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RESEARCH ARTICLE
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UNDERSTANDING THE DETERMINANTS OF CARDIOVASCULAR RISK FACTORS AND STROKE AWARENESS AMONG PATIENTS: A CROSS SECTIONAL STUDY.

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ABSTRACT

Background Heart disease and stroke are ravaging Pakistan, resulting in approximately 400,000 deaths each year. Immediate attention and action are crucial to combat this growing health crisis. By focusing on prevention, awareness, and healthy lifestyles, Pakistan can work towards reducing the alarming rate of cardiovascular-related fatalities and improving overall public health. **Objective:** This study aimed to assess the awareness of heart disease and stroke among cardiac patients to assess the efficacy of current education efforts.

Methodology The study involved two hundred fifty-one cardiac inpatients and outpatients. An unaided questionnaire assessed respondents' knowledge of cardiovascular risk factors, symptoms of heart attack and stroke and actions in the event of cardiovascular emergency. Demographic data and relevant medical history were also obtained. **Study place and duration** The study was conducted at Jinnah postgraduate medical centre between January 2024 to December 2024. **Results**: The study found that cardiac patients exhibited a relatively good understanding of heart attack warning symptoms and demonstrated adequate knowledge of appropriate actions to take during cardiovascular emergencies. However, despite this awareness, they showed a significant knowledge gap regarding the most critical risk factors for cardiovascular disease. Furthermore, their understanding of stroke symptoms was alarmingly poor. Notably, patients' socioeconomic status and personal history of heart attack or stroke were positively correlated with better knowledge, suggesting that these factors play a significant role in shaping patients' awareness and understanding of cardiovascular health. This highlights the need for targeted education and awareness initiatives, particularly for those from lower socioeconomic backgrounds and without a personal history of cardiovascular events, to improve their knowledge and ultimately enhance cardiovascular health outcomes.

Conclusions The study concluded that future patient education initiatives should focus on raising awareness about key cardiovascular risk factors, recognizing cardiovascular warning symptoms (especially stroke symptoms), and knowing appropriate actions during emergencies. Targeted interventions emphasizing primary and secondary prevention should prioritize low-income cardiac

patients to enhance knowledge, promote timely medical interventions and improve cardiovascular health outcomes.

Key Words: Heart attack, Stroke , Myocardial infarction, Public health education, Prevention

INTRODUCTION

Heart disease and stroke are the leading causes of death in Pakistan, accounting for approximately 30% of all fatalities[1]. According to recent statistics, cardiovascular diseases, including heart attacks and strokes, resulted in 317,850 deaths in 2020 alone, making up 21.19% of total deaths in the country. This alarming trend is attributed to a combination of factors, including sedentary lifestyles, poor nutrition, smoking, uncontrolled diabetes, and lack of awareness about heart health[2,3]. Both heart disease and stroke share common risk factors, including high blood pressure, high cholesterol, diabetes, smoking, and obesity, which can be managed through lifestyle modifications and medical interventions. Understanding the causes, symptoms, and risk factors of heart disease and stroke is crucial for prevention, early detection, and effective management, ultimately reducing the burden of these conditions on individuals and communities[4,5]. According to the Health Belief Model, having adequate knowledge about heart disease and stroke is crucial for behavior modification and prompt, proper emergency action, ultimately leading to effective treatment[6].

Studies have shown that Pakistan is facing a cardiovascular emergency, with a growing number of patients in their 30s and 40s presenting with advanced coronary artery disease[7]. The World Health Organization (WHO) has warned that Pakistan faces an increasing risk of cardiovascular diseases due to unhealthy diets, physical inactivity, smoking and rising stress levels. To combat this growing health crisis, health experts and policymakers are advocating for urgent, nationwide reforms to prioritize prevention, early detection, and equitable access to care[8-10]. Many researches assessed the awareness of heart disease and stroke among cardiac patients which revealed that cardiac patients had relatively good knowledge of heart attack warning symptoms and emergency response, they lacked awareness of key cardiovascular risk factors and stroke symptoms. Notably, socioeconomic status and personal history of heart attack or stroke were positively correlated with better knowledge[11-12].

The burden of cardiovascular diseases in Pakistan underscores the need for targeted interventions, public awareness campaigns, and policy reforms to promote heart health and reduce mortality rates. By prioritizing prevention, early detection, and equitable access to care, Pakistan can work towards mitigating the impact of heart disease and stroke on its population[13]. Studies have shown that timely administration of thrombolytic therapy can significantly reduce morbidity and mortality in heart attack patients, while early treatment with intravenous tissue plasminogen activator can improve outcomes in stroke patients when administered within three hours of symptom onset[14,15].

