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Research paper

Evaluation of applying chest pain guidelines in coronary care patients on their health outcome

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Abstract

Background: the National Heart, Lung, and blood Institute estimate that each year approximately 785,000 Americans will have a new coronary attack and approximately 470,000 will have a recurrent attack. Chest pain is one of the most common symptoms of coronary artery disease or acute coronary syndrome. **Objectives**: this study aims to compare between routine nursing care of chest pain and chest pain guidelines in patients with acute coronary syndrome and assess health outcome after application of chest pain guidelines in acute coronary syndrome patients. **Method:** Quasi experimental research design was used in the current study. The study was conducted at the coronary care unit of Suez canal University Hospital. Sample; consecutive of 70 patients was included in the study. Four tools were used for study data collection that named the chest pain guidelines evidence based nursing care in patients with angina pectoris, visual analog scale to assess chest pain, dyspnea scale to assess breathing pattern and fourth one was lab investigation to assess patient health prognosis. **Results:** The study results revealed an improvement of patients' health outcome represented in a significant reduction in complain of chest pain, blood pressure and insufficient sleeping with P-value of 0.000 after applying guidelines of care regarding chest pain. Additionally, the respiratory pattern and respiratory rate improved significantly with P-value of 0.000. Moreover, lab investigation showed significantly decrease in LHD level with P-value of 0.000. **Conclusion:** The current study concluded that application of chest pain guidelines intervention could be improved patients health outcomes.

Keywords: *Chest pain – Coronary - Nursing- Intervention – Guidelines- Patients.*

1. Introduction

Studies by the National Heart, Lung, and Blood Institute estimate that each year approximately 785,000 Americans will have a new coronary attack and approximately 470,000 will have a recurrent attack (Lloyd-Jones, 2010). Cardiovascular disease is the leading cause of death which estimated nearly 17.3 million patients in 2008, out of them 7.4 million were due to coronary artery disease (WHO 2014).

Moreover, cardiovascular diseases consider the leading cause of death in industrialized countries and are expected to become so in emerging countries by 2020. Coronary artery disease (CAD) is one of the prevalent health problems associated with high mortality and morbidity rate. Additionally, coronary artery diseases include silent ischaemia, stable angina pectoris, unstable angina, myocardial infarction (MI), heart failure, and sudden death. Patients with chest pain represent a very substantial proportion of all acute medical hospitalizations in Europe. Distinguishing patients with acute coronary syndromes (ACS) within the very large proportion with suspected cardiac pain are a diagnostic challenge, especially in individuals without clear symptoms or electrocardiographic features. Despite advanced treatment, the mortality rate, and readmission of patients with acute coronary syndrome still high ACS (Murray & Lopez 1997).

Acute coronary syndrome manifestations refer to atherosclerosis. Which caused acute thrombosis induced by a ruptured or eroded atherosclerotic coronary plaque, with or without vasoconstriction, leading to a sudden decrease in blood supply to the heart muscle? In rare cases, ACS may have a non-atherosclerotic etiology such as arteritis, trauma, dissection, thrombo-embolism, congenital anomalies, cocaine abuse, or complications of cardiac catheterization (Hamm *et al.* 2011).

On the other hand, risk factors of acute coronary syndrome include old age, diabetes mellitus, renal impairment, or other comorbidities, Symptoms of acute coronary syndrome at rest carry a worse prognosis than symptoms occurred only during physical activity. The presence of tachycardia, hypotension, or heart failure upon presentation indicates a poor prognosis and is an indicator for rapid management (Granger *et al.* 2003 and Fox *et al.* 2006).

Cardiac biomarkers should be measured for all patients who present with chest discomfort or other symptoms suggestive of ACS. Measurements of the cardiac-specific troponins T and I allow for highly accurate, sensitive, and specific determination of myocardial injury in the context of ischemic symptoms; these troponins have replaced CKMB as the preferred marker for the detection of myocardial necrosis. However, troponin measurements have some drawbacks. Troponin levels usually do not increase until at least 6 hours after the onset of symptoms; therefore, a negative result obtained within this period should prompt a repetition of the assay 8 to 12 hours after the onset of symptoms. Because troponin levels

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remain elevated for a prolonged period (5 to 14 days) after myocardial necrosis, their usefulness in detecting recurrent myocardial damage is limited. However, they are helpful in detecting myocardial damage in a patient who presents for assessment several days after the onset of symptoms. Because of the shorter half-life of CK-MB, the levels of this isoenzyme are useful for diagnosing infarct extension (reinfarction) and periprocedural MI. Point-of-care assays for bedside detection of biomarkers are being developed so that the time delay can be minimized and treatment decisions can be made quickly, but the use of such assays is currently limited (Kumar & Cannon, 2009).

