# Efficiency of nursing action in reduction of early deaths among patients referred to coronary care unit in Al-Saddr Teaching Hospital in Najaf, Iraq

**Dr. Abdul Kareem A. maahmood; college of nursing - university of kufa**
**Dr. Dergham Majeed Hameed; College of nursing - university of kufa**
**Dr. Maahmood Zaidan; Department of medicine, directorate of health in Al Najaf**

## كفاءة الخدمات التمريضية في خفض الوفيات المبكر لدى المرضى المحالين إلى ردهات إنعاش القلب في مستشفى الصدر التعليمي في مدينة النجف الاشرف

ا. د. عبد الكريم عبد الله محمود قسم تمريض صحة المجتمع كلية التمريض جامعة الكوفة.
د.ضرغام مجيد حميد قسم التمريض الباطني جراحي كلية التمريض جامعة الكوفة.
د. محمد زيدان طبيب اختصاص باطنية / دائرة صحة النجف الاشرف.

### الخلاصة

ان احتشـاء العضـلة القلبيـة هـو مـن أمـراض شـرايين القلب المميتـة. وتحتـاج هـذه الأمـراض إلـى التـدخل الطبـي التمريضي السريع قبل وبعد الوصول إلى المستشفى. ولا تزال منهـا عاليـة في المستشفيات مـن عـدم انتظـام القلب بشكل رئيسي.

**الهدف:** تهـدف الدراسـة إلـى بيـان أهميـة الخدمات التمريضية وكفاءتهـا فـي خفض الوفيـات المبكـر مـن متلازمـة الشرايين الإكليلية وحتشاء العضلة القلبية بشكل خاص.

**الطريقـة:** تم أجـراء دراسـة المقطـع العرضـي اختيـار عينـة مناسبـة مـن ٤٩٣ مريض مصابين بـأمراض الشرايين التاجية للقلب المحالين إلى مستشفى الصدر التعليمي في النجف الاشرف منهم ١٨٣ مصاب باحتشـاء العضـلة القلبيـة للفترة من الأول مـن كـانون الثـاني ٢٠٠٩ واغايـة الثلاثين من حزيران ٢٠٠٩. وقد تم حسـاب معدل ألاماتـه من المرضى (الوفيات المبكرة من المرضى الحالين) ومقارنتها مع معدلات الإماتة لدراسة تجريبية أجراها فريق العمل في عام ٢٠٠٨.

**النتائج:** ان معدل الإماتة ( نسبة الوفيات من مجموع المرضى الحالين) من المصابين باحتشاء العضلة القلبية بتوفر الخدمات التمريضية كـان ٧.٧% فـي الدراسـة الحاليـة مقارنـة بمعدل الإماتـة ١٩.٢% فـي الدراسـة التجريبيـة لعـام ٢٠٠٨ بفرق معنوي ( P > ٠.٠٥ ).

**الاستنتاجات:** ان تقديم الخدمات التمريضية خـلال التدخل السريع لمرضـى احتشـاء العضـلة القلبيـة الحـاد كانت لـه علاقة بانخفاض معنوي في نسبة الوفيات من المرض.-

### Abstract

**Introduction:** Myocardial infarction is one of most serious fatal disease of the acute coronary syndromes .These disease necessitate a rapid medical and nursing intervention both before and after hospital arrival. Deaths rate from the disease is still high in hospitals of the Najaf governorate mainly from fatal arrhythmias .

**Objective**: to verify the association between the provision of nursing services and reduction of mortality from acute coronary syndromes especially myocardial infarction.

**Design:** comparable cross sectional study.

**Methods**: A convenient sample of 493 patients with acute coronary syndrome referred to Al Sadder Hospital in Najaf from which 183 patients had diagnostic criteria of acute ST elevation myocardial infarction (SEMI) during the period from 1st January 2009 and 30th June 2009. The case fatality rate from STEMI of study sample was compared with

mortality rate in a previous study (test) conducted during the last four months of the year 2008. The death rate was compared in relation to the presence or absence of nurse contact at admission to hospital during the first 24 hours.
**Results:** The case fatality rate was 7.7% for patients with STEMI in the proper study (retet) period versus 19.2% among patients of the same disease in the previous study (test) (P<0.05). This death rate was associated with provision nursing actions for 53% of patients in the current study (retest) versus 35.8% for the comparable study (P<0.05)..
**Conclusion:** The provision of qualified nursing services through the rapid intervention to patients with acute MI   was associated with significant reduction in mortality.

