

Effect of Patient Education Programme on Knowledge in Identification of Early Signs and Symptoms of Myocardial Infarction in Young Adults: An Interventional Study Design

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ABSTRACT

Background: In recent years, Myocardial infarction (MI) has a rising incidence among younger adults, yet awareness of its early, atypical symptoms and appropriate emergency response remains inadequate. Patient education may improve early recognition and promote timely medical intervention leading to reduction in morbidity and mortality rates among young adults.

Objective: To evaluate the effectiveness of patient education programme on knowledge regarding the identification of early signs and symptoms of myocardial infarction among young adults.

Methods: A one-group pre-test and post-test interventional study was conducted among 30 asymptomatic young adults aged 18-40 years recruited through convenience sampling. Knowledge was assessed using a self-made validated questionnaire covering MI early signs, symptoms, risk factors, preventive measures, emergency response, and health screening. A structured patient education programme was given, followed by a post-test after two weeks. Pre- and

post-intervention knowledge was compared statistically.

Results: The intervention resulted in a marked improvement in participants' knowledge of MI. Overall mean recognition of MI symptoms increased from 42.3% in the pre-test to 76.3% in the post-test, representing an absolute improvement of 34 percentage points. Recognition of atypical symptoms, risk factors, preventive measures and appropriate emergency response also improved following the intervention.

Conclusion: The patient education programme effectively improved knowledge regarding early MI symptoms and appropriate emergency response among young adults. Structured cardiovascular health education may be useful in promoting early symptom recognition, timely medical care and preventive health practices in this population.

Keywords: Myocardial infarction; Young adults; Patient education; Early symptoms; Cardiovascular health; Emergency response.

INTRODUCTION

Cardiovascular diseases (CVDs) remain a leading cause of morbidity and mortality

worldwide, with the global cardiovascular disease burden projected to increase substantially in the coming decades.^[1] Ischaemic heart disease continues to be a major contributor to this burden, emphasizing the importance of prevention, early recognition, and timely management of cardiovascular emergencies.^[2]

Myocardial infarction (MI), although traditionally considered a disease of older adults, is increasingly recognized among younger individuals, primarily driven by modifiable lifestyle factors such as stress, smoking, obesity, physical inactivity, and post-COVID-19 complications. Premature MI is associated with traditional and non-traditional cardiovascular risk factors, highlighting the need for greater cardiovascular awareness and preventive strategies among young adults.^[3] Delayed recognition of symptoms and delayed contact with medical services can postpone reperfusion and adversely affect outcomes; therefore, prompt recognition and appropriate emergency response are essential.^[4]

Although chest pain or discomfort is the most commonly recognized symptom of MI, other manifestations may include shortness of breath, pain or discomfort in the arm, shoulder, jaw, neck or back, nausea, dizziness, fatigue, and sweating. Awareness of these atypical symptoms remains inadequate, which may contribute to delays in seeking medical care.^[4] Differences in symptom presentation according to age and sex further emphasize the need for comprehensive education regarding both typical and atypical symptoms.

Despite evidence of inadequate public awareness, limited research has evaluated structured educational interventions specifically targeting MI symptom recognition among young adults. Therefore, the present study was undertaken to evaluate the effectiveness of a patient education programme on knowledge regarding identification of early warning signs and symptoms of MI among young adults. The study aimed to assess baseline knowledge

using a self-developed validated questionnaire and to evaluate the effectiveness of the educational programme by comparing pre-test and post-test knowledge. Improving awareness of MI symptoms, risk factors, preventive measures, and appropriate emergency response may facilitate earlier recognition, timely medical intervention, and better preparedness for cardiovascular emergencies.

MATERIALS & METHODS

A pre-post-test experimental study was conducted in a community setting (March–April, 2026) among 30 asymptomatic young adults aged 18–40 years, of all genders, recruited using convenience sampling. Participants were eligible if they consented to participate, were proficient in English, and had no history of myocardial infarction or professionals from healthcare background.

Baseline knowledge was assessed using a self-developed, validated 36-item questionnaire, validated by three subject experts. The questionnaire covered demographic characteristics, knowledge and awareness of MI, immediate actions and emergency response, and prevention and risk perception.