Guidelines summarize and evaluate all available evidence, at the time of the writing process, on a particular issue with the aim of assisting physicians in selecting the best management strategies for an individual patient, with a given condition, taking into account the impact on outcome, as well as the risk–benefit ratio of particular diagnostic or therapeutic means (Hamm *et al.* 2011).

The National Quality Improvement Initiative found that the guidelines and treatments recommended by the American College of Cardiology/American Heart Association (ACC/AHA) were only followed in 74% of the time in 350 of the U.S. hospitals it studied. Not adhering to the ACC/AHA guidelines for recommended care of patients with ACS/NSTEMI has been associated with increased in-hospital mortality (Lloyd-Jones, 2010). The ICSI guideline for the Diagnosis and Treatment of Chest Pain and Acute Coronary Syndrome (ACS) was developed to aid the clinician and institutions to provide the most recent evidence-based guideline for a patient who presents with ACS. This guideline focuses mainly on the treatment of acute coronary syndromes (Davis *et al*., 2012).

On the other hand, greater frequency of chest pain was significantly correlated with greater severity of fatigue and dyspnoea, with a stronger association found between chest pain frequency and dyspnoea than with chest pain frequency and fatigue. Additionally, fatigue is a nonspecific symptom that is challenging for symptom management in CHD people (KIMBLE *et al.* 2011**).** So, nurses caring for patients with chronic stable angina should be focus on chest pain as a main symptom management. Consequently, nurses' assessment of chronic stable angina patients should have more focus to include chest pain frequency and the presence of dyspnea (KIMBLE *et al.* 2011).
Therefore, the current study aims to assess effect of application of nursing care guideline regarding chest pain in coronary care unit on patient outcome which present in clinical measures as complain of chest pain, breathing pattern, dyspnea, blood pressure alteration. Additionally, biomarkers as Prothrompin time, Partial prothrompin time, Platelet, LDH, INR, Na, K, HGB, RBC, WBC, CK and Ceratinin as health outcome for application of nursing care guidelines regarding chest pain.

2. Research objectives

1. Compare between routine nursing care of chest pain and chest pain guidelines in patients with acute coronary syndrome.
2. Assess health outcome after application of chest pain guidelines in acute coronary syndrome patients.

3. Research questions

1. Is their difference between nursing care for chest pain before and after guideline instructions explanation?
2. Is Biomarkers of acute coronary syndrome changed after implementing nursing care guideline regarding chest pain or not?

4. Methods

4.1. Design

Quasi experimental research design was used in the current study.

4.2. Sample

Consecutive sample of 70 coronary care patients in a period of six months was included in the study.

4.3. Study Setting

The study was conducted at the coronary care unit of Suez canal University Hospital.

4.4. Study tools

Four tools were used to collect study data. The first study tool is covered three parts; first part was the socio-demographic data e.g. age, gender, level of education, marital status, diagnosis and length of hospital stay and second part was the chest pain guidelines evidence based nursing care in patients with angina pectoris. It developed by Nezamzadeh *et al.* 2012. The chest pain guidelines was developed based on NANDA nursing diagnosis and nursing intervention that include 19 item that followed by the nurse to care of patients with chest pain e.eg. Investigate pain using visual analog scale (second tool) (Weber & Kelley, 2014), monitor patients' pain, and check vital signs every 5 to 15 minutes during pain attack until stabilization of the symptoms…ect. However the third Part was the evaluation criteria which include patients' appearance, complaining of pain, blood pressure, insomnia, respiratory rate, pulse rate and breathing pattern. Patients' appearance was assessed through observation or inspection. Complaining of pain was assessed by patients asking. Sphegnomanometer was used to measure blood pressure. However the isuficient sleeping was detected based on sleeping hours of patients which consider patient sleep five hours or more has sufficient sleeping and patient sleep less than five hour complaining from insufficient sleeping (Weber & Kelley, 2014). Additionally the breathing pattern was assessed using dyspnea scale (third tool) that developed by Hogan, 2014 which include four levels, first level characterized by no dyspnea at rest, some on vigor exercise, second level characterized by breathless on moderate exertion, third level characterized by mild breathless at rest, worse in mild exertion and fourth level characterized by significant breathless at rest and worse on even slight exertion**.** The fourth tool was the lab investigations as an additional evaluation of implanting chest pain guideline on patients health outcome and these investigation include Prothrompin time,Partial prothrompin time, Platelet, LDH, INR, Na, K, HGB, RBC, WBC, CK and Ceratinin.

