



ASSESSMENT OF WINDOW PERIOD KNOWLEDGE AMONG STEMI PATIENTS IN A TERTIARY CARE HOSPITAL, PUDUCHERRY: A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background: The rising cardiovascular disease (CVD) epidemic in South Asia, including India, is alarming. ST-elevation myocardial infarction (STEMI) requires urgent treatment, yet only 0.8% of patients in India seek care within the crucial first hour. Most delays are over 12 hours, leading to preventable complications like arrhythmia and heart failure. This highlights the need for greater public awareness about the importance of timely hospital arrival. **Material and Methods:** The present study was cross-sectional study carried out among STEMI patients both new and old cases more than 18 years. The data was collected in a semi-structured questionnaire after informed consent. Statistical analysis was done using descriptive statistics. **Results:** This study analyzed 90 participants with a mean age of 51.01 years, comprising 54 men (60%) and 36 women (40%). The age groups included 10% aged 30-39 years, 14.4% aged 40-49 years, 34.4% aged 50-59 years, 33.3% aged 60-69 years, and 7.8% aged 70-79 years. Educational attainment showed 8.9% were illiterate, 41.1% had completed college, and 50% had some schooling. Knowledge of how to respond to chest pain was observed in 54.4%, and 67.8% were aware of emergency services, with the 70-79 age group demonstrating the highest awareness ($p < 0.05$). However, only 55% understood the urgency of responding to chest pain, with 75% of illiterate participants lacking this knowledge. Regarding the optimal window for seeking care, 35.6% identified 1-2 hours, and 31.1% chose 3-5 hours, with men favoring the shorter window (46.3%) and women the longer (52.8%) ($p < 0.001$). Higher education correlated with faster care-seeking ($p < 0.001$). Awareness that chest pain is not always gas-related was seen in 63.3% of STEMI patients. Understanding of heart attack diagnosis was good in 42%, and 71.4% of the 70-79 group showed strong knowledge. The role of ECG was recognized by 57.8%, while 58.9% acknowledged that heart muscle deteriorates rapidly during a heart attack. **Conclusion:** Delay in treatment for acute coronary syndromes is a major contributor to the morbidity burden of cardiovascular disease. Hence awareness is critical for the general public to know about the window period of STEMI and timely arrival to the hospital for early management.

KEYWORDS : STEMI, Knowledge, window period, early treatment

INTRODUCTION

The emergence of the cardiovascular disease (CVD) epidemic in South Asian countries, including ours, over the last three decades is an alarming concern. ST-elevation myocardial infarction (STEMI), a severe consequence of CVD, carries a poor prognosis without timely reperfusion therapy to restore blood flow in blocked coronary arteries [1]. Over 50% of the 1.2 million individuals who suffer from acute myocardial infarction (AMI) annually pass away prior to reaching a hospital or shortly after arrival at an emergency department [2]. In India, less than 1% of patients are treated within the critical "golden hour," and fewer than half (47.77%) make it within the 12-hour timeframe for percutaneous coronary intervention (PCI), with the majority arriving beyond 12 hours on average [3-6]. The risk of preventable complications like arrhythmia and heart failure significantly increases when treatment is delayed because of the time it takes to recognize symptoms and seek medical help [7,8]. This underscores the crucial need to educate the public about the window period of STEMI and the importance of arriving at the hospital promptly for early treatment.

Objectives

The primary objective of this study was to assess the knowledge of STEMI patients regarding chest pain and the window period using a semi-structured questionnaire.

MATERIAL AND METHODS

This cross-sectional study was conducted at the General Medicine Department of Sri Venkateshwaraa Medical College Hospital and Research Centre in Puducherry, targeting adult patients with both new and old diagnosis of STEMI. The study spanned three months, from January to

March 2024, and was approved by the institutional ethics committee, with all participants giving informed consent. The study's sample size was determined by the formula $n = Z^2Pq/E^2$; where P represents the population proportion with the characteristic of interest, which was found to be 69.6% in Mohan et al [9] study. Maintaining a margin of error of 5%. It was determined that the sample size would need to be 90.