Following the pre-test, a structured patient education programme was conducted covering MI overview, risk factors in young adults, typical and atypical symptoms, differences in presentation across age and sex, immediate first-aid and emergency response, preventive strategies, and recommended routine health screening.

A post-test was conducted two weeks after the intervention using the same questionnaire to assess changes in knowledge and awareness.

Ethical approval was obtained from the Institutional Ethics Committee (Registration No. -EC/NEW/INST/2023/3576) prior to commencement of the study. Written informed consent was obtained from all participants, and confidentiality and

voluntary participation were ensured throughout the study.

Statistical Analysis- Descriptive analysis done using Microsoft excel.

RESULTS

1. Percentage distribution of participants according to age

18-24 years	56.7%
25-30 years	20%
36-40 years	16.7%
31-35 years	6.7%

Table No. 1- Percentage distribution of participants according to age

2. Percentage distribution of participants according to gender

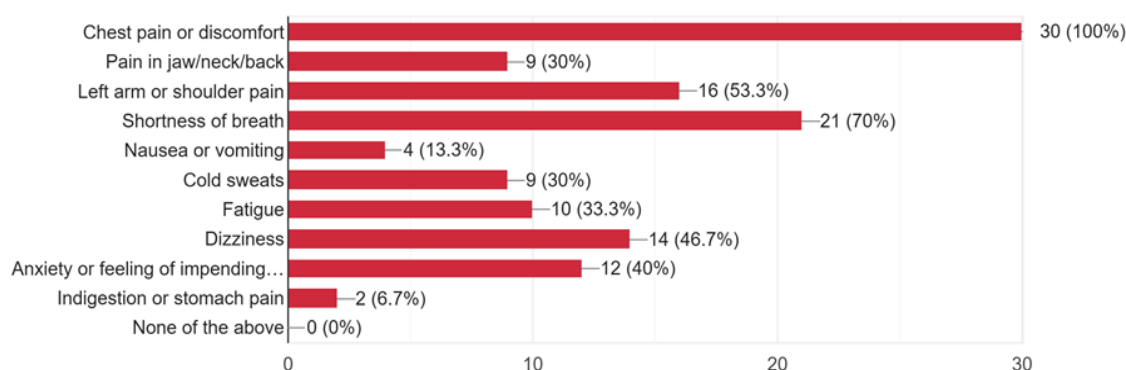
Male	43.3%
Female	56.7%

Table No. 2- Percentage distribution of participants according to gender

3. Percentage distribution of participants by perceived common symptoms of a heart attack

What do you believe are the common symptoms of a heart attack? (Tick all that apply)

30 responses



Bar Graph No.1- Pre test Percentage distribution of participants by perceived common symptoms of a heart attack



Bar Graph No. 2- Post test Percentage distribution of participants by perceived common symptoms of a heart attack

Compared with the pre-test, participants demonstrated improved awareness of all heart attack symptoms in the post-test. While recognition of chest pain/discomfort remained unchanged at 100%, substantial increases were observed for left arm/shoulder pain (53.3% to 93.3%), jaw/neck/back pain (30% to 90%), shortness of breath (70% to 90%), anxiety (40% to 63.3%), cold sweats (30% to 70%),

nausea/vomiting (13.3% to 66.7%), fatigue (33.3% to 66.7%), dizziness (46.7% to 83.3%), and indigestion/stomach pain (6.7% to 40%).

4. Percentage distribution of participants based on their awareness of 'silent heart attacks' (heart attacks without chest pain)

Some heart attacks may occur without chest pain ("silent heart attack")?
30 responses



Pie Chart No. 1, 2- Pre and Post test percentage distribution of participants based on their awareness of 'silent heart attacks' respectively.

