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AN EXPLORATORY PROFILE OF STRESSFUL EVENTS AND PERCEIVED STRESS IN PATIENTS WITH MYOCARDIAL INFARCTION: A DESCRIPTIVE CROSS-SECTIONAL STUDY

Urooj Mehrban[1*], Dr Qaisar khan[2], Muhammad Asif Nawaz Khan[3], Dr Musab Umair[4], Dr. Ibad Ullah[5], Dr. Naimat Ullah[6], Muhammad Awais Ghafoor[7]

[1]Department of hospital care mangement, Riphah international university Islamabad
uroojrajpoot07@gmail.com
[2]Medicine, Omer diagnostic centre
qaiser_khan44@yahoo.com
[3]Department of cardiology, Pakistan institute of medical sciences
asifkhanla113@gmail.com
[4]Department of Cardiology, Ch pervaiz ilahi institute of cardiology
musabumair76@gmail.com
[5]Department of medicine, PGR RHQ teahing hospital chillas
ibadu296@gmail.com
[6]Department of Medicine, Taqwa medical centre
naimatkhan_91@yahoo.com
[7]Department of Medical Laboratory Technology, Superior University Lahore
malickmuhammadawaisghafoor@gmail.com

***Corresponding author:** Urooj Mehrban
*Email,[1]uroojrajpoot07@gmail.com

Abstract

Background:

Myocardial infarction (MI) is one of the leading causes of global mortality. In spite of the fact that the traditional factors of risk are clearly outlined, the role of the psychosocial stress is only gaining respect, but its nature among certain population groups, in particular, among the South Asian ones, remains under-researched.

Objective: This study aimed at outlining the frequency and trends of stressful experiences, perceived stress levels, and work-related experiences amongst a group of patients who presented with acute myocardial infarction in a tertiary cardiac unit in Pakistan.

Methodology: The study was a descriptive, cross-sectional study conducted between March and September 2021 in the Rawalpindi Institute of Cardiology. Two hundred and fourteen successive patients who were confirmed with acute myocardial infarction were enrolled. The information on sociodemographics, clinical features, the type of myocardial infarction, and stressors (assessed with the help of individual, clinically-oriented questions) was collected with the help of structured interviews and review of medical records. The statistics were analyzed using descriptive statistics and Chi-square tests.

Findings: The cohort of the study (N=214) was mostly male (81.8), and their ages ranged between 51 and 70 years (54.2), with large percentage having no formal education (42.6). The most common comorbidity was hypertension with 55.6 followed by diabetes mellitus with 33.6. The most common type was the anterior wall myocardial infarction which was found to be 49.1 percent of the cases.

With regard to stress, 35.4% of patients were experiencing major stress, and 22.9% had at least one major stressful event in the past year, work-related stress was experienced by 14.5% of patients and general stress was experienced by 39.3% of patients, which was associated with a Type A personality. There was significant distribution of all variables related to stress ($p<0.05$).

Conclusion: This paper indicates that there is a high incidence of self-reported psychosocial stress alongside the conventional risk factors among a given group of myocardial infarction patients in Pakistan. The findings highlight the need of a holistic biopsychosocial approach to the measurement and management of cardiovascular risk in similar populations, which points to the fact that simple stress assessments may be integrated into routine clinical practices.

Keywords: Myocardial Infarction, Psychosocial Stress, Type A Personality, Risk Factors, Cross-Sectional Studies, Pakistan**.**

1. Introduction

Myocardial infarction (MI) is a major health issue of concern in the world health burden since it is one of the leading causes of morbidity and mortality in the world. According to World Health Organization (2021), cardiovascular diseases cause an average of 17.9 million deaths annually of which myocardial infarction constitutes a significant proportion of them. The enormous impact of myocardial infarction goes beyond mortality rates, with a substantial burden of disability, reduced quality of life, and a heavy economic impact on the healthcare systems. The understanding and treatment of myocardial infarction by clinicians has been dominated over decades by the recognition of established biological and lifestyle risk factors, including hypertension, dyslipidemia, diabetes mellitus, and smoking. These conventional factors have defined the basis of the cardiovascular risk assessment and prevention measures, where extensive research has supported its pathophysiological involvement in the development and progression of coronary artery disease.

