeutic regimen". Considering gender of the studied patients, the present study revealed that more than half of them were males. In addition, **Mohamed, (2012**),found that, most of the study groups were males due to the serious elevated number of smokers in the study which entitled "Patients with MI: Factors affecting adherence to therapeutic regimen". This finding goes in the opposite line with the study finding **of Seef, Jepsson, and Stafström (2013)**, who reported that more than half of patients were females. Also**, Atweh et al. (2018**) mentioned that more than half of the study sample was female. In relation to studied patients' educational level, the present study result indicated that, about half of patients were highly qualified this might be because of the setting place were contracted with highly reputably health care sponsoring companies beside the nature of the high socioeconomic class of patients. This result reinforced by **Dawood et al. (2013**), who revealed that about half of the study subjects had university education in the study which entitled "Predictors of Smoking Cessation after MI". Moreover, **Gulliksson et al. (2011),** stated that one fifth of study subjects had College or

university education in the study which entitled "Randomized controlled trial of cognitive behavioral therapy of standard treatment to prevent recurrent cardiovascular events in patients with CHD". This study result was inconsistent with **Mohammed (2016),** who represented that the highest percentage of the study subjects were secondary level, while high qualification represented among the minority of them, in the study entitled "Effect of educational guidelines on therapeutic regimen compliance and self - efficacy among patients with MI". With reference to marital status, majority of patients in this study finding were married. Which, consistent with **Ammouri et al. (2016),** entitled "Knowledge of coronary heart disease risk factors among a community sample in Oman". Also, this study finding was supported **by Abu Shuaib, (2014)** who conducted a study on 70 patients with MI in coronary care units and found that, the majority were married in the study entitled "Effect of an educational program on compliance of MI patients in Gaza Strip". Regarding the place of residence, the present study revealed that more than half of the studied subjects were from rural area this may be due to that low health care level in their regions push them to seek the medical care in urban cities. This study finding was supported by **Seef, Jepsson and Stafström, (2013)** who found that more than half of the study group were from rural areas, this result was incompetent with **Mohamed, (2016),** who informed that two third of the studied sample were from urban. As well as this result was oppositely with **Angerud, Brulin, Eliasson and Naslund, (2013)** in the study which entitled "Longer pre-hospital delay in first MI among patients with diabetes" and revealed that about two thirds of the studied subjects came from urban areas. Concerning occupation, the present study revealed that half of the studied patients had a mental occupation, which might be a reflect the sedentary life style that accompanied with low physical activities resulting in low cardiovascular circulation leading to more liability to cholesterol deposition in the vessels which considered as a risk factor for developing of IHD. This study finding was on the opposite with the study conducted by **Seef, Jepsson and Stafström, (2013),** who stated that more than half of the study groups were either applying normal daily activity or unemployed. Similarly, according to the study conducted by **Al-Tamimi, Ba-Omar and Nadar, (2017),** who found that more than two third of the studied group were unemployed/retiredin the study entitled "Knowledge regarding secondary prevention lifestyle practices among patients with IHD in Oman". In relation to financial status, the present study revealed that all the studied patients had cost care ability because of the nature of self-paying and sponsored patients who can afford the cost of the needed care. This study result confirmed by **Ammouri et al, (2016)**who stated that more than half of the sample had a sufficient income, As well as **Vardanjani et al., (2013)** found that, more than half of the patients under study can afford the care cost. Healthcare expenditure could be a large portion of living expenses for patients suffering from chronic disease in the study which entitled "The effect of face-to-face education and educational booklet on heart health indexes of the hospitalized patients with MI". But, this study finding was inconsistent with **Mohammed, (2016),** who reported that more than half of studied patients had insufficient income. Regarding to past medical data risk factors the most of the studied patients had HTN, the majority of them had DM and obesity diseases. That may be due to age, gender and nature of occupation that accompanied with more stressors. This study finding was reinforced by **Abd-elmoneim, Ali and Abdulkader, (2014),** who performed a study on 795 patients and stated that the most of patients had a history of previous ischemia and HTN, and more than two third had diabetesin the study entitled "Demographics of acute coronary syndrome (ACS) Egyptian patients admitted to Assiut University Hospital). This study finding was oppositely with **Seef, Jepsson and Stafström, (2013),** who revealed that tenth of studied patient had a history of CHD with a family history of CHD. Also, the result reflected a positive history of other chronic diseases such as DM and HTN) among fifteen of the participants. The most of the study sample had stress affecting IHD, the majority of them had high blood sugar level and HTN, considered two third of them were having the risk of obesity and smoking and less

