Editors Committee

Risk factors of Cardiac Arrest Among Critically Ill Patients At Intensive Care Units

Asmaa Badry Hassan[1], Mona Aly Mohammed[2], Amal Esmaeil Abd El-Hafez[3]
[1].Clinical Nurse Specialist at Assuit Urology Hospital University, Egypt.
[2].Assissant Professor of Critical Care Nursing, Faculty of Nursing, Assuit University, Egypt.
[3].Lectuer of Critical Care Nursing, Faculty of Nursing, Assuit University, Egypt.

Abstract
Risk factor of cardiac arrest among ill patient has as a risk factors for sudden death, through cardiac arrhythmias, tension pneumothorax ,shock, hypoglycemia ,Myocardial infarction (MI), pulmonary embolism, or edema ,hypothermia and drug toxins, At Assuit University Hospital major risk factor of cardiac arrest as diabetic ketoacidosis **Subjects and Method:** Study was executed in the following: Coronary, Trauma, post, Elraghy ,and General intensive care units. The study sample consisted of all patients predisposing to cardiac arrest admitted to intensive care units within 6 months period. Three tools were utilized for data collection: tool (one):"Patient's characteristics and clinical data ", tool (two): "cardiac arrest patient tool (three) Risk factor of cardiac arrest . **Results:** Major risk factor for cardiac arrest patients among critically ill in the above mentioned setting at Assuit Hospital was 130 patients who predisposing for cardiac arrest. About (18.5%) with diabetic keto acidosis, and (17.7%) with chronic obstructive pulmonary disease .were expose to cardiac arrest **Conclusion:** Risk factors of cardiac arrest have been identified as(diabetic keto acidosis ,is most common certified in tables to help predict the cardiac arrest by alerting a clinical response **Recommendations:** Monitoring risk factors for cardiac arrest should be required to allow for the early detection and management.

Keywords :Risk Factors ,Cardiac Arrest & Critically Ill Patients.

Introduction
A cardiac arrest also named a cardiopulmonary arrest and refer to an ineffective in blood circulation due to failure of the heart to effective pumping of blood, there many possible causes for Sudden Cardiac Arrest, include coronary heart disease ,physical stress and sometimes there is no known cause for Sudden Cardiac Arrest**.(Benjamin EJ,2010)**

In 2013James A. published by Elsevier science inc .at Journal of the American college of cardiology at 2014 ,which said in this study that the regional myocardial sympathetic denervation predicts the majority risk factor of sudden cardiac arrest especially with ischemic cardio myopathy**(j Am collcardiol2014) ;by Americancardiology foundation** .

In 2012 Robert said that, Epilepsy is a risk factor for sudden cardiac arrest in the general population .the most prevalent risk of cardiac arrest duo to ventricular fibrillation ,so sudden cardiac arrest may contribute to the increase incidence of cardiac arrest in people with epilepsy by determining the risk among people in a community based study.

In 1999 Michael S. applied study to detect the risk factor of cardiac arrest ,because coronary heart disease is leading cardiac arrest so, cause of death in the industrialized world.

Cardiac arrest it one of the most high risk situations which requires urgent ,immediate and deliberate action to survive and protect life which prevents from irreparable and irrecoverable complication s of the body vital systems**.(Merchant RM,2011)**

Cardiac arrest has been implicated as a risk factors for sudden death, through cardiac arrhythmias, tension pneumothorax ,shock, hypoglycemia ,Myocardial infarction (MI), pulmonary embolism, or edema ,hypothermia, drug toxins, anesthesia and depression**.(Sodhi K, ,2011)**

The major risk factors of cardiac arrest is represented by Chronic Heart Disease ,which is often the results of some chronic disease such as ,hypertension , Diabetes Mellitus(DM), and hypercholesterolemia, Ischemic heart disease (IHD) ,is leading to causes of death worldwide and the only cardiac arrest is responsible for about 60%of death from ischemic heart disease **.(Wang A ,2016)**

A key aim of triage is to identify those, with high risk of cardiac arrest, as they require intensive monitoring ,resuscitation facilities, and early intervention, so critically ill patients presenting to the emergency department**(Nolan,2013)**

Finally, the major risk factor for cardiac arrest among critically ill. patients is coronary heart disease, most of people who have cardio pulmonary arrest some have degree of coronary heart disease however many people may not know that they have coronary disease until cardio pulmonary arrest occurs. Usually their signs (silent) or symptoms .so we.should know that the cardio pulmonary arrest very danger, and important to identify **(Abella B,2010)**