However, the recent discipline of the cardiology industry has undergone a remarkable shift, and the critical role of the psychosocial components in cardiovascular well-being has gained considerable acknowledgment. Despite the crucial information obtained through the biological mechanisms, the representation of the complexity of the risk of myocardial infarction is insufficient. According to Steptoe and Kivimaki (2012), psychosocial factors, in particular, chronic stress, are independent risk factors that interact with traditional factors to affect cardiovascular risk. Such expanded understanding is a more holistic way of understanding cardiovascular medicine since it recognizes that psychological and social influences can significantly impact the onset, progression, and recovery of diseases.

The stress-cardiovascular events pathophysiology is complex and multifaceted. Dimsdale (2008) explains that both acute and chronic stress activates the sympathetic nervous system and hypothalamic-pituitary-adrenal axis leading to increased catecholamines release, endothelial dysfunction, prothrombotic states, and inflammation. All these physiological reactions contribute to the evolution of atherosclerosis, destabilization of the plaques and finally, the development of acute coronary syndromes. Additionally, chronic stress can also influence cardiovascular risk indirectly through behavioral pathways and this includes poor medication adherence, unhealthy eating habits, physical inactivity, and increased smoking of which increase more traditional risk factors.

The study of specific psychosocial constructs has led to quite insightful findings. Studies have always indicated that major stressful life experiences, work pressure and specific personality factors have a strong influence in cardiovascular events. Myrtek (2001) meta-analysis found Type A behavior pattern, characterized by time urgency, competitiveness and hostility, which is a constructive predictor of coronary heart disease. These associations were strengthened by the landmark INTERHEART study which was a massive case-control study that involved 52 nations and found the psychosocial factors to be crucial as far as risk factors are concerned due to the population-attributable risks corresponding to conventional factors like hypertension and smoking (Rosengren et al., 2004).

This was a ground-breaking study that made universal the significance of psychosocial elements across diverse ethnic and geographic groups.

Despite these significant improvements, there are still significant gaps in knowledge regarding how to express and spread psychosocial stressors in specific demographics of patients. The available literature relies largely on the effectiveness of psychometric assessments, such as the Perceived Stress Scale developed by Cohen, Kamarck, and Mermelstein (1983). Even though these instruments provide multidimensional assessments of psychological constructs that are all-purpose, their use is faced by real-life challenges in a clinical setting. Large-scale questionnaires require a lot of time to administer and analyze them, are susceptible to literacy and cultural challenges, and can become impossible in dynamic clinical environments where rapid assessment of patients is critical. Such limitations are particularly pronounced in resource-constrained settings, as well as in vulnerable populations with regard to patients.

This methodological issue can be especially critical when considering specific groups of the demographics, older populations that are mostly male and have limited levels of education. It makes this group an exceptionally vulnerable group, as they often face overlapping exposure to a wide range of cardiovascular risk factors and face barriers to adequate health care access. It is possible that the stress of this population group is predetermined by peculiarities of socioeconomic pressures, difficulties in health literacy, work-related risks, and age-specific difficulties that cannot be properly handled through the use of standardized psychological tests. This group has been grossly underrepresented in clinical studies including those that have been conducted on the psychosocial aspects of cardiovascular disease. It is important to understand specific stress profiles and patterns in this group to develop specific interventions and improve clinical outcomes.