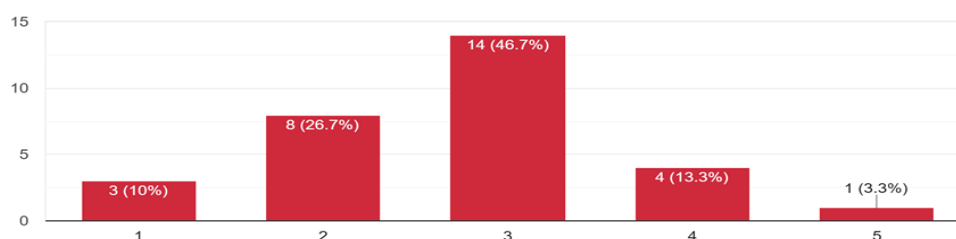
Compared with the pre-test, awareness of silent heart attacks improved from 86.7% to 100%, with all participants correctly recognizing that a heart attack can occur without chest pain after the educational intervention.

and symptoms of myocardial infarction

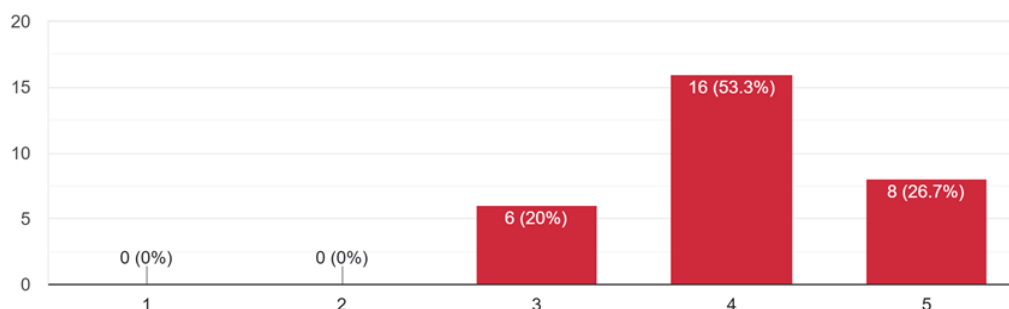
Participants were asked to rate their current knowledge of the early signs and symptoms of Myocardial Infarction on a scale of 1 to 5 (1 being very poor and 5 being excellent), and the results are presented as a percentage distribution.

5. Assessment of participants' knowledge level regarding early signs

On a scale of 1 to 5, how would you rate your current knowledge of the early signs and symptoms of Myocardial Infarction?
30 responses



Bar Graph No.3- Pre test Percentage distribution of participants' knowledge level regarding early signs and symptoms of myocardial infarction



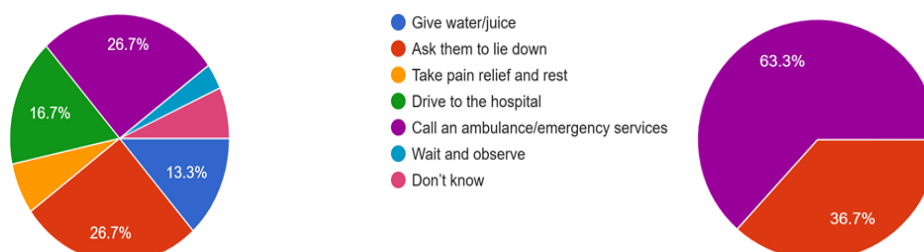
Bar Graph No.4 - Post test Percentage distribution of participants' knowledge level regarding early signs and symptoms of myocardial infarction

Compared with the pre-test, participants reported higher self-rated knowledge of myocardial infarction symptoms in the post-test. Ratings of very poor and poor knowledge (levels 1 and 2) decreased from 10% and 26.7% to 0%, while good and excellent knowledge (levels 4 and 5) increased from 13.3% and 3.3% to 53.3% and 26.7%, respectively. Average ratings

(level 3) decreased from 46.7% to 20%, indicating improved perceived knowledge following the educational intervention.

6. Percentage distribution of participants based on their first action when someone experiences sudden chest pain

If someone has sudden chest pain, what is the first thing you would do?
30 responses



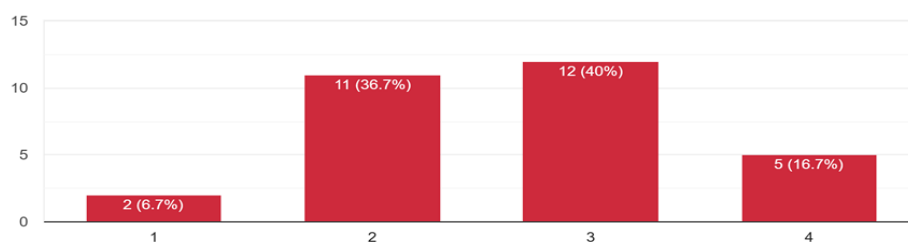
Pie Chart No. 3, 4- Pre and Post test percentage distribution of participants based on their first action when someone experiences sudden chest pain respectively.