Without medical attention ,the person will be die within a few minutes so, people are less likely to die if they have early defibrillation .you should give cardiopulmonary resuscitation (CPR) to a person having high risk for Cardiac Arrest until defibrillation can be done**.**
(Benjeamin E,2015)

Significance of the Study
Risk factor of cardiac arrest (CA) is a leading cause of death among adults over the age of 40 in the united states (USA) alone, approximately 325.200 people of all ages experience Emergency Medical Services (EMS) -assessed out of hospital non-traumatic sudden cardiac death each year and nine out of victims die.So that, (Sudden Cardiac Arrest) for more than 350.000 deaths in the(**United State Association .Death** from cardiovascular disease have declined markedly overthe past several decades .about 450,000 Americans die from risk factor of sudden death each year ,and most never have any symptoms of a heart problems ,men are especially at risk for cardiac death because cardiac disease tends to develop earlier in men ,cardiac disease A major risk for cardiac arrest(**Mark J,2010**)
This study will be the first to identify the risk factors of cardio pulmonary arrest at Assuit - university.

Aim Of The Study
Identify risk factors of cardiac arrest among critically ill patients at intensive care units.
Subjects and methods
Research design
Descriptive research design, was used to identify predisposing factors related to cardiac arrest for critically ill patients , at assuit hospital university.
Setting
Study was executed at Five units: at General Intensive Care Unit ,Post Intensive Care Unit,**,** Coronary Intensive Care Unit , Trauma Intensive Care Unit**,** Elraghy Intensive Care Unit at Assuit university hospitals..
Subjects
The subject of study includes (130 patients) diagnosed with cardiac arrest were included in this study for 6 consecutive months**.**
Inclusion Criteria
All patients exposed to cardiac arrest aged between 18-80 years old were included in the study.
Exclusion Criteria
• Pregnancy
• Brain death
• Depression
• cancer

Tools
Tool one : patient characteristics and clinical data tool
To identify level and risk factors associated with the occurrence of cardiac arrest among critically ill patients
Tools were developed by the researcher after review related to literature **(Karges, 2014)**
Part I: patients profile and clinical data:
such as patient's age, sex, martial statues ,occupation, date of admission ,discharge ,history of operation and diagnosis. In addition to history of past medical and surgical problems, duration of (ICU) stay, dead or survived.
Part II: criteria of cardiac arrest:
Part contain the time and duration of cardiac arrest.
Tool Two":cardiac arrest assessment sheet:
Part I:Assessment the risk factor of cardiac arrest:
Diabetic disease
(hyperglycemia ,hypoglycemia ,diabetic keto acidosis)
Cardio Vascular Disease
(myocardial infarction, hypertensive crisis, associated with chronic obstructive pulmonary disease).
Disturbed of conscious level
Motor Car Accident
Part II: Hemodynamic monitoring and Medication.
This part included: heart rates, pulse, respiratory rate, temperature, systole blood pressure, diastole blood pressure ,central venous pressure
For medication : issued to assess type of medications given during their staying in ICU such as (doses ,routs ,duration).
Part III: Laboratory investigation
This part include, Electrocardiogram (ECG) reading, cardiac cauterization results, and, Arterial blood gases, (ABG) results, complete blood picture(CBC) ,Electrolytes as ,K+, Ca+, and, Na+ ,and Echocardiography (Echo) results.
Methods
Preparatory phase
An official permission obtained from dean of the faculty of nursing and head of five intensive care units Coronary Intensive , Trauma Intensive Care Unit and Post -Intensive care unit, General Intensive Care Unit, and Elraghy Intensive Care Unit.
Tools were tested for content validity was established by panel of 3 expertise's from critical nursing staff from Assuit University who reviewed the tools of data collection for clarity ,relevance understanding , and easiness .

A pilot study

was carried out on 10% from sample(13 patients) included in study subjects to assess the clarity, feasibility and applicability of the tool .

Data were collected from five intensive units at Assiut university hospital during the period from July 2017-to November 2017,for two day every week to followed patients that arrest among intensive unit .

Ethical consideration

- Research proposal been approved from the ethical committee in the faculty of nursing
- No risk for the study subject during application of research
- The study could follow ethical 1 principles in research
- Informed consent would took from patients and family participating study after explaining the aim of the study

- patient would be assured that data of this research will not be refused without second permission .
- Confidentiality and anonymity would be assured.

Implementation phase

According to diagnosis of risk factors and criteria **(Time and Duration)**of cardiac arrest were assessed related time of cardiac arrest and duration using (tool 1and part).

