CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.826392

Available online at: http://www.iajps.com Research Article

SURVEY OF THE RELATIONSHIP BETWEEN PHYSIOLOGICAL PARAMETERS AND CHEST PAIN IN PATIENTS WITH UNSTABLE ANGINA

Elahe Khalili[1], Shahram Baraz[2*], Mohammad Adineh[2], Mohammad Hossein Haghighizadeh[3], Fatemeh Javanmardi[4]

[1]MSc student, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

[2] Nursing care Research Center in Chronic Diseases, School of Nursing and Midwifery, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

[3]Department of Statistics, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

[4]Students and scholars Department of Statistics, School of Public Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Abstract:

Background and Objectives*: Chest pain is the most common symptom among patients with unstable angina hospitalized in cardiac intensive care unit that can impact on patients' physiologic symptoms. In order to determine the exact relationship, this study aimed to determine the relationship between physiological parameters and chest pain in patients with unstable angina.*

Methods: *In this cross-sectional study which was conducted in 2015-2016 in Golestan Hospital of Ahvaz, 80 CCU patients were studied during three months with random sampling method. Pain and physiological parameters was measured and recorded for each patient during two days at the time of chest pain. Data analysis was performed using SPSS 21 software. Mann-Whitney test was used for gender and marital status, Kruskal-Wallis test for education and origin and for assessing the relationship between systolic blood pressure, diastolic blood pressure, pulse, respiration, temperature, and oxygen saturation of arterial blood Spearman nonparametric rank correlation coefficient. In this study, the relationship between the severity of chest pain and physiological parameters in patients with unstable angina was investigated.*

Results: *The mean and standard deviation of patients' chest pain in this study was 4.41±1.31. The results of Spearman correlation coefficient (Spearman's rank correlation test) showed that a significant relationship exists between pain intensity and mean arterial blood oxygen saturation (95.42±1.48). Pain intensity was inversely related to oxygen saturation of arterial blood (P =. / 021, r =. / 257). But no significant relationship was obtained between the pain and systolic blood pressure, diastolic blood pressure, pulse, respiration and temperature. (Significant level. /05 <P).*

Conclusion: *This study showed that pain intensity is significantly associated with arterial blood oxygen saturation. It seems that we can use the arterial blood oxygen saturation as a way to measure patients' pain. But since no relationship between other physiological parameters was found further studies with larger sample size are needed to be conducted.*

Keywords: *Unstable angina, chest pain, physiological parameters*

Corresponding author:

Shahram Baraz,

Nursing cares Research Center in Chronic Diseases,
School of Nursing and Midwifery,
Ahvaz Jundishapur University of Medical Sciences,
Golestan square, Ahvaz, Iran.
Tel. (Fax): +98 6133738333. E-mail address: shahrambaraz@ajums.ac.ir

QR code

Please cite this article in press as Shahram Baraz et al, ***Survey of the Relationship between Physiological Parameters and Chest Pain in Patients with Unstable Angina,*** *Indo Am. J. P. Sci, 2017; 4(07).*

INTRODUCTION:

Heart disease is known as the first cause of mortality in developing countries.(1) Coronary artery disease is at the top of heart diseases which is called the epidemic of the century that Iran is also experiencing this epidemic too.(2) Unstable angina is a subset of acute coronary syndrome.(3) that is the most common cause of death in individuals older than 35 years.(4) Unstable angina is a clinical condition with typical and intermittent chest pain which has started in the past month and occurs when heart is not receiving enough oxygen.(5) Following angina patients usually experience several problems such as pain, changes in tissues' blood flow, impaired tissue oxygen level, exercise intolerance, ineffective compatibility with anxiety and depression.(6) Chest pain is the most common symptom among patients with unstable angina hospitalized in cardiac intensive care unit.(7) Pain is the fifth vital sign and an unpleasant sensory and emotional experience with actual or potential tissue damage.(8) Pain stimulates the sympathetic nervous system with increasing the level of androgenous catecholamines and secreted hormones which increases blood pressure, pulse rate and makes the patient's condition worst.(9, 10) and can lead to different reactions, such as: changes in the rate and depth of breathing, increased heart needs, skeletal muscle contraction, muscle spasm, hyper coagulation, decreased ability to cough and deep breathing, low oxygen flow and ultimately reduce arterial oxygen saturation , sleep disorders and self-care role, immunosuppression, and persistent catabolism.(9, 11)