The study highlighted the need for targeted patient education initiatives that focus on primary and secondary prevention, particularly for low-income cardiac patients. By improving patients' understanding of heart disease and stroke, healthcare providers can empower them to take prompt and proper action in emergency situations, ultimately reducing morbidity and mortality.

OBJECTIVES

The study aimed to assess the level of cardiovascular knowledge among cardiac patients, focusing on their awareness of cardiac risk factors, warning symptoms, and appropriate emergency actions in case of a heart attack or stroke. By evaluating this knowledge, the study sought to gauge the effectiveness of current education efforts and inform the development of targeted health promotion

initiatives for this high-risk population. The research also aimed to identify specific knowledge gaps and misconceptions about heart disease and stroke among cardiac patients, ultimately informing strategies to improve their understanding and promote better health outcomes.

METHODOLOGY

The study included a a 30-item questionnaire to collect data from 251 cardiology inpatients and outpatients at Jinnah Postgraduate Medical Centre. The questionnaire was designed to assess patients' knowledge of heart disease and stroke risk factors, warning symptoms, and appropriate emergency actions. Participants were inpatients from the coronary care unit and cardiology ward, as well as outpatients attending cardiology clinics. Patients were asked to list risk factors for heart disease and stroke. Patients' knowledge was classified as good if they could identify at least two correct risk factors or warning symptoms. Demographic variables, including age, sex, education level, household income and medical history, were also collected.

STATISTICAL ANALYSIS

The study used SPSS 22.0 for statistical analysis. Descriptive data presented as frequencies and percentages, and predictors of knowledge identified using chi-squared and multiple logistic regression analysis. Multiple logistic regression analysis was employed to identify predictors of knowledge outcomes. Specifically, this analysis aimed to determine the factors that predict patients' ability to identify risk factors, recognize heart attack warning symptoms, and recognize stroke warning symptoms. By using this statistical technique, the study could assess the relationships between various demographic and clinical variables and these knowledge outcomes, while controlling for potential confounding factors.

RESULTS

In the study,the respondents comprised 48% inpatients from the cardiology ward and coronary care unit, and 52% outpatients attending cardiology clinics. The median age of the participants was 66 years, with a male predominance of 63%.

Table 1: Demography and characterstics of patients

Characteristic	**n (%)**
Age >65 years	126 (50.2)
Sex (male)	159 (63.3)
Inpatients	120 (47.8)
Level of education ≥ college	129 (51.4)
Household income>80k	91 (36.3)*
History of heart disease	74 (29.5)
History of stroke	12 (4.8)

Notably, a significant proportion of the study participants had a history of cardiovascular events, with 74 individuals having a history of heart disease and 12 having a history of stroke, highlighting the high-risk profile of the study population.

These demographic and clinical characteristics provide valuable context for understanding the patients' knowledge and awareness of cardiovascular disease

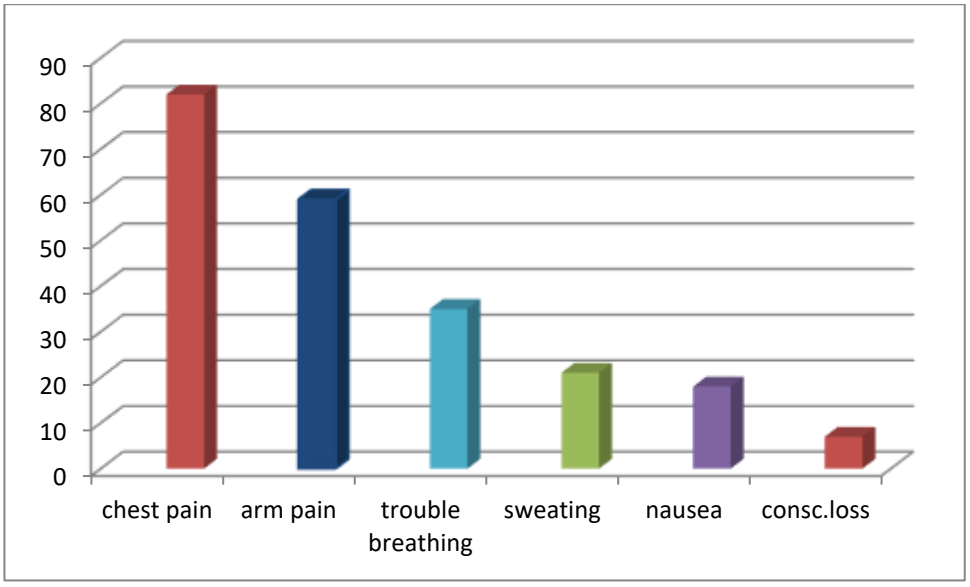

Fig 1: Percentage of cardiac patients who identified a heart attack warning symptom