Follow laboratory investigation that were done to patient during cardiac arrest, and monitor any drugs given to patients such as sodium bicarbonate, magnesium caliphate.(tool two and part 4)

Statistical analysis

The data entry and analysis were done using SPSS version 19 .Data were presented as number , percentage, mean, standard deviation descriptive test was used to when **p<0.05.**

Results

Part 1: socio demographic characteristics of patients.

Table (1): characteristics data of the studied patients regarding socio demographic data

	No. (n= 130)	%
Age: (years)		
< 40	61	46.9
40 – 50	33	25.4
> 50	36	27.7
Mean ± SD (Range)	42.97 ± 13.46 (19.0 – 80.0)	
Sex:		
Male	74	56.9
Female	56	43.1
Marital status:		
Single	21	16.2
Married	109	83.8
Occupation:		
Farmer	20	15.4
Employee	54	41.5
Skilled worker	17	13.1
Housewife	39	30.0

Table (2): Complete blood counts results among Risk factor cardiac arrest patients

	Mean ± SD	Range
WBCs	10.97 ± 4.61	4.1 - 21.7
RBCs	3.81 ± 1.00	2.1 - 9.3
Platelets	122.41 ± 38.77	60.1 - 292.0

Table (3): Distribution of the cardiac arrest patients regarding to majority of Risk factors.

Risk factors	No. (n= 130)	%
Endocrine system **- diabetic keto acidosis(DKA)** **- hypoglycemia**	24 11	18.5 8.5
Motor Car Accidents	13	10.3
Disturbance Conscious Level	22	16.9
Hepatitis C Virus	**16**	12.3
Hepatitis B Virus	6	4.6
Renal Failure	10	7.7
Hypovolemic shock	14	10.8
Hypertensive crisis	16	12.3
Ischemic heart disease (IHD)	8	6.2
Unstable angina	7	5.4
Open heart	7	5.4
Myocardial Infraction	4	3.1
Chronic obstructive Pulmonary Disease (COPD)	23	17.7
Pneumonia	3	2.3
Pulmonary edema	5	3.8

Table (4): Serum electrolytes results of major risk factor of cardiac arrest patients:

Serum electrolytes	Mean ± SD	Range
Serum albumin	1.87 ± 0.58	1.0 - 3.2
Potassium(K+)	2.00 ± 0.88	0.9 - 5.5
sodium (Na+)	127.69 ± 19.91	100.0 - 200.0
Calcium(Ca+)	2.27 ± 0.86	1.1 - 6.7
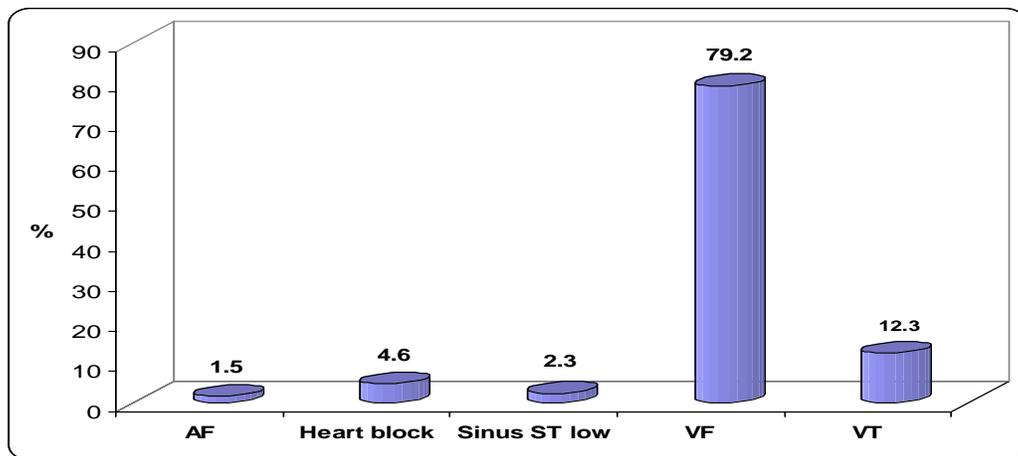
Figure (1): Percentage distribution of studied sample according to electrocardiography(ECG) reading of risk factor of cardiac arrest.

Table (1): Shows that (56.9%)of the cardiac arrest patients were male, their(46.%9) age less than 40 years and(83.8%)of cardiac arrest patients were married and were working(41.5%).

Table(2): Shows the complete blood count of cardiac arrest patients related to of (White Blood Cells ,Red Blood Cells ,platelets   as mean +SD were (10.97+4.61), (3.81+1.00) and,(122.41+38.77).

