



Original Article

Assessment of Non-Ischemic Chest Pain and its Association with Socio-Demographic Characteristics among Post Percutaneous Coronary Interventions (PCI) Patients

Subia Naz¹, Amjad Ali¹, Abdur Rasheed² and Tanseer Ahmed¹

¹Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan

²School of Public Health, Dow University of Health Sciences, Karachi, Pakistan

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***Corresponding Author:**

Subia Naz
 Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan
subia.naz@duhs.edu.pk

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ABSTRACT

The most common procedure used in cardiovascular medicine is percutaneous coronary intervention (PCI) that can create some physiological complications, such as decreasing heart rate, mechanical issues, and cardiac arrest among patients. **Objective:** To determine the frequency of non-ischemic chest pain and its relation with socio-demographic features amongst post PCI patients in a tertiary care hospital in Karachi. **Methods:** This analytical cross-sectional study was led at National Institute of Cardiovascular Diseases (NICVD) Hospital, Karachi. A total of 195 patients with Post PCI non-ischemic chest pain were recruited by using the Numerical rating scale (NRS). Non-probability purposive sampling technique was used and permission was taken from Institutional Review Board (IRB) of DUHS and Ethical Review Committee (ERC) of NICVD. Data were analyzed by using SPSS Version-26.0. Percentages and frequency were used for categorical variables while, a chi-square test was applied to check the associations of non-ischemic chest pain with demographic features of the patients. **Results:** In this study, 63.60% of the participants were male. Most of the participants (75.4%) were married. Non-ischemic chest pain was found significantly associated with age, gender, marital status, history of disease and drug history with p-values <0.001, 0.001, <0.001, <0.001, <0.001 respectively. The majority of the participants (90.26%) were suffered with non-ischemic chest pain. **Conclusions:** This study revealed that majority of the patients suffered with non-ischemic chest pain and moderate pain level was prevailing in the majority of the post PCI patients.

INTRODUCTION

Chest pain is the most common problem among patients with frequent non-cardiac in origin. Researches show that approximately 50% to 80% patients brought in emergency department with chest pain are discharged without any accurate diagnosis and labeled them as a non-cardiac chest pain (NCCP) [1]. The NCCP is similar to angina pectoris like pain with involvement of coronary artery diseases, during diagnostic evaluation, such as cardiac

marker (Troponin-I) and angiography [2]. However, there is a need to work on this significant issue because 44% of patients accepted that they had chest pain one year after negative coronary angiography results, and 50% of patients stated that they were unable to perform their routine tasks due to the chest pain [3]. The most common procedure used in cardiovascular medicine is percutaneous coronary intervention (PCI). According to

the American Heart Association report, the average PCI performed in United States is approximately 4,80000 in a year [4]. PCI can create some physiological complications, such as decreasing heart rate, mechanical issues and cardiac arrest among patients with age of more than 75 years and having (ST Elevated Myocardial Infarction) STEMI, as compared to the treatment of fibrinolysis [5]. Despite conflicting evidence concerning its efficacy in stable angina, PCI is the single advised as an adjunct to medical therapy and reduction of the risk in patients with rebellious or continuing angina due to conflicting reports about its advantages in stable angina [6-8]. The number of elector PCI procedures performed in individuals with stable angina still make up 30-40% of all PCI procedures in patients with coronary artery diseases. This method is becoming more popular as a result of the development of efficient noninvasive coronary imaging [9-10]. Post-PCI chest pain (PPCP) is a typical complication after a coronary artery bypass graft. PPCP has previously been researched mostly in patients with acute coronary syndrome (ACS). Schüep *et al.*, discovered that 1/3rd of individuals had chest discomfort after an effective PCI procedure [11], and Kini *et al.*, discovered that 35.8% of patients had chest pain following stenting in coronary arteries [12]. The mechanics of PPCP have yet to be fully explored. PPCP can be carried out by an acute thrombosis in the stent, insufficient revascularization, reoccurrence of stenosis, improper vasoconstriction, stretch at stent site, discomfort, and disease progress that does not affect the target arteries [11]. As per the guidelines of the European Society of Cardiology, acute STEMI can be best treated by primary PCI rather than fibrinolysis with the indicated timeframes [13]. The indication of PCI is preferable for patients with significant hemodynamic coronary stenosis in the presence of limiting angina or angina equivalent, which is failure to medical therapy [14]. The objective of this study is to determine the incidence of non-ischemic chest pain and its association with socio-demographic features among post PCI patients in tertiary care hospital Karachi.