5. Data collection

The data was collected by the researcher two times at patient admission and at patient discharge using the study tools that described previously for a period of six months.

6. Ethical consideration

An approval to conduct the study was obtained from the dean of the Faculty of Nursing, as well as the Director of coronary care unit in Suez Canal University Hospitals. Oral informed consent after brief explanation of the study aim and process was obtained from the patients before data collection. The patients informed about their right to withdraw from the study without rationalization and assuring them about the confidentiality of their data throughout the study.

7. Data analysis

Data were analyzed using the statistical package for social science version 20. Univariate analysis was used to describe the sample characteristics. Additionally, the prognosis of chest pain or patient health condition was analyzed using the clinical measures.

8. Results

The study results revealed that 61% of study sample were males. Also the highest percent of patients age falls between 51to 60 years old followed by patients age falls between 41 to 50 years old. Moreover the study revealed that mean age and standard deviation of patients were 58± 9.60. Additionally, 94.4% were married. Additionally, 41.4% have diploma or secondary school. Otherwise, 94.3% diagnosed with Acute Coronary syndrome (ACS). On the other hand, 37.3% of patients admitted two times to hospital and 35.8% were hospital admitted three times (see table 1).

Table 1: Socio-demographic characteristics of the study sample

Socio-demographic characteristics	Nr. (%)
• Gender	
Male	43 (61.4%)
Female	27 (38.6%)
• Age	
20 – 30 years	4 (5.8%)
31 – 40 years	8 (11.6%)
41- 50 years	24 (34.8%)
51 – 60 years	33 (47.8%)
Age mean ±SD	58± 9.60
• Education	
Illiterate	15 (21.4%)
Read and write	4 (5.7%)
Primary	5 (7.1%)
Diploma	29 (41.4%)
University	17 (24.3%)
• Marital status	
Married	66 (94.3%)
Divorced	1 (1.4%)
Widwo	3 (4.3%)
• Diagnosis	
Acute Coronary syndrome	66 (94.3%)
ACS	4 (5.7%)
Diabetes mellitus and ACS	
• Hospital admission frequency	
First time	13 (19.4%)
Second time	25 (37.3%)
Third time	24 (35.8%)
Fourth time	4 (6%)
Fifth time	1 (1.5%)
• Length of stay (mean ± SD)	4.81 ± 2.076

Furthermore, The current study results found that application of all nursing care guidelines for chest pain were different significantly (see table 2).

The study results revealed improvement of patients' outcome represented in a significant reduction in complain of chest pain, blood pressure and insomnia with P-value of 0.000 after applying guidelines of care regarding chest pain. Additionally, the respiratory pattern and respiratory rate improved significantly with P-value of 0.000. Moreover, lab investigation showed significantly decrease in LHD level with P-value of 0.000. However, there was a significant increase in Na and WBC with P-value of 0.003 and 0.057 respectively (see table 3).

Table 2: The differences between chest pain guidelines pre and post

Chest pain guidelines	Pre	Post	P- Value
Investigate pain intensity	68	69	0.000
Monitor patient pain	67	70	0.000
Check vital signs every 5 to 15 minutes	6	70	0.00
Communicating with humor	5	65	0.000
Complete rest	5	65	0.000
Use massage therapy as anti-pain	2	67	0.000
Use of relaxation as anti-pain	3	67	0.000
Change position anti-pain	3	67	0.000
Easing the situation	3	67	0.000
Reduce environmental stimuli	3	67	0.000
Restricting patients visitors	1	68	.321
Give 4 to 6 liters of oxygen through nasal (2 to 3 liter in patient with COPD	5	64	0.024
Nitroglycerine 5 – 10 μ/min, during 15 to 20 minutes in patient with systolic pressure over 90 mmhg, on doctor prescription	9	59	0.000
Recommending the doctor to use drugs	-	5	0.024
Consulting doctor if pain is not relief	9	59	0.000
Training low fat, low salt diet	3	66	0.000
Training patient to no use valsalva maneuver	2	68	0.000
Training patient not smoking	2	68	0.000
Training about cautious taking caffeine (tea- chocolate, cola drinks)	1	69	0.000