Table (3): Illustrates that were a high statically significance difference in (UA),(HCV,HBV),for diagnosis of majority of risk factors cardiac arrest patients with p-value (0.044*), (0.006*),(0.033*) respectively. Also   illustrates that (18.5%) of patients cardiac arrest diagnosed as majority of risk factors   with diabetic keto acidosis(DKA),Also (2.3%) of cardiac arrest patients diagnosed with pneumonia.

Table (4): Shows that (55.4%)of cardiac arrest patients were diagnosed with metabolic acidosis, (43.1%) with respiratory acidosis, and (1.5%) with metabolic alkalosis.

Figure (1): This table shows that the serum electrolytes of patients of cardiac arrest related to(liver albumin , K+, Ca+ ,Na+ ,and as were Mean + SD) , (1.87+0.58) , (2.00+0.88) , (127.69+19.91) , (127.69+19.91) respectively

Discussion

The result of this study explored that major risk factor of Cardiac Arrest among critically ill patients at Assuit University Hospital over six months period were 130 patients .

In the same line, **(Hulleman, et al., 2012)** who revealed that the survival rate until discharge of 43% of emergency medical services treated In-hospital cardiac arrest(IHCA) patients is feasible in an optimized chain of survival .

Regarding to the demographic data ,more than the studied patients were males, The common percent of the studied sample age less than 40, married, and were working.

Study finding was in the same line with a study conducted by **(Shiller et al., 2012)** who revealed that, the number of males who high risk for Cardiac Arrest was higher than women, there is a possible explanation for pervious history for heavy smoking.

(Myerburg, et al., 2015) in the same line with the current study found , The majority of SCDs occur in adult population, with occurrence <1%in young aged <35 years, the infinite rate of SCD augments noticeably with age; however, proportion of deaths are sudden seems to be higher in younger age groups, This is related to undiscovered heart defects or overlooked heart abnormalities .

As regard previous history ,the present study manipulated that the majority of high risk the studied sample have their history of Hypertension, then history of patient with respiratory disease ,and history of hyperglycemia, this not supported by **(Thygesen, et al., 2015)** that revealed to Acute coronary disease is known to be the most common pathology underlying SCD, followed by cardiomyopathies, and valvular heart disease.

The present study , was found that the highest percentage of major risk for cardiac arrest patients diagnosed with (Diabetic Keto acidosis)This supported by **(Karge, et al., 2014)** who mentioned that type 2 of diabetes has a third risk factor of death among more causes that lead to death at worldwide.

On the contrary,**(Nowrouzi-kia, et al., 2017)** who found a significance statistical relationship between CA and the number of hours worked/week occupation types (hard, accidental work).

As regarded cardiac arrest Patient outcomes according to diagnosis the present study illustrates that were a high statically significance difference with (Unstable angina)(HCV and HBV), This is due to high incidence rate of disease among Egyptian patients**(Travers, 2010)**.

In the same line**, (Benjamin, et al., 2010)** found the most common cause for death among critical ill patients is (ACS),in which unstable angina a type that predisposing to CA ,remains a lethal complication of ,sudden or reduced blood flow to the heart as myocardial infarction(MI).

In the contrary, **(Kern, et al., 2010)** mentioned that brain injury is the primary cause of death for patients treated in an intensive care unit In-hospital cardiac arrest (CA).

On the contrary, **(Henvik et al., 2015)** who estimated that initial EGG findings are not reliable in detecting patients with an indication for IGA after experiencing a cardiac arrest. Even in the absence of EGG changes indicating. myocardial ischemia, an acute culprit lesion may be present and patients may benefit from emergent revascularization.

Be caution and alarm for the prevailing risk factors existing in our society and the message should be disseminated to all through social media so that the community and individuals can be aware of the strategies to maintain a disease free and healthy livelihood**(Kumar, et al., 2015).**

Finally, when identify and investigated the risk factors of cardiac arrest will enhance increase survival rate of cardiac death**(Woods,2012).**

Conclusion

The present study concluded that; the incidence of survival post cardiac arrest among critically ill patients at Assuit University Hospital over six month was more than half of percentage . Hypertension ,respiratory disease and hyperglycemia were the major risk factor for Cardiac arrest

Recommendation

The study recommended that:-

1. Nurse should monitor the risk patients for cardiac arrest as early as possible for early detection and management.
2. Nurses must receive adequate knowledge about warring signs and symptoms of cardiac arrest for early detection and management.
3. Nurse should receive and train (ADLS)to know about basic to learn to how to deal with urgent situation advanced life support .

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