<u>**Introduction**</u>

Cardiac nursing is an important service to be provided in the coronary care units and emergency department (1).There are shortage in nursing staff of the hospitals in Najaf especially for serving the patients with acute ischemic heart diseases refereed to such hospital. A **coronary care unit** (CCU) is a hospital ward specialized in the care of patients with heart attacks, unstable angina and (in practice) various other cardiac conditions that require continuous monitoring and treatment. Acute coronary care units (ACCU), also called "critical coronary care units" (CCCU) is equivalent to intensive care in the level of service provided. Patients with acute myocardial infarction, cardiogenic shock, or post-operative "open-heart" patients commonly abide here (2, 3, and 4).

**There is one CCU** in Al Saddr Learning Hospital in Najaf .it is the main specific cardiac unit in addition to the intensive care unit established inside the causality department in the same hospital.    CCU is a 10 bed Coronary Care Unit, designed for critically ill adult patients requiring continuous nursing and medical care (5, 6).

There are approximately 90 admissions per month on the CCU, averaging 3 to 4 patient admissions/transfers per 24 hour period. The most frequently encountered medical diagnoses in the CCU include: rule out myocardial infarction, unstable angina, acute myocardial infarction, congestive heart failure, and arrhythmias (ventricular tachycardia, atrial fibrillation/flutter, paroxysmal supraventricular tachycardia, etc.)(7, 8, 9)

The main feature of coronary care is the availability of telemetry or the continuous monitoring of the cardiac rhythm by electrocardiography. This allows early intervention with medication, cardioversion or defibrillation, improving the prognosis (10). As arrhythmias are relatively common in this group, patients with myocardial infarction or unstable angina are routinely admitted to the coronary care unit. For other indications, such as atrial fibrillation, a specific indication is generally necessary, while for others, such as heart block, coronary care unit admission is standard.

**Special procedures performed in the CCU include, but are not limited to:** invasive homodynamic monitoring,    artificial cardiac pacing (transvenous and transcutaneous), electrical cardioversion/defibrillation, bedside echocardiography, intubation and mechanical ventilation, thrombolytic drug administration, antiarrhythmic and vasopressor drug therapy, hemodialysis/ultrafiltration therapies.

A large proportion of deaths from the acute coronary syndrome occur before arriving hospital and the other due to delay and inappropriate nursing and management (11, 12, and 13.)

The aim of the study was; to verify the association between presence of nursing services and reduction in death rate among patients with acute coronary syndromes during the first 24 hours of referral to CCU in Al – Sadder Teaching Hospital in Najaf.

## Materials And Methods

The study included all convenient patients with acute coronary diseases .referred to coronary care unit at Al Sadder Teaching Hospital during the period of January 1st to June 30th, 2009.

A convenient sample of 439 patients who met the criteria of only 183 patients were diagnosed to have ST elevation myocardial infarction (STEMI), and the other were free of ST elevation myocardial infarction (NON-STEMI) to study the death rate among those patients with acute MI. we evaluated the relation between nursing care and mortality among elderly patients after myocardial infarction by assessing the age distribution of the patients.

Diagnostic criteria: WHO criteria(WHO WEB SITE) formulated in 1979 have classically been used to diagnose MI; a patient is diagnosed with myocardial infarction if two (probable) or three (definite) of the following criteria are satisfied: Clinical history of ischemic type chest pain lasting for more than 20 minutes, Changes in serial ECG tracings, and Rise and fall of serum cardiac biomarkers such as creative kinase-MB fraction and troponin.

The WHO criteria were refined in 2000 to give more prominence to cardiac biomarkers (14). According to the new guidelines, a cardiac troponin rise accompanied by either typical symptoms, pathological Q waves, ST elevation or depression or coronary intervention are diagnostic of MI . The 12 lead ECG is used to classify patients into one of three groups: [58] those with ST segment elevation or new bundle branch block (suspicious for acute injury and a possible candidate for acute reperfusion therapy with thrombolytics or primary PCI), Clinically, myocardial infarction is further subclassified into ST elevation MI verses non ST elevation MI based on ECG changes (15, 16, 17). Those with ST segment depression or T wave inversion (suspicious for ischemia), and those with a so-called non-diagnostic or normal ECG, and sometime a normal ECG does not rule out acute myocardial infarction.