Compared with the pre-test, participants demonstrated improved awareness of the appropriate first response to sudden chest pain. The proportion selecting calling an ambulance/emergency service increased from 26.7% to 63.3%, while those choosing asking the person to lie down increased from 26.7% to 36.7%. Inappropriate responses, including driving to the hospital (16.7%), giving water/juice (13.3%), taking

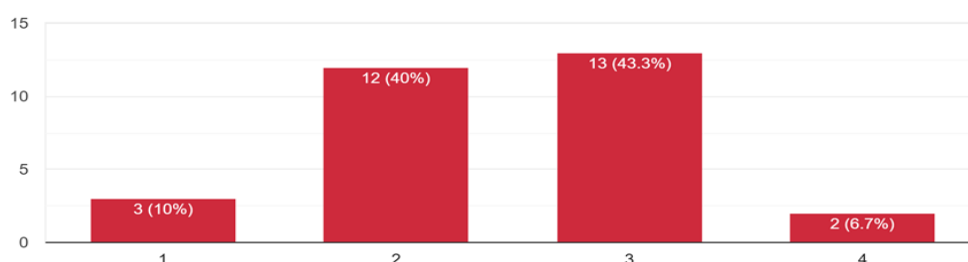
pain relief and rest (6.7%), waiting and observing (3.3%), and “don’t know” (6.7%), were eliminated in the post-test, indicating improved first-aid knowledge following the educational intervention.

7. Percentage distribution of participants based on their confidence level in identifying heart attack symptoms.

How confident are you in identifying symptoms of a heart attack ?
30 responses



Bar Graph No.5 - Pre test Percentage distribution of participants' based on their confidence level in identifying heart attack symptoms.



Bar Graph No.6 - Post test Percentage distribution of participants' based on their confidence level in identifying heart attack symptoms.

Compared with the pre-test, participants reported improved confidence in identifying heart attack symptoms after the educational intervention. The proportion who were very confident increased from 6.7% to 10%, and those somewhat confident increased from 36.7% to 40%, while participants who were not aware at all decreased from 16.7% to

6.7%, indicating greater overall awareness and confidence.

8. Percentage distribution of participants based on knowledge of basic steps to perform while waiting for emergency help in a heart attack case.

Do you know what basic steps to perform while waiting for emergency help in a heart attack case?
30 responses



Pie Chart No. 5, 6- Pre and Post test percentage distribution of participants based on knowledge of basic steps to perform while waiting for emergency help in a heart attack case respectively.

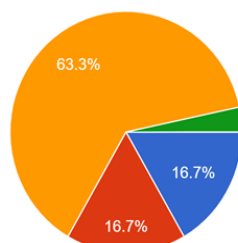
The results indicate participants' knowledge of the basic steps to perform while waiting for emergency help during a heart attack before and after the educational intervention, showing a marked improvement from the pre-test, where 13.3% of participants reported knowing the

basic steps, 26.7% reported not knowing, and 60% were not sure, to the post-test, where 96.7% reported knowing the basic steps, 3.3% were not sure, and none of the participants reported not knowing.

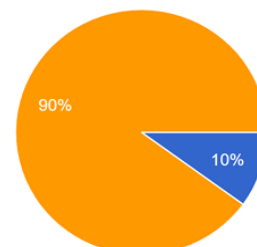
9. Percentage distribution of participants by frequency of needed

cholesterol checks

How often do you need to check your cholesterol levels?
30 responses



- Every 10 years regardless of age
- Once in a lifetime unless symptoms arise
- Every 4-6 years starting at age 20
- Only after the age of 50



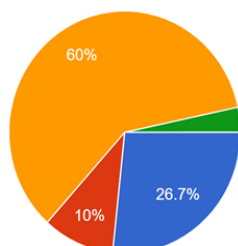
Pie Chart No. 7,8- Pre and Post test percentage distribution of participants by frequency of needed cholesterol checks respectively.