than two third of them done exercise practice affect IHD. That is may be due to the nature of their lifestyle. Additionally, no one of studied patient had any both vision problems and movement disability prohibits compliance of the treatment program. And also, no one had alcohol abuse. This study finding is in similar with **Krishnan et al. (2016),** who mentioned that CAD risk factors represented the studied patients were more than half of them overweight or obese, abdominal obesity and high total cholesterol. Less than third of them had HTN and about a third of them reported low levels of high density lipoprotein cholesterol and current smoking. Only fifteen of them were diabetes in the conducted study which entitled "Prevalence of CAD and its risk factors in Kerala, South India: a community-based cross-sectional study". On the same way a study carried out by **Atweh et al. (2018),**who showed that around one third of the patients smokers and more than twenty were current smokers. Less than tenth reported ever drinking alcohol. While the majority of them perceived themselves as fairly or very physically active, around more than half older adults were overweight and less than one third were obese. More than half of the participants reported having HTN. Additionally diabetes was reported by one third of the participants, while heart problems were reported by only fifth of the sample.

Part II: Patients' Knowledge regarding IHD.

The result of the study clarified that the majority of studied patients' had a satisfactory level of knowledge regarding IHD. This result revealed that they had information about IHD from the assigned health care team who provided them with sufficient information about their medical conditions by using teaching materials and might be due to the patients self-learning by exploring medical websites. This study result was supported by **Gregor, (2017),** who stated that one hundred patients, 67 men and 33 women with an average age of 57 years who were hospitalized with IHD achieved a satisfactory knowledge regarding their medical conditions throughout constructed teaching programs. Regarding patients' self-reported practice regarding the IHD management, the majority of studied patients had a satisfactory level of practice this may be due to the sufficient information acquired about their medical conditions from the providing health care team about IHD.

This study result confirmed with the finding of study conducted by **Al-Tamimi, Ba-Omar and Nadar, (2017)** who found that more than half of the studied patients made changes to their lifestyle following their IHD diagnosis. In addition, about two thirds of the patients reported adequately controlling the fat content of their daily diets. However, less than half of the participants exercised more following their diagnosis of IHD.

Part III: Factors affecting the outcomes of patients with IHD:

The current study described that all the studied patients had a positive psychological related factors with mean of 275.75+102.357 regarding continuing the treatment program. On the other hand, they upset and worried about their medical condition this may be due to their awareness of their disease process and the importance of completion of treatment. As well as, all the studied patients had a positive beliefs related factors with mean of 339.571+60.43 that the medications are important for their medical condition, the importance of doing regular ECG and follow up, the majority of them believe that their relation with their treating medical team is