The results were compared with the data collected through a previous study (test) conducted from the period of September 1st to December 31st, 2008 at the same hospital for patients same criteria of acute coronary syndromes to compare the death rate from such diseases in the two groups regarding presence or absence of nurses at time of patient arrival to the hospital. . The main feature of coronary care is the availability of telemetry or the continuous monitoring of the cardiac rhythm by electrocardiography. This allows early intervention with medication, cardioversion or defibrillation, improving the prognosis. As arrhythmias are relatively common in this group, patients with myocardial infarction or unstable angina are routinely admitted to the coronary care unit. For other indications, such as atrial fibrillation, a specific indication is generally necessary, while for others, such as heart block, coronary care unit admission is standard(18,19).

The nursing services provided to the critical cardiac patients included the following procedures under supervision of the physician on call: invasive homodynamic monitoring, artificial cardiac pacing (transvenous and transcutaneous), electrical cardioversion/defibrillation, bedside echocardiography, intubation and mechanical ventilation, thrombolytic drug administration

The nursing actions were classified into pre-nursing care, technical skills, and post-nursing care according to the categories below:

**Pre-nursing care:** Prepared room, prepared bed, and prepared equipments.

**Technical skills:** Respects the state of hygiene and asepsis, follows scientific principles, principles of drug administration, wash hands and protect patient, and properly use the defibrillator.

**Post nursing care:** makes the patient comfortable, clean and tidy equipments, transmit patient information, reports verbally and in written, precise, concise, and pertinent observations.

## Nursing Interventions:

1. Monitor continuous ECG to watch for life threatening arrhythmias (common within 24 hours after infarctions) and evolution of the MI (changes in ST segments and T waves). Be alert for any type of premature ventricular beats-these may herald ventricular fibrillation or ventricular tachycardia.
2. Monitor baseline vital signs before and 10 to 15 minutes after administering drugs. Also monitor blood pressure continuously when giving nitroglycerin I.V.
3. Handle the patient carefully while providing care, starting I.V. infusion, obtaining baseline vital signs, and attaching electrodes for continuous ECG monitoring.
4. Reassure the patient that pain relief is a priority, and administer analgesics promptly. Place the patient in supine position during administration to minimize hypotension.
5. Emphasize the importance of reporting any chest pain, discomfort, or epigastric distress without delay.
6. Explain equipment, procedures, and need for frequent assessment to the patient and significant others to reduce anxiety associated with facility environment.
7. Promote rest with early gradual increase in mobilization to prevent deconditioning, which occurs during bed rest.
8. Take measures to prevent bleeding if patient is thrombolitic therapy
9. Be alert to signs and symptoms of sleep deprivation such as irritability, disorientation, hallucinations, diminished pain tolerance, and aggressiveness.
10. Tell the patient that sexual relations may be resumed on advise of health care provider, usually after exercise tolerance is assessed.

The frequency of relevant risk factors for acute coronary syndromes had been compared between the previous study (test) and the appropriate study (retest) to exclude their effects on the mortality from the STEMI disease. These risk factors included; hypertension, Diabetes Mellitus, hypercholesterolemia. smoking, obesity and frequency of physical activity per week. Ambulatory care after acute myocardial infarction can identify related complications, such as chest pain or depression, and promote appropriate therapies for the prevention of recurrent myocardial infarction. High quality ambulatory care can also reduce or prevent complications of coexisting illnesses, such as diabetes mellitus (14, 15, and 20).

**Statistical analysis:**

Chi-square had been applied to test the categorical association at level of significance ($\leq 0.05$) in addition to expression of regression of death in both previous study (test) and the proper study (retest) to describe the reduction of death frequency in early 24 hours of referral to CCU. The SPSS program (version 17) had been used in statistical analysis.

**Results**

In this study 493 cardiac cases referred to CCU in al Sadder Teaching Hospital in Najaf, from January 1st 2009 to June 30th 2009. the mean age ($\pm$ SE) was (57.4 $\pm$ 5.6) for males and (62$\pm$ 10.2) for females .the higher proportion of the patients was in age group of 51-60 years. There was no significant difference in distribution of cases by age and gender (Table 1).

There was no significant difference (P>0.05) in the distribution of cases by months of the year among those with acute myocardial infarction and critical cardiac cases (Table2). More than half of the patients in the two samples were smokers n addition to other risk factors. The previous study (test) and proper study (retest) showed no significant difference in the presence of some risk factors (P>0.05).about 48% of patient in the proper study (retest) and 36% in the previous study (test) were hypertensive. These risk factors included; previous MI, hypertension, diabetes mellitus, hyperlipidemia, and smoking experience. (Table 3).These risk factors were investigated to exclude there effect on the difference of mortality rates in the previous study (test) and proper study (retest).