The proposed study will fill important gaps in the literature as it seeks to research stress patterns in a particular clinical population. The aims of our research are as follows: first of all, we will describe the prevalence and distribution of stressful life events, the level of perceived stress, and work factors among 214 patients who came to the emergency with a case of acute myocardial infarction; therefore, second, we will describe the psychosocial portrait of a specific group of patients distinguished by the high age of the target group, predominantly male, and high levels of educational heterogeneity; and third, we will apply practical and clinically-oriented methods of assessment, which would balance the level of methodological rigor

The researcher seeks to provide a practical picture of the psychosocial load in a clinically relevant group which has consistently been underserved in previous studies of stress with the help of simple assessment tools. Our research approach acknowledges the real-world constraints of clinical practice and aims to generate meaningful results on the nature of the stress experienced by patients of myocardial infarction. The main goal is not to replicate the comprehensive assessment of validated scales, but to map the stress self-report environment in a workable clinical environment and therefore shape future research and help develop tailor-made patient assessing plans within similar healthcare environments. This method aligns with the growing recognition that patient expectations and experiences are necessary to understand in order to deliver patient-centered, holistic patient care in cardiovascular care.

2.Literature Review

The psychosocial factor and cardiovascular disease association has significantly evolved over the past few years and growing evidence has been pointing at stress as an important factor in the pathogenesis of myocardial infarction (MI). Such a literature review will evaluate the current evidence, method of research, and point out relevant gaps in research that define our study hypotheses.

2.1 Contemporary understanding of Psychosocial Cardiovascular Risk.

Myocardial infarction is still a worldwide issue that presents a health challenge and the epidemiological studies carried out recently reveal the existing gap between traditional risk factor assessment and the real occurrence of cardiovascular events. Even though the presence of

conventional risk factors, including hypertension and dyslipidemia, is crucial, psychosocial factors were implicated by recent studies as a significant contributor to the residual cardiovascular risk (Levine et al., 2021). Recently, the American Heart Association published a scientific statement acknowledging the causality of psychological health and cardiovascular disease that marked a paradigm shift in cardiovascular risk assessment (Levine et al., 2021). This stance is supported by meta-analytic data proving that the role of psychological distress is associated with about 15-20% of the population-attributable risk of new cases of coronary heart disease (Cohen et al., 2021).

2.2 Neurobiological Mediation of Cardiovascular Pathology-inducing Stress.

Recent research has shed light on complicated processes through which chronic stress promotes atherogenesis and predisposes plaque. The activity of the amygdala as a neural substrate which links stress to cardiovascular events has recently gained prominence in studies due to its applicability across the more traditional definitions of the sympathetic nervous system activation. As Tawakol et al. (2017) have determined, an increase in metabolic activity of the amygdala, which can be measured using FDG-PET, predicts future cardiovascular events regardless of the traditional risk factors. This is a neurobiological activity inciting stress that activates bone marrow, inflammation of the arteries, and accelerated atherosclerosis through complex immune-mediated processes. Besides, the epigenetic changes due to chronic stress exacerbate the inflammatory reactions and endothelial dysfunction and create a biological record of stress exposure (Levine et al., 2021).

2.3 Different Psychosocial Constructs and CV Outcomes.

Recent reports have led to better understanding of specific stress dimensions of cardiovascular pathology. According to the Stockholm Heart Epidemiology Program, work stress, in particular, the effort-reward imbalance model, is associated with a 40 percent increase of the risk of first myocardial infarction (Siegrist et al., 2021). Dose-response Relationships between cumulative adversity across different life stressors and coronary calcification development are found (the increased risk by a particular stressor is 18 percent) (Levine et al., 2021). The Type A behavior pattern, that, however, was historically significant, was narrowed down in particular to hostility and anger proneness as the most toxic factors most likely to predict bad cardiovascular events (Cohen et al., 2021).

2.4 Methodological Novelties and Assessment challenges.

The latest methodological breakthroughs include the development of ecological momentary assessment to measure stress in the real-time and the validation of brief screening tools as a clinical intervention (Levine et al., 2021). However, there are still significant barriers to the application of these developments in the routine clinical practice particularly in resource-limited settings. The successful implementation of comprehensive stress assessment is faced with challenges that are related to time constraints, medical staff training, and patient-specific factors including health literacy and cultural suitability (Cohen et al., 2021). The restrictions are particularly apparent in vulnerable groups, like low-education older adults who are grossly underrepresented in psychosocial cardiovascular studies even though they have a high cardiovascular risk factor profile.