The most common risk factors for heart disease and stroke identifies as smoking, diet, stress, inactivity or lack of exercise, and genetics. However, only smoking was recognized by more than 50% of patients. In contrast, alcohol abuse, hypertension, diabetes, age, and sex were the least commonly identified risk factors. Despite this, 87% of subjects demonstrated good knowledge by naming at least two risk factors, while 50% showed excellent knowledge by identifying at least four risk factors. A small proportion (8%) were unable to identify any risk factors. Notably, having a household income of 90,000 or more and the absence of a stroke history were significant predictors of good risk factor knowledge.

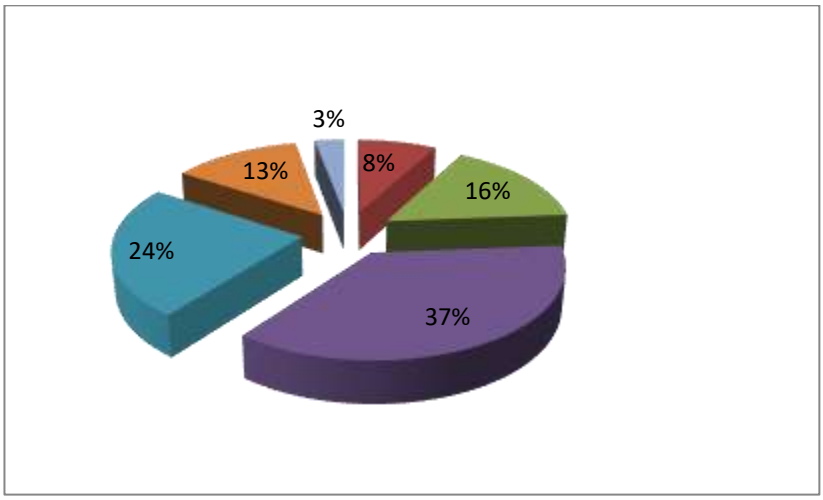

Fig 2: Number of heart disease symptoms identified by cardiac patients

Table 2: Multivariate analysis of good cardiovascular risk factor knowledge

Independent variable	Estimate	Adjusted SE	OR	95% CI	P
Stroke history	–1.659	0.607	0.190	0.058–0.625	0.006
Income ≥80k	1.354	0.570	3.874	1.268–11.839	0.017

The study assessed cardiac patients' knowledge of heart attack symptoms through open-ended questions. The results showed that more than half of the respondents could identify chest pain and

arm pain as symptoms, while 39% mentioned shortness of breath. However, fewer than 25% recognized sweating, nausea, or loss of consciousness as warning signs. Overall, 77% of patients demonstrated good knowledge of heart attack symptoms, although only 16% could list at least four symptoms, and 8% were unable to name any. Notably, patients with a household income of $50,000 or more and those with a history of heart disease were significantly more likely to have good knowledge of heart attack symptoms.

Table 3: Multivariate analysis of good heart attack symptom knowledge

Independent variable	Estimate	SE	Adjusted OR	95% CI
CVD history	1.595	0.455	4.928	2.020–12.025
Income ≥80k	1.182	0.417	3.261	1.440–7.385

Regarding stroke symptom knowledge, the study found that fewer than 25% of patients could spontaneously identify any one symptom, while almost half (48%) were unable to name any stroke symptoms. Only 31% of patients demonstrated good knowledge, and a mere 6% had excellent knowledge of stroke symptoms. The analysis revealed that patients with higher education (beyond college), a household income of 90,000 or more, and a history of stroke were significantly more likely to have good stroke symptom knowledge, highlighting the disparities in awareness and understanding of stroke symptoms among cardiac patients.