strong, the physician instructions will help them in the control of wellbeing and their family has an important role in their treatment this finding due to the patients under the study were more aware about dealing with disease and its management and being responsible of their families, these are reflected on their adherence and disease prognosis. From the researcher's point of view the psychological related factors among the studied patients with IHD have a positive influence on their attitude toward their illness. Cognitions and beliefs of patients have a significant impact on their progression of the disease experience, including understanding the signs, looking for causes, and changes in individual behavior. Beliefs of the patients play a crucial role in effective treatment, psychological adjustment and adherence to treatment recommendations. This result sustained by the study conducted by **Seef, Jepsson and Stafström, (2013),** who revealed that tenth of the participants had a history of chronic heart disease, and the majority had total satisfactory level of knowledge about disease, and the most of them had a positive attitude and believe toward risk prevention. Also, **Saeidi, Sorous, Komasi, Moemeni and Heydarpour (2015)**, stated that, less than half of the patients believed that the main cause of their illness is behavioral risk factors. While, one third of them referred to psychological status as a factor, the minority referred to biological and environmental factors. About a tenth of the patients were not aware of the cause of their illness. Stress is the most important factor among the psychological factors. The results showed that there was a significant difference among the patients in term of attitudes, and behavioral and psychological attitudes. In fact, the patients identified behavioral problems as the main cause of their illness in the study which entitled "Attitudes toward cardiovascular disease risk factors among patients referred to a cardiac rehabilitation center: Importance of psychological attitudes". Regarding the health care system and medical team related factors nearby all of the studied patients agreed with items regarding health care system and medical team related factors with the mean 318.75+70.25 and 371.91+18.58 respectively, including health education, medical services, explaining treatment plan and medical instruction and the nursing team, explain the physician instructions, giving sufficient information about their medical condition and the used teaching material in the health education. This finding may be due to the selected study setting polices and the protocols of documentation that cover all areas of patient health care and health education beside the high level of education of the hired nursing staff and specialist physician, all these factors are to make the patient more orientated and engaged to the therapeutic regimen. This study result supported by **Zerwic, (2011),** who stated that, the compliance to therapeutic regimen was promoted by nursing clarification and explanation. Therefore, the information provided through nursing intervention must be sufficient to increase patient's desire to comply with prescribed therapeutic regimen after discharge. Patients who are oriented with everything about the disease are more likely to engage in activities that promote changing the behaviors, physical well-being and enhancing the compliance with a therapeutic regimen in the study which entitled "Early MI symptom recognition". As well as, the study conducted by **Birkhäuer et al., (2017),** who stated that patients reported more beneficial health behaviors, less symptoms and higher quality of life and to be more satisfied with treatment when they had higher trust in their health care personnel in the study which entitled "Trust in the health care professional and health outcome". This study finding was contradicted with the study finding of **Ammar, (2015) and Robert, (2011),** whom stated that, lack of patient's education had a strong effect on their knowledge, some patients lack understanding of their role in the treatment; others lack knowledge about the disease and the consequences of poor compliance; or lack understanding of the value of clinic visits follow up. Moreover, patients' understanding of their condition and treatments is positively related to compliance with the doctor's instructions with regards to the pharmacological treatment regimen, as well as will help them in the control of wellbeing entitled "The awareness and performance of appropriate foot self-care practices among diabetic patients".

Part IV: Nurses' demographic characteristics.

As regards to the demographic characteristics of the studied nurses, the study findings revealed that, two third of the studied nurses had a bachelor degree in nursing science. While, more than half of them were females that is might be due to the greater fraction of the nurse in Egypt was females and also may related to the nursing study in the Egyptian universities was exclusive for females only till 2005. And half of them had experience in ICU less than 5 years. As well as less than two third of the studied nurses' age were less than 30 years. While more than one third of them had experience in nursing less than 10 years that is might be due to the staff retention plan of the study setting place of the study. Despite the fact that, more than half of studied nurse attended training courses for caring of critically ill patients, only less than one third of them attended training courses for caring of patients with IHD patients that may be require more effort of the learning and development in the study selected setting for enforcing more on work courses beside off work courses. On the same line this result of the study conducted by **Ibrahim, Abd-Allah, Arafa and Mohammed (2017),** which showed that: more than two-fifths of the studied participants were between 25 and 30 years old. The most of them were females and a significant proportion of them were married. Two-thirds of them had between 5 and 10 years of experience and less than half of them held a bachelor's degree in nursing in the study which entitled "Effect of nursing care standards on nurses' performance in caring for patients with cardiac arrhythmias".

Part V: Nurses' knowledge and practice.

The current study finding revealed that the majority of studied nurses had (80%) total satisfactory level of knowledge regarding IHD definition, modified is factors causing IHD and non modified risk factors. In addition to (83%) total satisfactory level of knowledge regarding caring for patients with IHD; medication (morphine, nitroglycerine and anticoagulant), O2 therapy and ECG and notify the physician about patient parameters. As well as explaining the health status of the patient, cardiac enzymes and troponine follow up, maintaining bed rest of the patient, follow up after discharge, blood laboratories and vital signs follow up, attaching to ICU monitor and follow up of the blood glucose level, this finding could be due to the most of the nurses had bachelor in nursing or they attending in-services job training courses related to caring of critically ill patients. The study findings supported by **Ding, et al, (2017)**, who clarified on study completed by 273 registered nurses and found that more than two thirds of the registered nurses knew the CVD risk factors; however, less than half knew the right target goals for these risk factors. Notably, less than two thirds of registered nurses were routinely provided health education for CVD prevention during their practice. There was positive relation between registered nurses' knowledge of target goals for CVD risk reduction and their education practices on CVD prevention in the study entitled "Knowledge and practice in cardiovascular disease prevention among hospital registered nurses: a cross-sectional study". Also, this study result supported with **Svavarsdóttir, Sigurðardóttir and Steinsbekk, (2014)**,who stated that nurses must gain knowledge about the patients experience, concerns and emotional reactions entitled "Knowledge and skills needed for patient education for individuals with CHD: The perspective of health professionals". This study finding was inconstant with **Aliakbari, Parvin, Heidari and Haghani, (2015)**,who found points of defect in the nurses knowledge and practice, suggested that higher schools can make the difference in nurses performance for patient safety in many situations, as nurses have hands-on administration of medication and treatments, talent with new technologies, the ability to gain important clues from everyday contact with patients and accurately and efficiently speaking, entitled "Learning theories application in nursing education". In the light of nurses practice regarding caring for patients with IHD; the current study showed that the majority of them had satisfactory level of practice regarding caring of patients of IHD. This study went in the same line **with Fonarow, Gawlinski, Moughrabi and Tilisch (2015),**