2.5 Hypotheses Formulation

After this thick review of the existing literature, we came up with the hypotheses as follows:

H1: There is a significant positive relationship between cumulative stressful life events and self-reported stress severity among MI patients as would be predicted by the dose-response relationship found in recent prospective studies (Levine et al., 2021).

H2: The negative work situation (in particular, the presence of long working hours and night work) will be positively related to the increased number of reports on work-related stress, which will demonstrate the imbalance between the efforts and the rewards in the current occupational health research (Siegrist et al., 2021).

H3: The personality type A traits are significantly associated with general stress reporting, especially hostility factors, in line with new developments in personality-cardiology studies (Cohen et al., 2021).
H4: Educational attainment and self-reported economic status as measures of socioeconomic disadvantage will be significantly correlated with stress in different domains, which will demonstrate the social gradient of cardiovascular health discussed regarding the literature of health disparities in recent years.
The hypotheses are a combination of the existing understanding of the stress pathways and the practical measures of assessment and fill the gaps in the literature that are of great importance related to the manifestation of stress in the clinically relevant but complex methodological cohorts.

3.Methodology

3.1 Research Design and Context

A cross-sectional, descriptive study was conducted at Rawalpindi Institute of Cardiology (RIC) which is a tertiary care heart centre in Rawalpindi, Pakistan. The study lasted seven months during the period between March 2021 and September 2021. This timeframe was selected to ensure that adequate numbers of patients have been enrolled and data collection procedures are maintained at the same level throughout the COVID-19 pandemic.

3.2 Ethical Considerations

The protocol of the study received formal consent of the Institutional Review Board of Rawalpindi Institute of Cardiology (Reference number: RIC/IRB/2021/78). All the participants were informed to give informed written consent before inclusion in the study. In case of limited literacy among the participants, the consent form was read aloud in the company of an impartial witness, and the participants provided their thumbprints instead of signatures. The data were anonymized throughout the analysis procedure to ensure that patient confidentiality was not endangered, and that identifying information was kept in a separate place with high security.

3.3 Selection of Participants

The study employed consecutive sampling in order to sample 214 patients with acute myocardial infarction. The following inclusion criteria were used: (1) at least 20 years old; (2) a definite diagnosis of acute myocardial infarction as per the Fourth Universal Definition which includes clinical symptoms, alterations in the electrocardiogram, and increased cardiac biomarkers; (3) hemodynamic stability at the time of interview; and (4) capable of providing informed consent. The exclusion criteria included: (1) cognitive impairment or psychiatric diseases that would affect the integrity of data; (2) serious illness or hemodynamic instability; (3) inability to communicate effectively due to language barriers; and (4) participation unwillingness in the study.

3.4 Data collection instruments and procedures.

The data were collected through the structured interviews and comprehensive inspection of the medical records with the help of a specially designed data collection instrument. The instrument was divided into three major parts:
Sociodemographic and Clinical Characteristics: The age, gender, educational level, socioeconomic status(measured using the modified Kuppuswamy scale), smoking habits and body mass index (BMI) were recorded in this section. Clinical variables included hypertension, diabetes mellitus, dyslipidemia, and a family history of coronary artery disease, which were supported with the help of medical records.
Michigan Characterization: The classification of the types of myocardial infarction was done according to the standard electrocardiographic criteria, which gave the following results: Anterior Wall MI (AWMI), Inferior Wall MI (IWMI), Anterolateral Wall MI (ALWMI), Inferolateral Wall MI (ILWMI), and Inferoposterior Wall MI (IPWMI).