The significant level considered when P-Value ≤ 0.05

Table 3: Comparison between health parameters of patients with chest Pain in pre and post guideline implementation

Health outcome indicators	Pre guideline implementation	Post guideline implementation	P- Value
General appearance			
Normal	3 (4.2%)	59 (84.3%)	0.406
Pallor	67 (95.8%)	11 (15.7%)	
Complain of chest pain	8.9±1.2	2.6±1.8	0.000
Insufficient sleeping hours	59	11	0.000
• Blood pressure			
Systole	135.4±19.2	111±10	0.000
Diastole			
Respiratory rate	22.2±2.2	18.5±1.7	0.000
Breathing pattern			
Normal	9 (12.8%)	32 (45.7%)	
Dyspnea level 1	6 (8.6%)	19 (27.1%)	
Dyspnea level 2	27 (38.6%)	15 (21.4%)	
Dyspnea level 3	25 (35.7%)	4 (5.7%)	0.000
Dyspnea level 4	3 (4.3%)	-	
• Lab investigation prognosis			
PT	14.79±6.59	15.05±3.38	0.669
PPT	36.12±4.52	36.69±4.57	0.427
Platelet	2.57±76.79	2.42±68.95	0.102
LDH	8.16±749.81	4.52±314.65	0.000
INR	1.13±0.360	1.19±0.309	0.087
Na	135±6.78	137±6.56	0.003
K	4.33±3.81	3.77±0.506	0.275
HGB	12.18±1.57	12.11±1.47	0.566
RBC	4.12±0.818	4.32±1.38	0.199
WBC	8.92± 3.55	9.76±3.41	0.057
CK	4.41±461.91	9.23±1442.86	0.381
Ceratinin	1.20±1.22	1.14±1.16	0.614

The significant level considered when P-Value ≤ 0.05

9. Discussion

The current study results revealed that mean age and standard deviation of patients were 58± 9.60 and nearly two third of study sample were males. Additionally, most of study sample were married. This in agreement with Harbman, 2014, which reported that the mean age of his study on patients with coronary ar-

tery disease, was 58 years. Additionally, the majority of the patients were men and three quarter of study patients were married (Harbman 2014). This could be interpreted that men, married and older patients are more vulnerable to coronary artery disease and this might be refer to exposed to more stressor e.g. family needs and work.

Furthermore, the current study results found that application of all nursing care guidelines for chest pain were different significantly and this could be refer to in availability of standard guidelines or missed of new guidelines of chest pain care or management. Consistent with that the study of Chapmana, (2012), which stated that dissemination and application of new clinical guidelines remains a challenge in clinical practice. The current study also revealed improvement of patients' outcome represented in a significant reduction in complain of chest pain, blood pressure, respiratory pattern, respiratory rate and insufficient sleeping after applying guidelines of care regarding chest pain and this could be referred to the effectiveness of chest pain guidelines application. Otherwise the strong association between chest pain and dyspnea as reported by KIMBLE *et al.* 2011 could affect patient outcome improvement**.** Additionally, dyspnea is assessed through respiratory rate and pattern these reflect the indicators of health outcome improvement as dyspnea, respiratory rate and pattern and consequently sleeping and blood pressure could be also improved.

In the same way, the results of the study of Harbmann, 2014 revealed that a nurse can deliver safely comprehensive secondary prevention as modified risk factors e.g. smoking, stress, hypertension, activity and diet are considered effective intervention and could lead to significantly improve guidelines implementation based secondary prevention treatments and risk factor reduction strategies, in addition to improves management achieved by the patients (Harbman 2014). Moreover, the current study showed that some lab investigations decreased significantly as LHD level which considered one of important cardiac enzyme that reflect cardiac functions and so decrease its value is an indicator of improved health outcome.

10. Conclusion

The current study concluded that application of chest pain guidelines intervention could be improved health outcomes e.g. decrease complaining of chest pain,improve blood pressure, insomnia, dyspnea, respiratory pattern and improve some of cardiac enzyme as LDH. Otherwise, nurses could be help in disseminating guideline of care which could be lead improve patient health outcome.

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