who stated that nurses are ideal health care professionals to direct the CVD risk reduction team and to deliver multi-factorial risk reduction in hospital settings, outpatient clinics, and community-based facilities. Nurses have an in-depth knowledge of medicine, psychology, and behavior change entitled "Improved treatment of coronary heart disease by implementation of a Cardiac Hospitalization Atherosclerosis Management Program (CHAMP)". But, this study finding went in contrary with **Kennedy, Martin and Duffy, (2019),** who reported that nurses' practice in the absence of an established model to predict the IHD outcomes consider a risk factor like the other modified a non modified risk factor, entitled "Advanced practice nursing in the care of older adults".

Part VI: Patients' outcomes

The study findings stated that, the LOS at the ICU of the studied patients was ≤ 5 days with a mean (8.86+ 3.848) and suffering from complications: arrhythmias, hypotension and cardiac arrest. Even though the minority of studied patients only fifteen had readmission rate within the first 6 months after discharge with mortality rate 1.25% among the studied patients with IHD this findings might be may due to the high quality level of practice, the polices followed and the well-equipped ICUs. Beside, the trend of MEWS that calculated by the nurses paying extra attention for the studied patients at high risk for complications as revealed that about less than one quadrant of them was at the high score of ≥ 5 and more than the half of them was at the median score of 2-4, meticulous discharge plan and the outpatient follow up in the selected setting of this study. All together shape the accepted outcomes for the sake of the patients' wellbeing. This study finding was inconsistent with **Wiley et al., (2018),** who mentioned that, a total of 830 patients, less than two third of them men with mean age 73 ± 13 years. Multi-morbidity was common, with an average of 6.6 ± 2.4 comorbid conditions with sex-based differences in prevalence of 4 of 10 conditions. Within 30 days of initial hospitalization, less than one third of them were readmitted for any reason. Greater multi-morbidity was associated with increasing readmission (4%–44% for those with 0–1 to 8–9 morbid conditions; adjusted odds ratio, 1.25; 95% confidence interval, 1.13–1.38) for each additional condition.

Conclusion

On the light of the current study results, it can be concluded that, Majority of the studied patients and nurses had satisfactory level of knowledge regarding IHD. In addition the majority of the studied nurses had satisfactory level of knowledge and practice regarding caring of patients with IHD in ICU. There was statistically significant correlation between patients' demographic characteristics and nurses' demographic characteristics regarding the studied patients' outcomes except with mortality rate for nurses. Moreover there was statistically significant correlation between total patients' knowledge, total nurses' knowkedge and practice and the studied patients' outcomes except with mortality rate. Finally there was statistically significant correlation between psychological, beliefs, health care system and medical team regarding the studied patients' outcomes except with mortality rate.

Recommendations

Based upon the results of the current study, the following recommendations were suggested:

❖ Conducting educational programs for patients with IHD for improving their knowledge regarding disease management, taking into consideration the psychological and beliefs related factors among such group of patients to enhance their outcomes.

❖ Conducting in service training programs for the nurses caring for patients with IHD to improve their performance (knowledge and practice) which consider a mile stone issue affecting the patients' outcomes.

❖ Further studies are recommended to study the other factors affecting the outcomes of patients with IHD in ICUs to be taken in

consideration when providing care for such group of patients.

❖ Using MEWS for all critically ill especially patients with IHD as a tool reflecting patients' outcomes as a consequence of nursing care provided for such group of patients at all different hospitals standing in Egypt.

❖ Replication of this study using large probability sample and different setting to generalize the study

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