The distribution of patients by their educational levels showed no significant difference in both groups f the studies. About half of them had no educational qualification (Table 4).

It was found that 79(43.2%) of patients with ST elevation myocardial infarction had received pre-nursing actions, 98 patients (53.6%) received technical skills including the application of defibrillator , and 114 patients (62.3%) received post – nursing care precise, concise ,and pertinent observations. There was no significant difference in nursing actions provided for patients with STEMI and other admitted cardiac cases (Table 5).

Table 6 showed that 93 (50.8%) of the patients with STEMI had 1-3 pain frequency. The case fatality rate during the first 24 hours of admission to CCU was 7.7% in the current proper study (retest) which was significantly different (P < 0.05) from the death rate estimated in the previous study (test) (19.2 %) during the last four months of the year 2008. (Table 7).

In Table 8; the proportion of the patients who received nursing contact during arrival to hospital was 53% in the proper study (retest) versus 35.8% the previous study (test) of 2008 with statistically significant difference (P < 0.05)    (Table 9) .Most of the patients arrived hospital within 120 minutes (Table10), and more than two third of early death within 24 hours was found to be from ventricular fibrillation (Table 11).   There was 11.5 % reduction in the death rate among STEMI patients of current study (retest) that the death rate (case fatality rate) of the plot study conducted at the last four months of the previous year (figure 1).

There was significant difference in reduction of the death frequency among those patients who received nursing actions versus those who did not received nursing action (figure 2).The case fatality rate within the early 24 hours among referred    STEMI

patients with nurse contact was 3.1% versus 12.8 % for patients without nurse contact at referral (Figure 3).There is significant regression in mortality of patients with STEMI referred to CCU ( r=0.92) for both samples of the previous study (test) and proper study (retest) (Figure 4).

**Table 1:** Age distribution of patients with STEMI referred to CCU in Al Sadder hospital in Najaf by sex.

| Age (year) | Male | | female | | Total | |
|---|---|---|---|---|---|---|
| | N0 | % | No | % | No | % |
| ≤ 50 | 26 | 23.21429 | 10 | 14.08451 | 36 | 19.67213 |
| 51-60 | 40 | 35.71429 | 25 | 35.21127 | 65 | 35.51913 |
| 61-70 | 31 | 27.67857 | 27 | 38.02817 | 58 | 31.69399 |
| >70 | 15 | 13.39286 | 9 | 12.67606 | 24 | 13.11475 |
| Total | 112 | 100 | 71 | | 183 | 100 |

$\chi^2 = 3.33$         P = 0.34

**Table 2:** Distribution of cardiac cases referred to CCU in Al Sadder Teaching Hospital in Al-Najaf by months, 2009

| Month of admission During the study | Total cardiac cases | | Myocardial infarction (STEMI)* | |
|---|---|---|---|---|
| | No | % | No | % |
| January | 99 | 20.1 | 26 | 14.2 |
| February | 69 | 14.0 | ٢٤ | 13.1 |
| March | 86 | 17.4 | 41 | 22.4 |
| April | 88 | 17.9 | 31 | 16.9 |
| May | 73 | 14.8 | 31 | 16.9 |
| June | 78 | 15.8 | 31 | 16.4 |
| Total | 493 | 100 | 183 | 100 |

\* STEMI:  ST elevation myocardial infarction         $X^2 = 4.8$         P = 0.44

**Table 3:  Risk factors percentage among patients with STEMI referred to CCU**

| Risk factors | | Current study (retest) (2009) N = 183 | | previous study (test) (2008) N = 120 | |
|---|---|---|---|---|---|
| | | No | % | No | % |
| **Previous myocardial infarction** | | ١٥ | ٨٫٢ | ١٣ | ١٠٫٨ |
| **Hypertension** | | ٨٨ | ٤٨٫١ | ٤٣ | ٣٥٫٨ |
| **Diabetes mellitus** | | ١١ | 6.0 | ٦ | ٥ |
| **Hyperlipidemia** | | ٩٥ | ٥١٫٩ | ٧٣ | ٦٠٫٨ |
| **Smoking at time** | | ١١٥ | ٦٢٫٨ | ٨٢ | ٦٨٫٣ |
| **Physical activity** | ≤ 2 times/ week | ٩٤ | ٥١٫٤ | ٥٩ | ٤٩٫٢ |
| | >2 times /week | ٣٣ | ١٨ | ٣٤ | ٢٨٫٣ |
| | Non | ٥١ | ٢٧٫٩ | ٢٣ | ١٩٫٢ |
| | Disable | ٥ | ٢٫٧ | ٤ | ٣٫٣ |