METHODS

This cross-sectional analytical study was conducted at the National Institute of Cardiovascular Diseases hospital, Karachi. The duration of this study was from December 2017 to April 2018. The non-probability purposive sampling technique was used for participants selection and sampling. Patients over 18 years of age were recruited from Coronary Care Unit (CCU) after identifying post PCI non-ischemic chest pain. NRS were filled to find out the pain intensity. Those patients who had post PCI complications such as bleeding from insertion site, any change in their ECG and participants who were not willing to take part were

exempt from this study. Sample size calculation was performed using Open-Epi online calculator, by using prevalence of non-ischemic chest pain as 18% [15], confidence interval was taken as 90% with 5% margin of error, and the calculated sample size was 160. However, the research team distributed 200 questionnaires to achieve the desired sample size, five incomplete forms were rejected, and hence data were collected from 195 patients. The approval of this study was obtained before starting data collection from Institutional Review Board of Dow University of Health Sciences, Karachi (Ref # IRB: 888/DUHS/Approval/2017/96, 15th September 2017). Permission was granted from the National Institute of Cardiovascular Diseases Karachi (ERC-08/2017, 13th July, 2017). Informed consent in written was obtained prior to data collection from all study participants. Demographic information was taken from the study participants. Moreover, to check the pain intensity, Numerical rating scale (NRS) was used. NRS is a valid tool that had been used in previous studies for the measurement of pain levels [16]. NRS contain 0- 10 score, with the categories of no pain (0 score), mild pain (1-3 score), moderate pain (4-6 score) severe pain (7-10 score) category. Data were analyzed by using SPSS Version-26.0. Overall, percentages were used for categorical variables to find out the relationship between patients' demographic characteristics and non-ischemic chest pain. Moreover, Pearson Chi-square test was also performed. P-Value ≤ 0.05 was represented statistically significant.

RESULTS

Table 1 highlighted the socio-demographics characteristic of the study participants and their association with non-cardiac chest pain. In this study, 42.5% of participants belonged to age group of >50 years, and 63.60% were male. The majority (37.9%) of participants with below primary education and 75.4% were married. Most of the study participants (45.6%) earned between 10000-20000 PKRs/month and 50.3% respondents had private jobs. Findings of this study also revealed that major part of the study participants did not have any disease history and drug history with frequency of 70.3% and 75.9% respectively. Furthermore, nearly half (49.2%) of the study participants personal interest was watching T.V, News and Mobile. In this study, non-ischemic chest pain was significantly associated with age, gender, marital status, disease history and drug history with p-value of <0.001, 0.001, <0.001, <0.001 and <0.001 respectively. Furthermore, variables including education level, profession, monthly income, and personal interest showed no significant association with non-ischemic chest pain with p-value 0.133, 0.252, 0.764 and 0.091 respectively.

Table 1: Demographic features of the participants and its association with non-ischemic chest pain(n=195)

Variables	Categories	n (%)	p-value
Age	18-35	36(18.5)	<0.001*
	36-50	76(39)	
	>50	83(42.5)	
Gender	Male	124(63.6)	0.001*
	Female	71(36.4)	
Educational level	Below Primary	74(37.9)	0.133
	Matric	62(31.8)	
	Others	59(30.3)	
Marital status	Single	48(24.6)	0.000*
	Married	147(75.4)	
Profession	Private	98(50.3)	0.252
	Govt./Others	97(49.7)	
Monthly income PKRs/Month	Less than 10000	50(25.6)	0.764
	10000-20000	89(45.6)	
	More than 30000	56(28.7)	
Disease history	Yes	58(29.7)	0.000*
	No	137(70.3)	
Drug history	Yes	47(24.1)	0.000*
	No	148(75.9)	
Personal interest	T.V, News & Mobile	96(49.2)	0.091
	Family & Friends	37(19.0)	
	Others	62(31.8)	

P-values \leq 0.05 was considered significant*

Table 2 displays the frequency of pain level among study participants on NRS. The table highlighted that overall non-ischemic chest was 90.26% among patients in Post PCI assessment. On assessment of pain categories, it was evident that the majority of the participants 49.2% were in moderate pain category, followed by mild pain among 58 (29.7%), severe pain among 22 (11.3%) and no pain was observed only 19(9.7%) among study participants.