Compared with the pre-test, participants showed improved knowledge of the recommended frequency of cholesterol screening. Correct responses increased from 63.3% to 90%, while incorrect responses, including checking cholesterol only once in a lifetime or only after age 50, decreased to 0%. Only 10% continued to select checking cholesterol every 10 years, indicating

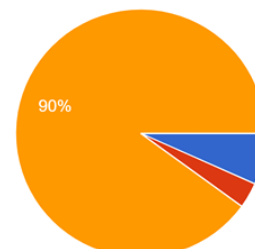
improved awareness following the educational intervention.

10. Percentage distribution of participants: Frequency of Blood Pressure Monitoring for Effective Hypertension Detection and Management

How often should you check your blood pressure levels to help detect and manage hypertension effectively?
30 responses



- Only when you feel symptoms like dizziness or headaches
- Once every 5 years, if you are below 40 and feel healthy
- At least once every 2 years if your blood pressure is normal (<120/80 mm Hg), and more often if it's elevated
- Only during annual health check-ups after age 50



Pie Chart No. 9,10- Pre and Post test percentage distribution of participants by frequency of Blood Pressure Monitoring for Effective Hypertension Detection and Management respectively.

Compared with the pre-test, participants demonstrated improved knowledge of the recommended frequency of blood pressure monitoring. Correct responses increased from 60% to 90%, while incorrect responses decreased, with no participants selecting annual health check-ups only after age 50 in the post-test. Only 6.7% and 3.3%

continued to choose checking blood pressure only when symptoms occur and once every 5 years, respectively, indicating improved awareness following the educational intervention.

11. Participant distribution by frequency of blood sugar level checks:

How often should you get your blood sugar levels checked to help prevent heart disease and diabetes complications?

30 responses



Pie Chart No. 11,12- Pre and Post test percentage distribution by frequency of blood sugar level checks respectively.

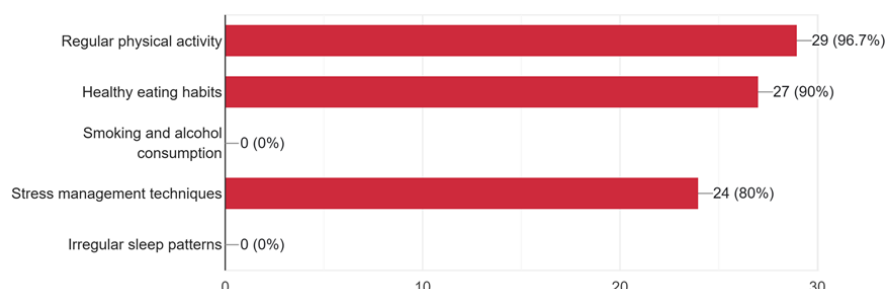
The findings showed an improvement in participants' knowledge regarding blood sugar screening after the educational intervention. Correct responses increased from 33.3% in the pre-test to 40% in the post-test, indicating improved awareness of appropriate screening frequency. However, some participants continued to believe that

testing should be done monthly, only when symptoms occur, or once every 10 years.

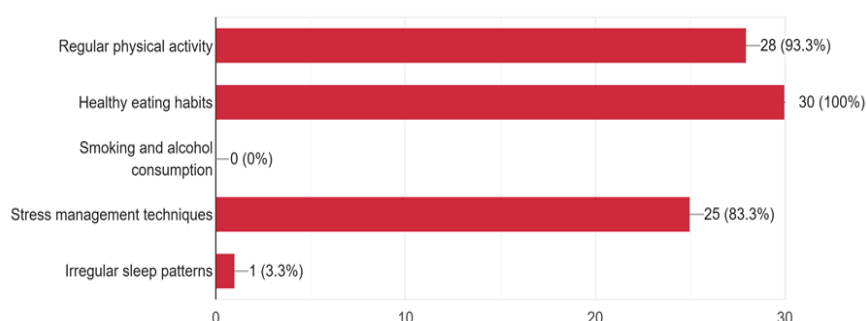
12. Percentage distribution of participants according to: Which essential components of lifestyle modification do you consider important?