Several factors such as age, gender, cultural background, psychological, social and environmental factors can influence pain perception. These factors may increase or reduce the feeling of pain and affect the reaction to pain.(12) Although pain is a priority in terms of importance from the patients' view, but it is the final grade of importance for nurses because nurses believe pain is not a palpable and understandable issue.(13) One of the reasons for the prevalence of severe pain in patients can be inappropriate assessment and measurement of it. Pain is subjective, individual, very complex and multidimensional phenomenon that the severity of it is usually estimated and recorded by another person in clinical environments. On the other hand pain is a common clinical problem because patient response to pain is dependent on multiple factors and unsuccessful control will lead to the lack of patient's satisfaction.(14) Pain assessment methods should be adapted with patient's communication capacities. For appropriate management and control of pain, multiple assessments and individual treatment based on observation of the patient's condition is needed.(9) In patients who are not able to make verbal communication, visible behavioral and physiological indices are used to assess pain.(13) Effective and appropriate administration of pain leads to reduced pathogenicity, facilitating a rapid recovery, returning to past performances, earlier discharge from hospital and improving the patients' quality of life(15) and inappropriate treatment of pain has physiological, psychological, economic and social consequences for patients, families and the community.(16) Pain Association of America believes that patients' pain should be assessed routinely such as taking blood pressure and pulse, controlling it should be included in the standards and it is the patient's right to be properly evaluated in terms of pain. These standards show the importance of pain control.(17) Paying attention to changes in the patient's physiological parameters is one method for realizing the severity of a threaten disease.(18) It seems that in coronary artery disease which impairs the heart's oxygen supply and demand, symptoms resulting from disease, especially pain, are related to physiological changes.(19) However, due to the timely identification and assessment of angina pain can prevent patient discomfort and also considering the relationship between pain and the physiological parameters role of evaluating these parameters in rapid detection and accurate assessment of pain from angina, this study aimed to determine the relationship between the severity of chest pain and physiological parameters in patients with coronary artery disease admitted to CCU wards of Golestan Hospital of Ahvaz in 2015-2016.

MATERIAL AND METHODS:

This study aimed to determine the association between the severity of chest pain and physiological parameters with descriptive-analytic method in patients with unstable angina. In this study, 107 patients with angina hospitalized in CCU wards of Golestan hospital were studied with convenience sampling method in 2015-2016. Inclusion criteria consisted of unstable angina approved by doctor, being aware of time, place and himself, patient cooperation and satisfaction and the ability to communicate verbally. After receiving consent from patients, in two days at the time of chest pain and immediately after that physiological parameters including systolic blood pressure, diastolic, heart rate, respiratory rate, temperature and arterial blood oxygen saturation were measured and recorded. Demographic data including age, sex, education, ethnicity and marital status were collected in a special form. To assess pain Numeric rating Scale (NRS) was used and patients were asked to give their pain from zero to 10 points. Zero for the least pain and 10 for the most pain. Systolic blood pressure, diastolic blood pressure, heart rate, respiratory rate and oxygen saturation of arterial blood was measured by cardiac monitoring devices. The patient's temperature was measured and recorded by a mercury thermometer orally. When the patient had chest pain before prescribing any drug, including nitroglycerin or narcotic drugs, the pain and

physiological parameters were measured immediately and then the routine nursing and medical care was done. After collecting data, the relationship between pain severity and physiological parameters was analyzed using descriptive and inferential statistics in SPSS version 21software. Mann-Whitney test for gender and marital status, Kruskal-Wallis test for education and ethnicity, and Spearman nonparametric rank correlation coefficient for assessing the arterial blood oxygen level, blood pressure, heart rate, temperature and age.

FINDINGS:

The mean pain intensity in this study was 4.41 ± 1.31. In this study, men and women were equal (40 men and 40 women) and Mann-Whitney U test indicates that no connection exists between men and women in terms of pain scores (P = 0.596). In terms of educational status, 24 patients were illiterate, 27 elementary school, 7 middle school, 10 high school and 12 academic education which did not show a significant association in terms of pain intensity based on the Kruskal-Wallis test (P = 0.034). In terms of marital status, 4 patients were single and 76 patients were married and the results of Mann-Whitney test showed no significant relationship between pain and marital status (P = 0.807). In terms of ethnicity, 30 patients were Lor, 35 patients were Arab, 10 patients were Persian and 5 were from other ethnicities and does not show a significant association with pain intensity on the basis of Kruskal-Wallis test (P = 0.496).

Spearman correlation coefficient (Spearman's rank correlation test) showed a significant association between pain intensity and mean arterial blood oxygen saturation (95.42 ± 1.48) which pain was inversely related with arterial oxygen saturation (P = 0.021, r = 0.257). It did not show a significant association between pain and systolic blood pressure (131.84±16.26) (P = 0.970, r = 0.004). No significant association was observed between pain and diastolic blood pressure (81.94±11.77) (P = 0.503, r = 0.076). Also, according to the Spearman correlation coefficient test no significant relationship between pain intensity and heart rate (78.46 ± 11.19) was found (P = 0.177, r = 0.0149). Between pain and respiratory rate (19.3 ± 11.54) was no significant association (P = 0.442, r = 0.087). The test also did not show any significant relationship between pain and temperature (37.06 ± 0.410) (P = 0.177, r = 0.152). In terms of age distribution patients were in the range of 34-70 years. No significant correlation between pain severity with age was observed based on Spearman correlation coefficient test (56.31 ± 9.25) (r = 0.094 P = 0.406) (Table 1).