Table 2: Assessment of NRS frequency of non-ischemic chest pain(n=195)

Pain Categories	Frequency (%)
No pain	19 (9.74)
Mild pain	58 (29.75)
Moderate pain	96 (49.23)
Severe pain	22 (11.28)
Total	195 (100)

DISCUSSION

Autonomic nervous system either peripheral or central shows a vital part in pain processing, emotional activation, and cardiac outflow to many organs [17]. Individual variations in thresholds may also take part in cardiac pain [18]. Post PCI non-ischemic chest pain is still not fully understood; nevertheless, minimum awareness is available related to the history. Reasons, such as affective, sensory, and cognitive characteristics of this pain causing the problems that contribute post PCI non-ischemic chest

pain among patients are not fully identified. Limited literature available related to this topic, especially in Asian countries. This study will be pioneer efforts in Pakistani context and provide base line data about the topic. This study finding revealed that approximately 2/3 of the patients with coronary artery diseases were male. The number of cases of coronary artery diseases was low among female participants. It was noticed that more than 3/4 of the female participants suffered with non-ischemic chest pain. These evidences were opposed by study finding of New York (2016), Canada (2016) and Norway in 2003, where non-ischemic chest pain was on lower side among female participants [15, 19, 20]. In this study, the higher prevalence of non-ischemic chest pain was 42.5% among patients with the age group of more than 50 years. Similar results were seen in a Canadian study conducted in Ontario [9], Suzhou Kowloon Hospital and Wuhan Asia Heart Hospital China [21] and North American centers in 2016 [22]. In contrast, the findings of a study conducted in Germany (2018) revealed that as age increased the level of non-ischemic chest pain decreased [23]. The findings of this study suggested that overall, 90.26% of participants suffered with non-ischemic chest pain. These finding were not supported by the study conducted in Canada (2012) and Norway (2003), where the non-ischemic chest pain was found 74% and 18% respectively [15, 24]. Findings of this study revealed that the majority of the participants (75.4%) were married. These finding supported by the Iran study conducted in 2017 [25]. In addition, this study highlighted that age of the participants was significantly associated with pain. Similar findings were recorded in the study conducted in the US in 2017, where age showed significant link with angina [26]. Finding of our study highlights that there is a significant association of disease history with post PCI non-ischemic pain. Similar kind of finding found in a study, where significant association was identified of disease history with coronary artery diseases [27]. This study highlighted that majority of the participants had their education at below primary level 74 (37.9 %). Study conducted at Changsha China in 2018 showed that most of the participants had primary education 69 (34.2%) [28]. Furthermore, this study showed that monthly income ranges from 10,000 to 20,000, 89(45.6%) while study from China also support these findings as they had 1001-3000 yuan 76 (37.6%) per month income [28]. Findings of this study showed that mostly participants were doing private job 98(50.3 %), on the other hand, the study conducted in Greece where highlighted participants 55 (55.0%) were Pensioner [29]. Moreover, in this current study 3/4 of the participants in drug history was responded "No" by the participants. Study conducted in China (2018) showed that more than half of the participants had taken medication

[28]. In this study, moderate pain was reported higher after PCI 96 (49.23%), similar findings were found in study conducted in Amman in 2021 where pain was also on moderate level [30]. It could be due to nature of chest pain is non-ischemic.

CONCLUSIONS

The finding of this study indicated that moderate pain level was seen in the majority of the post PCI patients. Marital status, gender, disease history, age and drug history were significantly related to post PCI non-ischemic chest pain.

Authors Contribution

Conceptualization: SN

Methodology: AA

Formal analysis: AA, AR

Writing-review and editing: SN, TA

All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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