Data collection was carried out through a semi-structured interview process, which consisted of two main parts. Part I collected socio-demographic information, including participants' age, gender, and education level. Part II focused on evaluating participants' knowledge about the STEMI window period, specifically the critical time frame within which patients should seek medical attention after experiencing chest pain. This section also assessed their understanding of recognizing and responding to heart attack symptoms, distinguishing chest pain from other origins, the process of heart attack diagnosis, and the risks associated with delayed treatment. This structured approach allowed for a comprehensive evaluation of participants' awareness and understanding of the vital factors related to STEMI and the importance of timely medical intervention.

The collected data were initially entered into Microsoft Excel 2019 to create preliminary charts and organize the information. The master dataset was then imported into SPSS 30 for detailed statistical analysis. Descriptive statistics were used to interpret the data, with frequency and percentage applied to describe qualitative variables. A Chi-square test was conducted to assess the influence of sociodemographic characteristics on the knowledge of STEMI patients. Additionally, bar graphs were utilized to visually represent the

data findings, providing a clear overview of the study results.

RESULTS

Sociodemographic Characteristics

Table 1: Socio-demographic Characteristics Of STEMI Patients

Gender	N	%
Male	54	60
Female	36	40
Age groups	N	%
30-39	9	10.0
40-49	13	14.4
50-59	31	34.4
60-69	30	33.3
70-79	7	7.8
Education		
Illiterate	8	8.9

Table 2: Knowledge Of STEMI Patients Regarding Heart Attack Symptoms, Window Period, Diagnosis, And Complications

		Q1. Do you know what you should do when you get chest pain?					Q5. Are you aware that you can call emergency services in case of getting heart attack?					Q7. Have you ever heard elsewhere about coming as soon as possible to doctor with heart attack?				
		Good knowledge		Poor knowledge		p-value	Good knowledge		Poor knowledge		p-value	Good knowledge		Poor knowledge		p-value
		N	%	N	%		N	%	N	%		N	%	N	%	
Gender	Male	49	54.4	41	45.6	0.489	61	67.8	29	32.2	0.854	50	55.6	40	44.4	0.194
	Female	18	50.0	18	50.0		24	66.7	12	33.3		23	63.9	13	36.1	
age groups	30-39	4	44.4	5	55.6	0.742	4	44.4	5	55.6	0.056	4	44.4	5	55.6	0.050
	40-49	8	61.5	5	38.5		8	61.5	5	38.5		11	84.6	2	15.4	
	50-59	19	61.3	12	38.7		18	58.1	13	41.9		16	51.6	15	48.4	
	60-69	14	46.7	16	53.3		24	80.0	6	20.0		13	43.3	17	56.7	
	70-79	4	57.1	3	42.9		7	100.0	0	0.0		6	85.7	1	14.3	
Education	Illiterate	6	75.0	2	25.0	0.267	5	62.5	3	37.5	0.674	2	25.0	6	75.0	0.110
	Schooling	26	57.8	19	42.2		29	64.4	16	35.6		24	53.3	21	46.7	
	College	17	45.9	20	54.1		27	73.0	10	27.0		24	64.9	13	35.1	

Knowledge Regarding Recognizing And Responding To Heart Attack Symptoms

Table 3: Association Between Socio-demographic Variables And Knowledge Regarding Recognizing And Responding To Heart Attack Symptoms

Questions	N	%
Q1. Do you know what you should do when you get chest pain?		
Yes	49	54.4
No	41	45.6
Q2 .Do you know how heart attack is diagnosed?		
Yes	38	42.2
No	52	57.8
Q3. Do you know in how much time (hours)you should get into hospital?		
1-2 hours	32	35.6
3-5 hours	28	31.1
>6 hours	20	22.2
>12 hours	10	11.1
Q4. Do you know coming late to hospital after getting chest pain has more mortality risk?		
Yes	53	58.9
No	37	41.1
Q5. Are you aware that you can call emergency services in case of getting heart attack?		
Yes	61	67.8
No	29	32.2
Q6. Do you know all chest pain are not because of gas trouble?		
Yes	57	63.3
No	33	36.7
Q7. Have you ever heard elsewhere about coming as soon as possible to doctor with heart attack?		