**X² = 10.38          P = 0.24**

**Table 4  : Distribution of the patients by educational level.**

| Educational  level | Study patients | |
|---|---|---|
| | **Patients with STEMI N=183** | **Other  cardiac cases N= 310** |
| No education qualification | 81 (44.2) | 149 (48.1%) |
| Primary & intermediate | 38 (20.8) | 41 (13.2 %) |
| High school & university | 64  (35) | 120 (38.7%) |

**χ² = 4.87                P = 0.08**

**Table 5:** Affordable nursing action for patients with coronary heart diseases referred to CCU

| Provided nursing action | Target cardiac patients | | Total n= 493 |
|---|---|---|---|
| | With ST elevation N=183 | Other cardiac cases N=310 | |
| **Pre-nursing care:** Prepared room, Prepared bed, and prepared equipments | 79 (43.2%) | 108 (33.2%) | 187 (37.9) |
| **Technical skills:** Respects the state of hygiene and asepsis, Follows scientific principles, Principles of drug administration, Wash hands and protect patient, and Properly use the defibrillator | 98 (53.6%) | 133 (42.9%) | 231 (46.9%) |
| **Post nursing care:** Makes the patient comfortable, Clean and tidy equipments, Transmit patient information, Reports verbally and in written, Precise, concise, pertinent observations | 114 (62.3%) | 189 (61%) | 303 (61.5%) |

٣  P = 1.6 ٤٤ 0. = $\chi^2$

**Table 6:** Frequency of pain symptoms in addition to chest pain among patients with STEMI

| Pain No. | patients | % |
|---|---|---|
| None | ٤٦ | 25,1 |
| ٣-١ | ٩٣ | 50.8 |
| 4-8 | 44 | 24.1 |
| Total | ١٨٣ | ١٠٠ |

Table 7:  Early death rate among M I patients refereed to CCU

| Group | patients | Deaths | Case fatality rate (%) (within first 24 hours) |
|---|---|---|---|
| Current study (retest) Jan-June 2009 | 183 | 14 | 7.7 |
| previous study (test) Sept-Dec.2008 | 120 | 23 | 19.2 |

P<0.05

**Table 8:** proportion of patients receipt nursing contact at arrival to hospital

| Groups | patients | Presence of nurse at reception | | P value |
|---|---|---|---|---|
| | | No. | % | |
| Current study (retest) Jan-June 2009 | 183 | 97 | 53.0 | |
| Previous study (test) Sept-Dec.2008 | 120 | 43 | 35.8 | P<0.05 |

**Table 9:** Proportion of death among patients with MI referred to CCU in the current study (retest) compared with previous study (test) findings

| Groups | patients | Presence of nurse at reception | | Death rate at referral | |
|---|---|---|---|---|---|
| | | No | % | No | % |
| Current study (retest) Jan-June 2009 | 183 | 97 | 53.0 | 14 | 7.7 |
| Previous study (test) Sept-Dec.2008 | 120 | 43 | 35.8 | 23 | 19.2 |

**Table 10:** Distribution of deaths from myocardial infarction in relation to delay time (minutes) before arrival to hospital

| | Deaths During 24 hours | Delay before hospital | |
|---|---|---|---|
| | | Delay ≤ 120 minutes | Delay > 120 minutes |
| **Proper study (retest) 2009 N = 183** | 14 | 9 | 5 |
| **Previous study (test) 2008 N = 120** | 23 | 16 | 7 |