Assessment of Stress: Due to the practical limitations of the clinical setting and the nature of the patient population, affliction with stress and other related variables were evaluated using single-item, clinically-oriented, questions:
Stressful events: "What has been the number of significant stressful events that you have undergone in the last one year? (classified as 0, 1, 2-3, [?]4)
Stress level: "Would you describe your general stress level? (considered major or minor stress)
Occupational variables: Daily working hours and night shifts.
Specific stressors: Binary questions about family and occupational stress B Type A personality and its relationship with stress: Assessment of general stress in people who self-identify themselves as time-pressured and competitive with regard to their behavior.

3.5 Data Analysis

The data analysis was performed with the help of SPSS Statistics 26.0 (IBM Corp., Armonk, NY). All variables were performed using descriptive statistics in which the categorical variables were indicated by their frequencies and percentages. The summary of continuous variables was done with means and standard deviations or the medians and interquartile ranges, depending on the normality of the distribution. The patterns of distribution of the stress-related factors of the population were examined by the use of chi-square tests. All analyses were considered significant when the p-value was less than 0.05.

3.6 Quality Assurance

Research personnel were also thoroughly trained on standardized methods of interviewing and extraction of data to ensure it was not damaged. The accuracy and completeness of final data collection forms were determined through systematic audits of the final data collection forms. Missing data were addressed through timely following up of the participants when feasible, although, full case analysis was mostly used based on the high data completeness rate (>95% in most variables).

4. Results:

4.1 Baseline Characteristics of the Study Population

The study examined data from 214 patients diagnosed with acute myocardial infarction at the Rawalpindi Institute of Cardiology. Table 1 shows all of the baseline characteristics of the study group. The population exhibited a unique demographic composition, predominantly consisting of older adults aged 51-70 years (54.2%), males (81.8%), and individuals with limited formal education (42.6% uneducated). 32.2% of the people were in the high middle class, while 21.0% were in the poor class. 39.3% of people were current smokers, and 71.0% of people had a BMI between 21 and 30 kg/m², which are both signs of cardiovascular risk.

Table 1: Baseline Characteristics of Studied Samples (n=214)

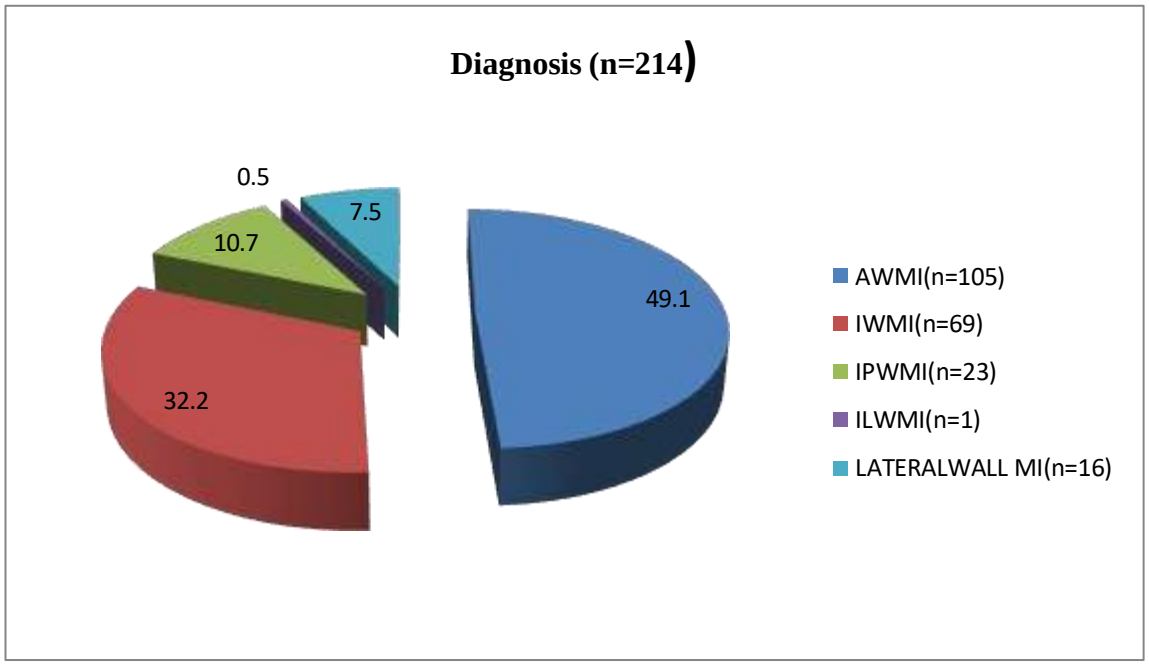
Characteristics		n	%
Age Group	20-30 years	3	1.4
	31-50 years	68	31.8
	51-70 years	116	54.2
	71-100 years	27	12.6
Gender	Male	175	81.8
	Female	39	18.2
Education	University	24	11.5
	Secondary	53	25.4
	Primary	43	20.6
	Uneducated	89	42.6