Table 1: Participants demographic information

Variables	Characteristics		Groups		P value
Age	-		80(57.2)		0.406
Gender	Male		40(50%)		0.596
	Female		40(50%)		
Marital status	Married		76(96.96)		0.807
	Single		4(3/04)		
Level of education	Illiterate	Elementary	24(30%)	27(33.75%)	0.034
	secondary	High school	7(8.75%)	10(12.5%)	
	University		12(15%)		
Racial	Lore	Arab	30(37.5%)	35(43.75%)	0.496
	Persia	Remainder	10(12.5%)	5(6.25%)	

Table 2: the relationship between pain scores and arterial blood oxygen saturation, systolic blood pressure, diastolic blood pressure, pulse, respiration, temperature and age in patients with unstable angina

Parameters	samples	Minimum	Maximum	Average	Mean deviation	P
Systolic blood pressure	80	90	175	131.84	16.26	0.970
Diastolic blood pressure	80	56	115	81.96	11.77	0.503
Pulse	80	61	119	78.41	11.19	0.186
Respiration	80	15	23	19.31	1.54	0.442
Arterial blood oxygen saturation	80	92	98	95.42	1.48	0.021
Temperature	80	36	37	37.06	0.410	0.177
Age	80	34	70	56.31	9.25	0.406

Kruskal-Wallis, (Kruskal-Wallis test), the significance level was considered as P <0/05.

DISCUSSION:

This study aimed to investigate the relationship between physiological parameters and chest pain in patients with unstable angina and here we want to compare the findings with other studies.

All of the patients were similar in terms of demographic characteristics and there was no significant difference between them and the pain. Although physical location, highly stimulating, gender, family environment, culture and race affect the incidence and severity of pain.(20) Sharifi et al in 2011 did a study to assess differences in clinical symptoms of myocardial infarction between men and women and concluded that statistically there is no significant difference between pain and gender.(21) Majidi and colleagues in a study in 2011 compared the signs and symptoms of acute coronary syndrome between men and women and concluded that there are significant differences between the two sexes.(22) Mac Cobain and his colleagues in a study in 2001 with the aim of investigating the effects of gender on the relationship between blood pressure and pain, showed that blood pressure can predict pain in men and women.(23) Meier & Partners in 2001 in his study which aimed to investigate the relationship between age, sex, blood pressure and pain in the pain forecast showed that gender is effective in pain incidence. So that women tolerate less pain than men. Also results showed that there was a significant inverse relationship between systolic blood pressure and pain (24).

In our study, no significant statistically difference between pain and blood pressure, respiratory rate, heart rate and temperature was found. Lord and his coworkers in a study in 2011 which aimed to determine the reliability of the pain severity with adult vital signs, concluded that there is no significant relationship between pain and systolic blood pressure, respiration and heart rate.(25) Finding no significant relationship between pain intensity and physiological parameters in this study may be due to the fact that in this study, vital signs were measured immediately after the onset of pain and this interval is very short to determine the relationship between physiological parameters and pain.

There is a significant relationship between pain and arterial blood oxygen saturation based on the results of our study. Bandal and colleagues in a study in 2011, with the aim of investigating the effect of vital signs in anticipation of pain, showed that respiratory rate can be a predictor of pain intensity.(26) Ledovsky and colleagues study in 2012 aimed to evaluate the effect of postoperative pain on plasma catecholamine levels, blood pressure and autonomic control of the heart, found no significant correlation between postoperative pain and breathing and heart rate.(27) Also Jung and colleagues' study in 2007 aimed to evaluate the results of pulse oximetry in anticipation of pain in sycle cell anemia patients showed that there were no correlations between the SPO2 and pain.(28) Ali Mohammadi et al in 2014 studied the impact of pain on O_2 saturation and showed that there is no relationship between pain control and oxygen saturation.(29)

It seems that vital signs can't be pain indicant due to the results of this study and other studies. Pain is a naturally subjective experience and should be assessed and treated. Evidence to date indicates that the automatic response to pain, the severity of your pain not show it.(30) The results of our study showed a significant relationship between pain and arterial blood oxygen saturation and the pain can lead to changes in the speed and depth of breathing, increased heart needs and oxygen reduction(9, 11) While this relationship wasn't seen in other studies. One of the reasons could be the kind of pain and the type of underlying disease. Another reason could be the patient's age. Changes of vital signs are more evident at younger ages. However, due to the contradictory results obtained in this study and other researches, more studies in this field and fellow patients with a larger sample size is recommended. Also, putting the results of relevant researches in educational programs of treatment area is recommended.

CONCLUSION:

This study showed that pain intensity is significantly associated with arterial blood oxygen saturation. It seems that we can use the arterial blood oxygen saturation as a way to measure patients' pain. But since no relationship between other physiological parameters was found further studies with larger sample size are needed to be conducted.

ACKNOWLEDGEMENT:

This article is the outcome of Intensive Care Nursing graduate thesis of Jundishapur University of Medical Sciences which the ethics code of it has been registered at the Jundishapur University of Medical Sciences with IR.AJUMS.REC.1394.713 number. We sincerely acknowledge the authorities of Ahvaz university of Medical Sciences, Golestan hospital president, head nurses and nurses of CCU1 and 2 and also all dear patients and their families who helped the researcher in this study.

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