Fisher's Exact Probability Test      P = 0.71

**Table 11: The main cause of early death from acute myocardial infarction**

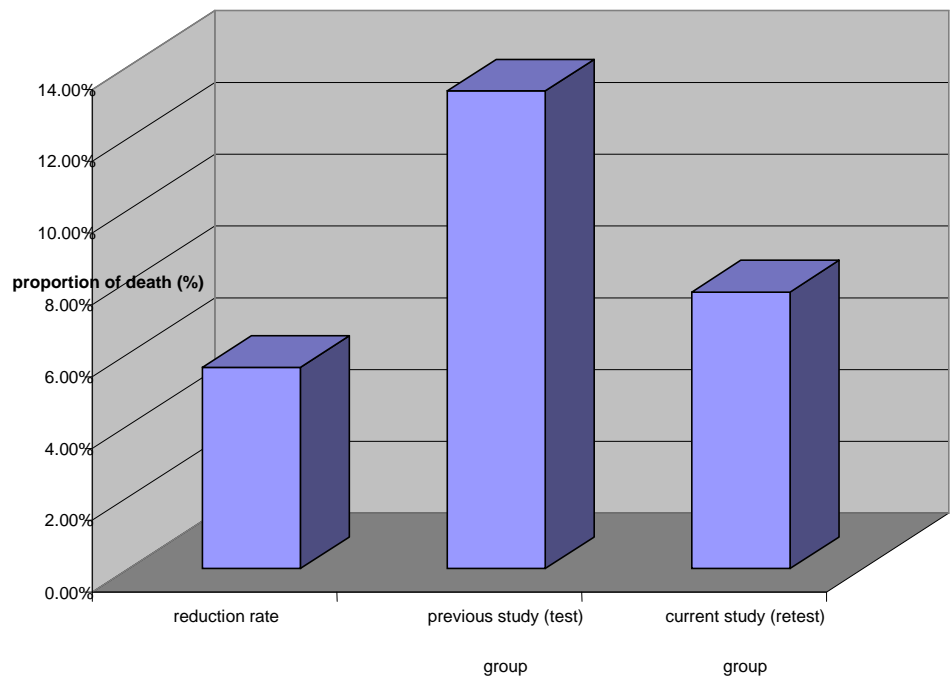| Cause of early death | Current (proper)study (retest) | | Previous (comparison) study (test) | |
|---|---|---|---|---|
| | No | % | No | % |
| Ventricular Fibrillation | 10 | 71.4 | 16 | 69.6 |
| others | 4 | 28.6 | 7 | 30.4 |
| TOTAL | 14 | 100 | 23 | 100 |

**Figure 1:** Death reduction among patients with M I referred to CCU in the previous study (test) and proper study( retest)
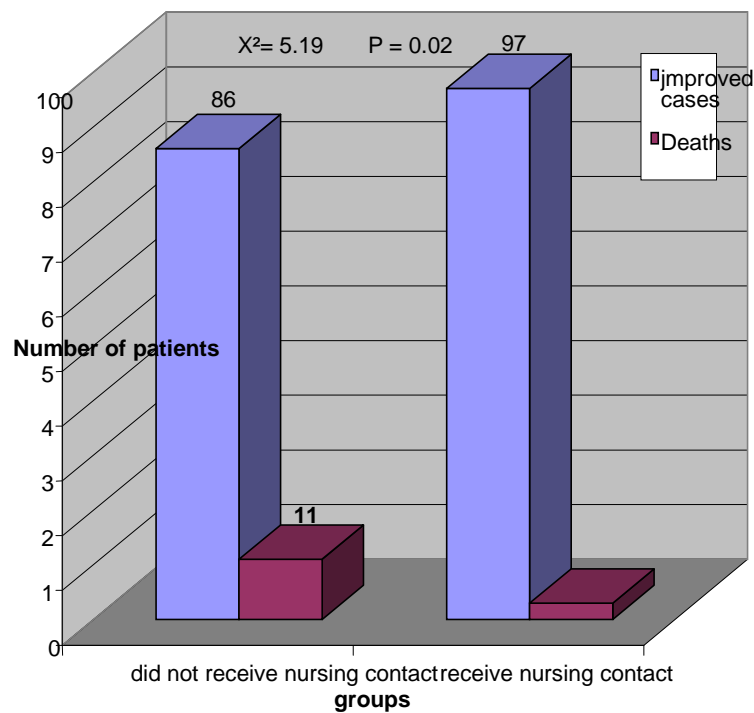