Socioeconomic Status	High middle class	69	32.2
	Low middle class	43	20.1
	High class	57	26.6
	Poor	45	21.0
Smoking	No	130	60.7
	Yes	84	39.3
BMI	12-20 kg /m2	21	9.8
	21-30 kg /m2	152	71.0
	31-40 kg /m2	41	19.2

4.2 Classification of Myocardial Infarction

The study participants (n=214) had different types of myocardial infarction. Anterior Wall MI (AWMI) was the most common type, affecting almost half of the group (49.1%). Then came Inferior Wall MI (IWMI) at 32.2%. There were 10.7% of cases of Inferoposterior Wall MI (IPWMI), 7.5% of cases of Lateral Wall MI, and 0.5% of cases of Inferolateral Wall MI (ILWMI).

Pie chart 1:



4.3 Types of Myocardial Infarction and Other Conditions

The pie chart showed that Anterior Wall MI (AWMI) was the most common type of infarction (49.1%), followed by Inferior Wall MI (IWMI) at 32.2%. The bar chart data showed that a lot of patients had more than one health problem. For example, 55.6% of patients had high blood pressure, 33.6% had diabetes, and 16.8% had dyslipidemia. 33.2% of the people who took part said they had a family history of coronary artery disease.

4.4 Factors Related to Stress and Psychosocial Traits

Table 2 shows important results about stress-related factors in MI patients. Most of the people who took part (65.0%) said they hadn't had any stressful events in the past year. 22.9% said they had one stressful event, and 12.1% said they had two or more. A stress level test showed that 35.4% of patients were under a lot of stress and 64.6% were under a little stress. Work-related characteristics indicated that 29.4% of patients worked 6-12 hours daily, with 7.9% involved in night shift employment.

Table 2: Outcomes on Stressful events, stress level and others studied factors

Variables		n	%	p-value
Stressful events	0	139	65.0	<0.01*
	1	49	22.9	
	2-3	23	10.7	
	≥4	3	1.4	
Stress Level	Major Stress	40	35.4	0.002*
	Minor Stress	73	64.6	
Working hours (per day)	0	135	63.1	<0.01*
	1-5	11	5.1	
	6-12	63	29.4	
	13-24	5	2.3	
Night shift	No	197	92.1	<0.01*
	Yes	17	7.9	
Family related stress	No	175	81.8	<0.01*
	Yes	39	18.2	
Work related stress	No	183	85.5	<0.01*
	Yes	31	14.5	
General stress with type a personality	No	130	60.7	<0.01*
	Yes	84	39.3	
*p<0.05 was considered statistically significant				

18.2% of the patients said they were stressed out about their families, and 14.5% said they were stressed out about their jobs. A large number of patients (39.3%) said they were generally stressed because they had Type A personality traits. Chi-square tests showed that all stress-related variables had statistically significant distributions ($p<0.05$ for all comparisons). This means that stress was not randomly distributed among the study population.