Which of the following are important components of lifestyle modification? (Select all that apply)

30 responses



Bar Graph No.7 - Pre test Percentage distribution of participants according to: Which essential components of lifestyle modification do you consider important?



Bar Graph No.8 - Post test Percentage distribution of participants according to: Which essential components of lifestyle modification do you consider important?

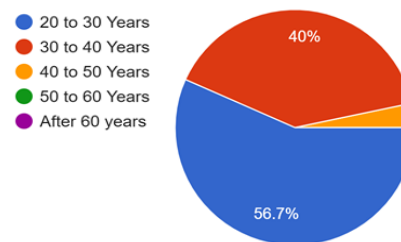
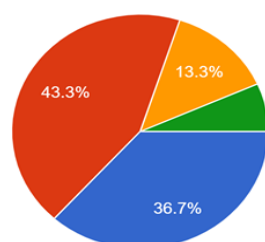
Compared with the pre-test, participants demonstrated improved knowledge of healthy lifestyle modification practices. Recognition of healthy eating habits

increased from 90% to 100%, and stress management techniques increased from 80% to 83.3%, while regular physical activity remained high (96.7% vs. 93.3%). Incorrect responses remained minimal,

indicating improved understanding following the educational intervention.

13. Percentage distribution of participants by perceived appropriate age for health screening

What is the appropriate age for health screening?
30 responses



Pie Chart No. 13,14- Pre and Post test percentage distribution by perceived appropriate age for health screening respectively.

Compared with the pre-test, participants showed improved awareness of the appropriate age to begin health screening. The proportion selecting 20–30 years increased from 36.7% to 56.7%, while responses for 40–50 years decreased from 13.3% to 3.3%, and no participants selected 50–60 years or after 60 years in the post-test, indicating improved understanding following the educational intervention.

DISCUSSION

The present study assessed the effectiveness of a structured patient education programme on knowledge in identification of early signs and symptoms of myocardial infarction among young adults using a one-group pre-test and post-test design. The study included 30 participants aged 18–40 years, of whom 56.7% were females and 43.3% were males. Most participants were well educated, with 46.7% being postgraduates and above, 43.3% undergraduates, and 10% having completed high school. Despite their educational background, pre-test findings revealed inadequate awareness of atypical myocardial infarction symptoms, emergency response, and preventive measures, suggesting that general education alone may not ensure adequate cardiovascular health knowledge.

The pre-test findings demonstrated inadequate to moderate knowledge regarding the early signs and symptoms, atypical presentation, emergency response, and prevention of myocardial infarction. Although chest pain or discomfort was recognized by 100% of participants, awareness regarding atypical symptoms was comparatively low. Only 30% identified jaw, neck, or back pain, 53.3% recognized left arm or shoulder pain, 33.3% identified fatigue, 46.7% identified dizziness, 13.3% recognized nausea or vomiting, and only 6.7% identified indigestion or stomach pain as symptoms of myocardial infarction. Shortness of breath was recognized by 70% of participants. These findings highlight inadequate awareness regarding atypical symptom presentation, which may contribute to delayed treatment-seeking behaviour. [4,11,13]

A major finding of the study was the significant improvement in awareness of both typical and atypical symptoms following the educational intervention. In the post-test, recognition of left arm or shoulder pain increased from 53.3% to 93.3%, jaw/neck/back pain increased from 30% to 90%, nausea/vomiting improved from 13.3% to 66.7%, cold sweats improved from 30% to 70%, and awareness regarding

indigestion or stomach pain increased from 6.7% to 40%. Awareness regarding anxiety or impending doom also improved from 40% to 83.3%. These findings demonstrate the effectiveness of the patient education programme in improving recognition of atypical myocardial infarction symptoms, supporting AHA and Byrne et al. (2023) recommendations that greater public awareness promotes earlier recognition, timely medical attention, and improved clinical outcomes. [13,14]

The study also demonstrated improved understanding of symptom variability in young adults and silent heart attacks. Awareness of silent heart attacks also improved from 86.7% to 100% following the intervention. These findings are consistent with Gallagher et al., suggesting that targeted educational interventions reduce misconceptions and improve early symptom recognition, particularly among populations traditionally considered at lower cardiovascular risk. [11]