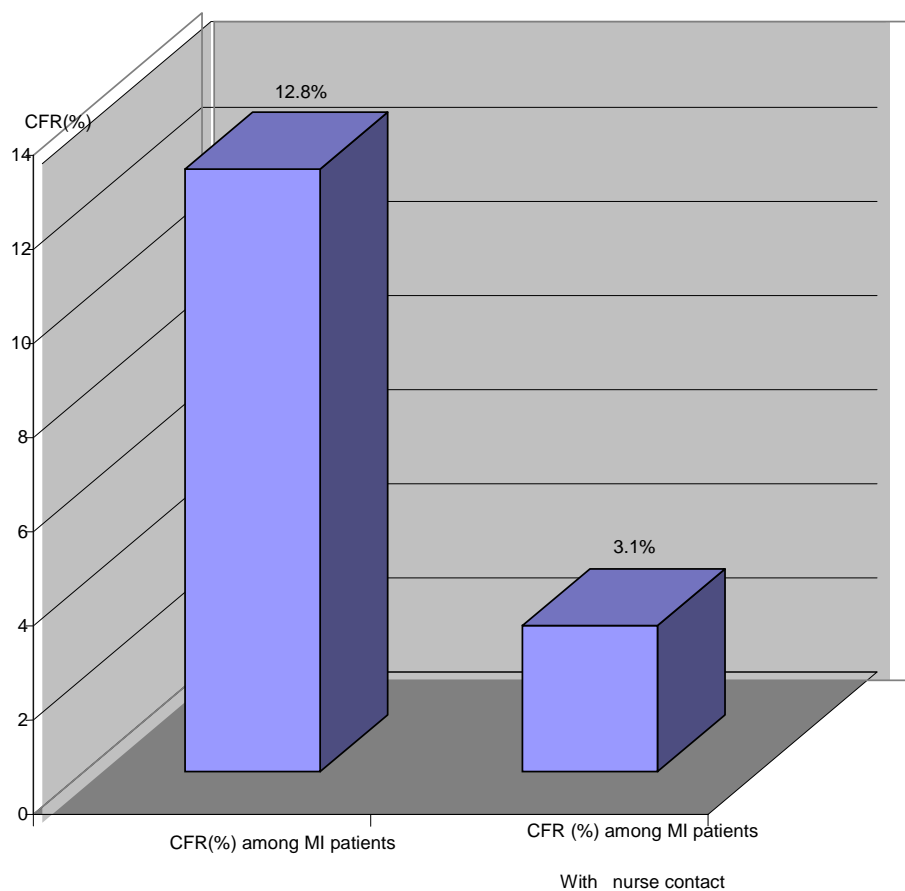**Figure 2:** frequency of Deaths among patients with STEMI (n=183) regarding presence of nursing contact

**Figure 3:** Case fatality rate (CFR) among patients with MI regarding nurse contact at referral to CCU
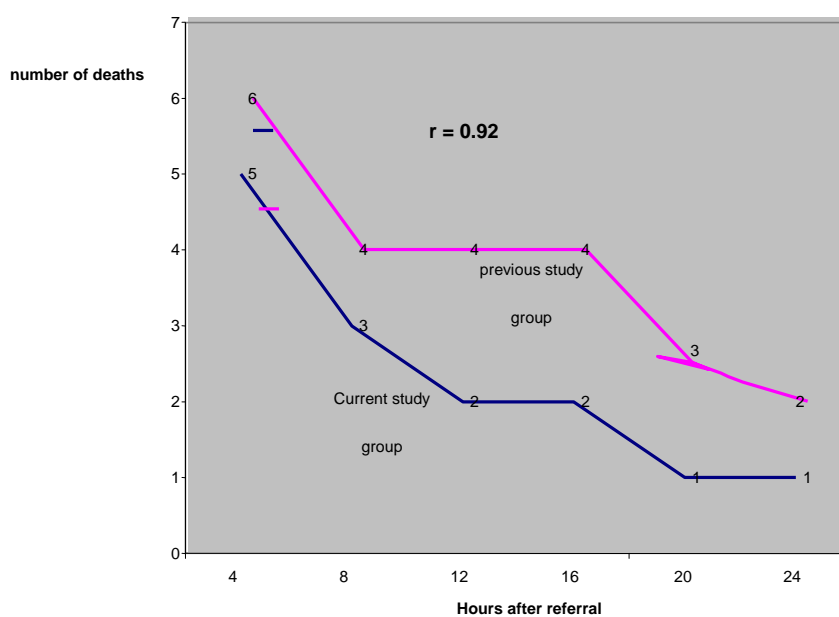


**Figure 4:** Mortality regression of patients with MI during first 24 hours of referral to CCU in previous study (test) and proper study (retest).

### DISCUSSION

The acute coronary syndromes especially myocardial infarction represent the main aspect of cardiac attacks .They are the leading cause of death for both men and women all over the world (21). Ventricular fibrillation is the main serious risk of early death during the first 24 hours of the attack onset. Important risk factors are previous cardiovascular disease (such as angina, a previous heart attack or stroke), older age (especially men over 40 and women over 50), tobacco smoking, high blood levels of certain lipids (triglycerides, low-density lipoprotein or "bad cholesterol") and low levels of high density lipoprotein (HDL, "good cholesterol"), diabetes, high blood pressure, obesity, and personality stress levels(3,4,22).