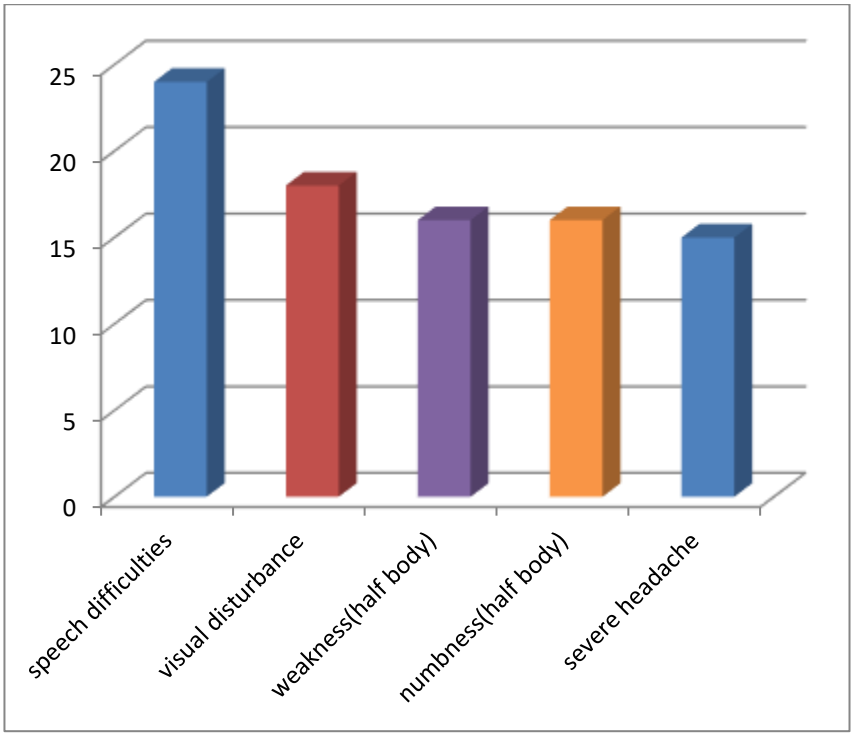

Fig 3: Percentage of cardiac patients who identified a stroke warning symptom

In the event of a cardiovascular emergency, such as a heart attack or stroke, 89% of patients reported that they would either call emergency services or go to the nearest emergency room, indicating good emergency preparedness. However, 10% of respondents stated that they would take less effective actions, such as calling their family doctor, consulting relatives or friends, or waiting for symptoms to subside. Notably, the study did not find any significant predictors of appropriate emergency action, suggesting that patients' knowledge of emergency procedures was not strongly influenced by specific demographic or clinical factors**.**

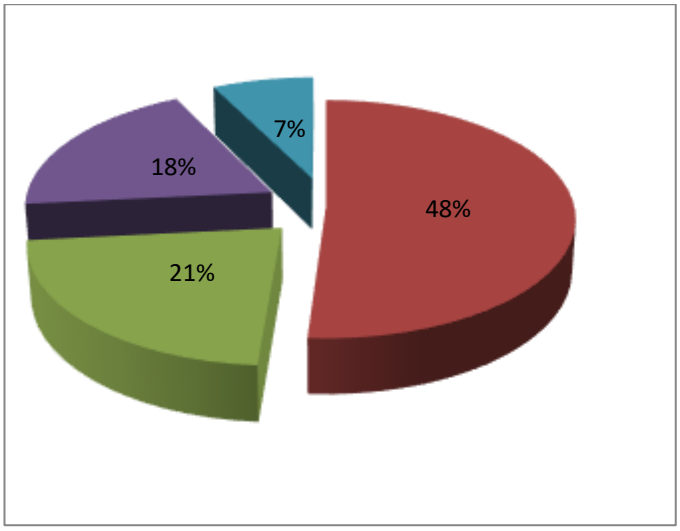

Fig 4: Number of stroke symptoms identified by cardiac patients

Table 4: Multivariate analysis of good stroke symptom knowledge

Independent variable	Estimate	SE	Adjusted OR	95% CI	P
Education ≥ college	0.757	0.364	2.131	1.044–4.350	0.038
Stroke history	1.033	0.511	2.809	1.032–7.647	0.043
Income ≥80k	0.893	0.362	2.443	1.202–4.969	0.014

DISCUSSION

Cardiac patients face a significantly higher risk of heart disease and stroke compared to the general population. In fact, experiencing a heart attack increases the risk of stroke by a substantial margin[15]. Given this elevated risk, it's crucial that cardiac patients are well-informed about cardiovascular risk factors, warning symptoms, and the appropriate course of action in case of a cardiovascular emergency. The study surveyed patients visiting cardiologists due to a history of heart disease or stroke, or those at high risk of developing cardiovascular disease[16-17]. These patients were expected to have a better understanding of these conditions compared to the general public. The survey assessed patients' knowledge of heart disease and stroke using an unaided questionnaire, which revealed that while patients had relatively adequate knowledge of cardiovascular risk factors and emergency action, there were significant knowledge gaps regarding warning symptoms, particularly those related to stroke[18]. The use of an unaided questionnaire provided an accurate representation of patients' knowledge and awareness during cardiovascular emergencies, highlighting the need for improved education and awareness[19,20].