Knowledge regarding preventive health monitoring improved following the educational intervention. Awareness of the recommended cholesterol screening frequency increased from 63.3% to 90%, recommended blood pressure monitoring frequency from 60% to 90%, and recommended blood sugar screening frequency increased from 33.3% in the pre-test to 40% in the post-test, indicating improved understanding of cardiovascular risk prevention and routine health screening. Knowledge regarding emergency response improved significantly following the intervention. Recognition of calling emergency medical services as the first response increased from 26.7% to 63.3%, while 26.7% initially preferred asking the person to lie down and 16.7% preferred directly driving to the hospital. Awareness of appropriate first-aid measures while awaiting emergency assistance also improved markedly from 13.3% to 96.7%. These findings align with the American Heart Association and Byrne et al. (2023) ESC Guidelines, emphasizing that early

symptom recognition and prompt medical attention are essential to reduce myocardial infarction related morbidity and mortality. [13,14]

An important observation during the intervention was the highly interactive participation of the attendees. Participants actively asked questions about myocardial infarction, CPR, ambulance activation, first aid, and emergency management, allowing several misconceptions to be clarified. Many also shared personal experiences of relatives or family members with heart attacks, highlighting existing gaps in public awareness of cardiovascular emergencies.

The educational intervention also improved participants' confidence in identifying heart attack symptoms and responding appropriately. Participants reporting being very confident increased from 6.7% to 10%, those somewhat confident reached 40% in the post-test, while those not confident were 40% in the pre-test and those not aware at all decreased from 16.7% to 6.7%, indicating improved awareness and preparedness following the educational programme. However, despite this improvement, confidence levels remained suboptimal, with 43.3% of participants still reporting that they were not confident in identifying heart attack symptoms. This finding highlights the need for continuous, structured educational interventions and practical demonstrations from a younger age to strengthen knowledge retention, improve confidence in recognizing myocardial infarction symptoms, and promote appropriate emergency response.

Overall, the post-test findings demonstrated a considerable improvement in participants' knowledge regarding myocardial infarction, with significant gains in awareness of risk factors, signs and symptoms, emergency response, preventive measures, lifestyle modification, and cardiovascular health screening. These findings are consistent with those of Kim SJ et al., and Gallagher et al. supporting the effectiveness of structured educational programmes in improving

awareness of myocardial infarction and appropriate emergency response. [4,11]

The study highlights the importance of interactive, community-based educational programmes in improving cardiovascular health awareness among young adults. Consistent with the recommendations of the World Health Organization (WHO) and the American Heart Association (AHA), these findings suggest that educational programmes promoting cardiovascular health awareness, myocardial infarction symptom recognition, and emergency response training (including CPR) in schools, colleges, workplaces, and community settings may facilitate early recognition, reduce delays in treatment-seeking, and improve outcomes during cardiac events. [12,13] Greater emphasis should be placed on primordial prevention through regular exercise, a balanced diet, stress management, smoking cessation, adequate sleep, and routine health screening from an early age.

CONCLUSION

The patient education programme was effective in improving knowledge regarding the identification of early signs and symptoms of myocardial infarction among young adults. Overall symptom recognition increased from 42.3% in the pre-test to 76.3% in the post-test, reflecting an absolute improvement of 34 percentage points and a relative improvement of approximately 80.3%. The intervention also improved awareness of typical and atypical symptoms, preventive cardiovascular health practices, and appropriate emergency response measures, thereby highlighting the potential role of structured health education in promoting early recognition and preparedness during cardiac emergencies. The findings emphasize the importance of incorporating primordial prevention and cardiovascular health education among young adults through community, educational, and healthcare settings. Physiotherapists and other healthcare professionals can contribute to such

programmes by promoting healthy lifestyle practices, routine health screening, symptom recognition, and emergency preparedness. However, the study was limited by the inclusion of only English-speaking participants and assessment of knowledge rather than actual behavioural responses during real-life emergencies.

Future studies should include more diverse populations, regional-language educational materials, and practical training in first aid, cardiopulmonary resuscitation (CPR), and emergency response to improve accessibility, knowledge retention, and preparedness for cardiac emergencies

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare that they have no conflict of interest.

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