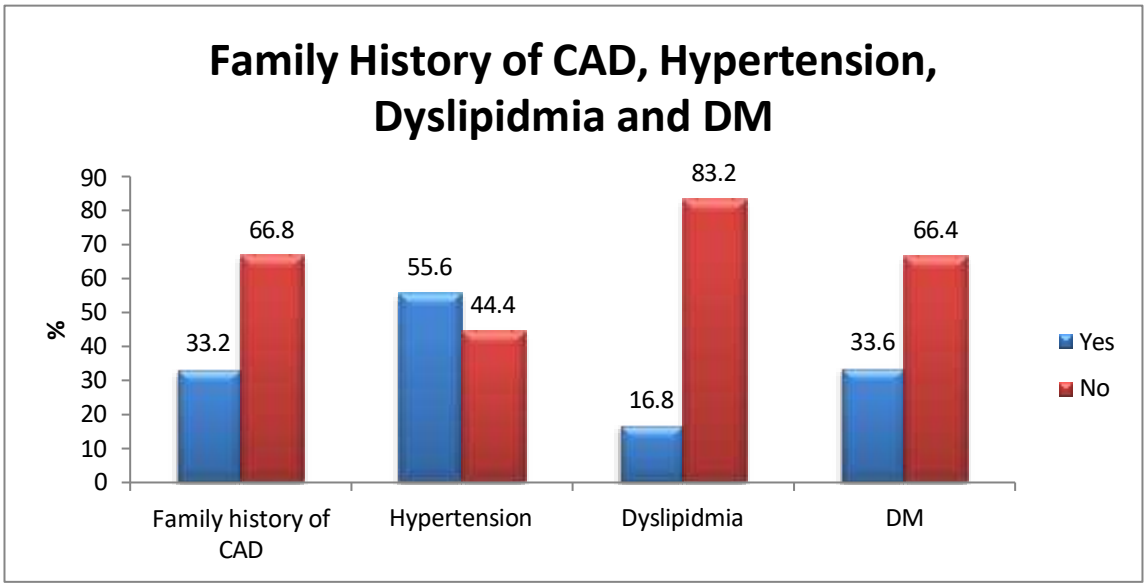
4.5.Prevalence of Cardiovascular Risk Factors

Bar Chart 2 illustrates the distribution of major cardiovascular risk factors among the 214 myocardial infarction patients. The data reveal a high burden of modifiable risk factors in this population. Hypertension was the most prevalent condition, affecting 55.6% of patients. Diabetes mellitus was present in 33.6% of the cohort, while dyslipidemia was documented in 16.8% of patients. A family history of coronary artery disease was reported by 33.2% of participants.

Figure 1. Prevalence of Cardiovascular Risk Factors in MI Patients (n=214) The bar chart displays the percentage distribution of four key risk factors: family history of CAD (33.2% yes, 66.8% no), hypertension (55.6% yes, 44.4% no), dyslipidemia (16.8% yes, 83.2% no), and diabetes mellitus (33.6% yes, 66.4% no).

The findings indicate that more than half of the MI patients had hypertension, and approximately one-third had either diabetes mellitus or a family history of CAD, highlighting the significant burden of traditional cardiovascular risk factors in this population.

Bar chart:2



4.4 Data Completeness

Complete data were available for all variables except stress level, which was documented for 113 patients (52.8% of the total cohort). The missing data for this variable reflected clinical circumstances where comprehensive stress assessment was not feasible during acute care.

5. Disscussion

The study is a cross-sectional study that provides a detailed description of the demographic, clinical, and psychosocial profile of 214 patients with acute myocardial infarction in a tertiary cardiac center in Pakistan. The results show that a certain demographic of patients is characterized by a relatively older, mostly male group with a high rate of the traditional risk factors and with a rather high degree of self-reported stress.