A significant proportion of the surveyed patients, approximately 87%, demonstrated good knowledge of cardiovascular risk factors, being able to name at least two risk factors. This level of awareness is notably higher compared to general population surveys, where typically only 25% to 62% of respondents can identify multiple risk factors[21,22]. Factors such as higher annual household income and a personal history of stroke were associated with better risk factor knowledge. However, despite the overall good knowledge, patients tended to overlook critical risk factors emphasized by the medical community, such as age, sex, diabetes, hypertension, and alcohol abuse. Notably, hypertension, a leading risk factor for stroke, was identified by only 20% of the subjects, highlighting a significant knowledge gap in this area between heart attack and stroke, future education initiatives should prioritize highlighting the importance of hypertension, along with other key cardiovascular risk factors that were underreported in this study[23-25] Encouragingly, the patients' knowledge of heart attack symptoms was relatively good, which is consistent with expectations for this population. Notably, individuals with a history of heart attack and those with

higher household incomes demonstrated better knowledge of heart attack symptoms[26]. However, compared to previous studies, where approximately 90% of respondents could identify chest pain as a heart attack symptom, the present study found a slightly lower rate of 82%[27]. This disparity underscores the need for enhanced education efforts targeting cardiac patients, who should ideally possess a deeper understanding of heart disease warning symptoms compared to the general public. By improving symptom knowledge, healthcare providers can ultimately enhance patient outcomes and reduce the burden of cardiovascular disease[28].

The study revealed a concerning lack of knowledge about stroke symptoms among cardiac patients, with only 31% of respondents demonstrating good understanding. This finding is consistent with previous community-based studies, where approximately 30% of participants showed good knowledge of stroke symptoms. Factors associated with better knowledge of stroke symptoms included post-secondary education, a history of stroke, and higher household income The complexity and variability of stroke symptoms may contribute to the challenges in recognizing them. However, given the significantly increased risk of stroke following myocardial infarction, it is essential for cardiac patients to be well-informed about stroke symptoms. Early recognition of stroke warning symptoms is critical for prompt emergency action and reduced mortality. The study also found that individuals with higher incomes were more likely to have good knowledge of cardiovascular disease, likely due to greater access to health information and resources. In contrast, individuals with lower socioeconomic status may face barriers to accessing health information and resources, highlighting the need for targeted education efforts. Notably, income was a stronger predictor of good knowledge than education level, emphasizing the importance of addressing socioeconomic disparities in health education.

Recognizing the symptoms of cardiovascular emergencies and taking prompt emergency action, such as calling emergency services or seeking immediate medical attention, is crucial for effective care. A study found that a significant majority (89%) of cardiac patients reported they would take proper emergency action in the event of a cardiovascular emergency. However, unlike expected, there were no significant predictors of proper action among the surveyed patients.

The study highlighted the need for comprehensive education on cardiovascular emergencies, including not only promoting proper emergency actions but also addressing potential barriers to seeking care. Issues such as denial, fear of embarrassment due to false alarms, and misconceptions about heart disease and stroke can hinder prompt and effective care. Future education efforts should focus on empowering patients with accurate knowledge, including what actions to avoid during a heart attack or stroke. By addressing these knowledge gaps and misconceptions, healthcare providers can better equip patients to respond appropriately in emergency situations and improve outcomes.

CONFLICT OF INTEREST Nil

CONCLUSIONS

In conclusion, due to the limited understanding of heart disease and stroke among cardiac patients, future educational initiatives should prioritize highlighting key modifiable cardiovascular risk factors, with a particular emphasis on hypertension management. Effective education strategies can significantly enhance patients' awareness of heart attack symptoms, ultimately improving health outcomes. This study's findings underscore the need for targeted patient education programs that focus on bridging knowledge gaps and promoting cardiovascular health.

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