Schooling	45	50.0
College	37	41.1

Table 1 presents the demographic characteristics of all respondents, including age, gender, and educational status. The study involved 90 subjects with a mean age of 51.01 years. Among the participants, 54 (60%) were men, and 36 (40%) were women. The age distribution showed that 9 individuals (10%) were between 30 and 39 years old, 13 (14.4%) were between 40 and 49 years, 31 (34.4%) were between 50 and 59 years, 30 (33.3%) were between 60 and 69 years, and 7 (7.8%) were between 70 and 79 years. Regarding educational attainment, 8 participants (8.9%) were illiterate, 37 (41.1%) had completed college, and 45 (50%) had received some level of schooling.

The responses to the study questions were presented in Table 2. A detailed analysis, including the influence of sociodemographic variables, will be discussed below.

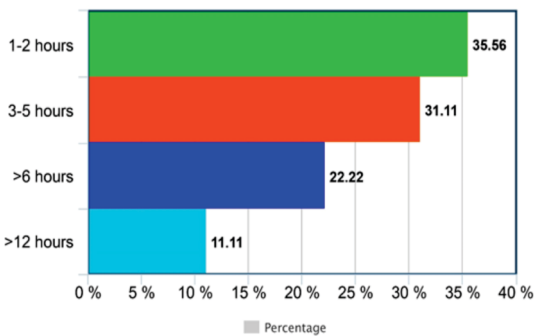
Yes	50	55.6
No	40	44.4
Q8. Do you know ECG will be need for diagnosing heart attack?		
Yes	52	57.8
No	38	42.2
Q9. Do you know heart muscle dies every second during heart attack?		
Yes	53	58.9
No	37	41.1
Q10. Do you know coming late to hospital during heart attack has more complications?		
Yes	53	58.9
No	37	41.1

Regarding knowledge of how to deal with chest pain (Q1), 49 participants (54.4%) exhibited good understanding, as detailed in Table 3. This knowledge was observed across both genders and all age groups. When asked whether they could access emergency services for chest pain (Q5), 61 participants (67.8%) responded affirmatively, with no significant differences noted based on gender or educational status. Notably, all individuals in the 70-79 age range demonstrated a high level of knowledge ($p < 0.05$). The study also assessed whether participants had prior education on responding promptly to chest pain (Q7), revealing that only 55% displayed good knowledge in this area, with no evident gender bias. Furthermore, 85.7% of individuals aged 40-49 and 84.6% of those aged 70-79 were found to have received adequate education on this topic ($p < 0.05$). In contrast, 75% of illiterate participants demonstrated a lack of understanding regarding the importance of a quick response to chest pain.

Knowledge Regarding Window Period For Seeking Hospital Care For Chest Pain

Table 4: Association Between Socio-demographic Variables And Knowledge Regarding Window Period For Seeking Hospital Care For Chest Pain

		Q3. Do you know in how much time (hours)you should get into hospital?								
		1-2hours		3-5hours		>6hours		>12hours		
		N 32	% 35.6	N 28	% 31.1	N 20	% 22.2	N 10	% 11.1	p-value
Gender	Male	25	46.3	9	16.7	16	29.6	4	7.4	<0.001
	Female	7	19.4	19	52.8	4	11.1	6	16.7	
Age groups	30-39	3	33.3	5	55.6	1	11.1	0	0.0	0.134
	40-49	3	23.1	4	30.8	3	23.1	3	23.1	
	50-59	11	35.5	12	38.7	5	16.1	3	9.7	
	60-69	13	43.3	4	13.3	11	36.7	2	6.7	
	70-79	2	28.6	3	42.9	0	0.0	2	28.6	
Education	Illiterate	2	25.0	2	25.0	3	37.5	1	12.5	<0.001
	Schooling	16	35.6	15	33.3	9	20.0	5	11.1	
	College	14	37.8	11	29.7	8	21.6	4	10.8	

Distribution of window period knowledge among STEMI patients**Fig.1: Distribution Of Window Period Knowledge Timeframe From Sample Population**