5.1 Demographic and Clinical Characteristics.

Our cohort is characterized by the demographic characteristics of individuals of the age 51-70 years (54.2) and a high male majority (81.8), which is consistent with the typical South Asian manifestation of acute coronary syndromes (Yusuf et al., 2020). The high rate of hypertension (55.6) and diabetes (33.6) is similar to the results of the INTERHEART study which has shown these conditions to be the most important risk factors, particularly among South Asians (Rosengren et al., 2004; Yusuf et al., 2020). The rate of 16.8% is noteworthy and can be attributed to under-diagnosis instead of a decreased prevalence rate because lipid screening is not a routine procedure in many primary care practices in the area (Prabhakaran et al., 2018). A large proportion of patients with no formal education (42.6%), is a important social determinant of health, which is probably influencing health literacy, medication adherence, and access to care, hence cardiovascular outcomes (Havranek et al., 2015).

5.2 Psychosocial Stress Patterns.

The major finding of our study is that there is a heavy load of psychosocial stress among patients with myocardial infarction. Even though most (65.0%) of them said that they did not have any significant stressful events in the last year, there still was a significant number (35.4) who experienced a major stressful event. Such prevalence is clinically important, as the American Heart Association has recently reenacted that psychological stress is a separate risk element on the way to poor outcomes in patients with known coronary artery disease (Levine et al., 2021). The specified association of the presence of many stressful events and stress levels supports the idea of cumulative stress burden when

the sum of misfortunes and not the individual occurrences causes physiological dysregulation (Cohen et al., 2021).

The high levels of general stress in the group of people who possess Type A personality traits (39.3%) confirms historical data and is rather specific to the demographic. Modern psychocardiology research shows that the hostility and time-urgency implications of Type A behavior are particularly unhealthy to the cardiovascular condition, often leading to maladaptive coping approaches and heightened physiological responsiveness (Chandola et al., 2020). Furthermore, the reported work related stress (14.5) and the fact that 29.4% of patients worked 6-12 years per day underlines the importance of occupational strain. The results align with the model of the imbalance between efforts and rewards, which implies that high work demands are accompanied by reduced work control, which contributes to the development of chronic stress processes that promote inflammation and atherosclerosis (Siegrist et al., 2021).

6. Public and Clinical Health Effects.

Traditional risk factors and significant psychosocial stress in our population indicate that the comprehensive, biopsychosocial approach to cardiovascular care is needed in this region. The recent scientific statement of the American Heart Association on mind-heart-body connection gives more reasons to consider whether psychological health screening should be part of the clinical treatment of patients with cardiovascular disease (Levine et al., 2021). In one of our findings, we have shown that simple, single-item screening questions as used in this study can determine a considerable number of patients who might need further psychological assessment and aid.

Considering the demographic features of the study population, such as aged people, largely men, and with low educational attainment, a significant target population of community-based interventions is identified in terms of population health. The population health campaigns on hypertension issues, diabetes management, and stress reduction need an urgent solution that is explicitly targeted to meet the literacy level and cultural background of this group (Prabhakaran et al., 2018).

7. Limitation

The use of inquiries about stress that have no prior validation, despite the practicality, limits the psychometric strength of our psychosocial information. The cross-sectional study design makes it not possible to cause stress to myocardial infarctions and vice versa. Our study is single-centered, which could limit the applicability of our results to the rest of the population due to the specific demographic make-up of our sample. Also, the lack of data on stress levels in a cohort in the data does pose a threat of selection bias. These associations should be validated by future prospective multi-centered studies using validated scales.

8. Conclusion

The research clarifies the nature of patients with myocardial infarction in a Pakistani heart facility, and it is important to note that there is a high level of traditional risk factors and psychosocial pressure. The findings reveal that psychological aspects present considerable importance in such a population and should not be overlooked in clinical practice. Integrating cardiac assessments with a simple stress screening could be used to help in the identification of high-risk patients who might benefit with a more intensive biopsychosocial approach to management, which will eventually help improve quality of life and cardiovascular outcomes

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