This study verified a reduction in the death rate of patients with acute coronary syndromes specially those with ST elevation myocardial infarction by estimation of case fatality rate within the first 24 hours. The reduction of this death rate was confirmed by comparing the rate calculated during the proper study (retest) (7.7%) from January to the end of June 2009 with the death rate from the same disease calculated during a previous study (test) (19.2%) conducted during last four months of the year 2008 with 11.5% reduction in death rate associated with effect of nursing contact (P<0.05).

The two samples of the studies were matched for the difference in main sociodemographic characteristics including; age , sex, educational level and presence of important risk factors for coronary diseases. The proportion of the patients received nursing actions was 53% in the current study (retest) of 2009 which significantly higher than nursing services provided to the patients of the previous study (test) sample in 2008 (35.8%) this difference had associated with the lower mortality during the early 24 hours of admission to CCU in Al Sadder Hospital in Najaf .

The were important risk factors that may contribute to early death from coronary care syndromes especially myocardial infarction such as hypertension, diabetes mellitus, hyperlipidemia and smoking (23). The proportion of these risk factors had been compared among patients with myocardial infarction in the current proper study (retest) of 2009 with that estimated in the previous study (test). The was no significant difference in proportion of risk factors between the two samples. Emphasize the effect of nursing contact rather than risk factors during the early death of the patients (24, 25). The regression of mortality was significant(r =0.92) during both samples reflected the reduction of mortality from STEMI with presence of nursing action (figure 4). The prognosis for patients with myocardial infarction varies greatly, depending on the patient, the condition itself and the given treatment (26, 27, and 28). Using simple variables which are immediately available in the emergency room, patients with a higher risk of adverse outcome can be identified. For example, one study found that 0.4% of patients with a low risk profile had died after 90 days, whereas the mortality rate in high risk patients was 21.1%, (29).

For the period 2005 - 2008 in the United States the median mortality at 30 days was 16.6% with a range from 10.9% to 24.9% depending on the hospital which one looks at (30).

The risk factors that play a role in early death from MI include age, hemodynamic parameters (such as heart failure, cardiac arrest on admission, systolic blood pressure, or Killip class of two or greater), ST-segment deviation, diabetes, serum creatinine concentration, peripheral vascular disease and elevation of cardiac markers (28.30,31).

There is evidence that case fatality of myocardial infarction has been improving over the   Automatic external defibrillation (AED).

Most of early death from acute coronary syndromes were due to  ventricular fibrillation in both previous study (test) and proper study (retest) . Since the publication of data showing that the availability of automated external defibrillators   in public places may significantly increase chances of survival, beside the availability of them at hospital. The ventricular arrhythmias can be effectively treated at delay before and after reaching hospital (30, 31). So training of nurses on management of such serious arrhythmias by medications and urgent defibrillator is a life saving way even at the delay of intervention by other medical staff who are on call.

## CONCLUSIONS

1. There was   11.5% reduction in case fatality rate from myocardial infarction associated with presence of nurse at referral to CCU during the period of the current study (retest) of 2009 in comparison with a previous study (test) of 2008 during the early 24 hours of admission .
2. Most of patients with myocardial infarction were found to have home-to-hospital delay of  ≤120 minutes  which make the chance of survival better with rapid medical and nursing intervention.
3. Only 53%  of the patients with STEMI  ,who were referred to CCU in the current study (retest),  received qualified nursing services at  first contact which might contribute to high risk of early death.
4. the daily admission rate of acute coronary syndromes found to be 2-3 cases per day which make the presence of at least two qualified cardiac nurse highly effective in the rapid intervention  to save the  life of  patients.
5. The case fatality rate among patients with STEMI was significantly affected by presence of nurse contact at admission during early 24 hours..
6. Ventricular fibrillation is still the main cause of early death from acute myocardial infarction  and the presence of well trained nurse on the defibrillator is  life saving. .

## RECOMMENDATIONS

1. Presence of at least two cardiac nurses in the casualty and CCU for rapid nursing contact with acute coronary cases.
2. availability of automated external defibrillators in public places may significantly increase chances of survival, beside the availability of them at hospital.
3.  Training and qualification of the nurses  in the hospital on the cardiac nursing practices.
4. Nursing actions including; pre-nursing care, technical skills, and post-nursing care should be considered in the case investigation form of acute coronary syndromes at hospital principally by a university nurse.

## REFERENCES

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