In terms of understanding the window period, patients were asked how soon they should go to the hospital after experiencing chest pain (Q3). According to their responses, 35.6% indicated they should seek care within 1-2 hours, 31.1% within 3-5 hours, 22.2% after more than 6 hours, and 11.1% after more than 12 hours (see Table 4 and Fig. 1). Among those who chose the 1–2 hour timeframe, 46.3% were male, while 52.8% of females reported a timeframe of 3-5 hours ($p < 0.001$). Notably, there was no significant age group dominance observed. Regarding education level, individuals with a school education (35.6%) and those with a college education (37.8%) tended to seek medical help earlier compared to illiterate participants (37.5%), who were more likely to arrive at the hospital after 6 hours ($p < 0.001$).

Knowledge Regarding Heart Attack Diagnosis And The Importance Of ECG

Table 6: Association Between Socio-demographic Variables And Knowledge Regarding Heart Attack Diagnosis And The Importance Of ECG

		Q2. Do you know how heart attack is diagnosed?					Q8. Do you know ECG will be need for diagnosing heart attack?				
		Good knowledge		Poor knowledge		p- value	Good knowledge		Poor knowledge		p- value
		N	%	N	%		N	%	N	%	
Gender	Male	23	42.6	31	57.4	0.931	35	64.8	19	35.2	0.098
	Female	15	41.7	21	58.3		17	47.2	19	52.8	
Age groups	30-39	3	33.3	6	66.7	0.491	5	55.6	4	44.4	0.106
	40-49	6	46.2	7	53.8		10	70	3	30	
	50-59	11	35.5	20	64.5		20	64.5	11	35.5	
	60-69	13	43.3	17	56.7		13	43.3	17	56.7	
	70-79	5	71.4	2	28.6		3	42.9	4	57.1	
Education	Illiterate	3	37.5	5	62.5	0.902	6	75.0	2	25.0	0.203
	Schooling	20	44.4	25	55.6		22	48.9	23	51.1	
	College	15	40.5	22	59.5		24	64.9	13	35.1	

Regarding knowledge of heart attack diagnosis (Q2), 38 participants (42%) from the STEMI population demonstrated a good understanding, as detailed in Table 6. However,

Knowledge Regarding Chest Pain Not Always Linked To Gas-related Issues

Table 5: Association Between Socio-demographic Variables And Knowledge Regarding Chest Pain Not Always Linked To Gas-related Issues

		Q6. Do you know all chest pain are not because of gas trouble?				
		Good knowledge		Poor knowledge		
		N	%	N	%	
		57	63.3	33	36.7	p-value
Gender	Male	35	64.8	19	35.2	0.010
	Female	22	61.1	14	38.9	
Age groups	30-39	3	33.3	6	66.7	0.261
	40-49	10	76.9	3	23.1	
	50-59	19	61.3	12	38.7	
	60-69	21	72.7	9	27.3	
	70-79	4	57.1	3	42.9	
Education	Illiterate	5	62.5	0	0.0	0.148
	Schooling	28	62.2	17	37.8	
	College	22	59.5	15	40.5	

Among the participants with ST-elevation myocardial infarction (STEMI), 57 individuals (63.3%) demonstrated a good understanding that not all chest pain is due to gas-related issues (Q6), as summarized in Table 5. No significant gender differences were observed ($p < 0.05$). Knowledge levels varied by age group, with 76.9% of individuals aged 40 to 49 and 72.7% of those aged 60 to 69 exhibiting a strong understanding of this issue. Regarding educational status, 62.5% of illiterate individuals, 62.2% of those who had attended school, and 59.5% of college graduates displayed a good grasp of the distinction between the origins of chest pain.

previous hospitalizations or those of their family members. When asked about the importance of ECG in diagnosing heart attacks (Q8), 52 participants (57.8%) recognized its necessity.

Knowledge Regarding Mortality Risks And Complications From Delayed Heart Attack Treatment

Table 7: Association Between Socio-demographic Variables And Knowledge Regarding Mortality Risks And Complications From Delayed Heart Attack Treatment

		Q4. Do you know coming late to hospital after getting chest pain has more mortality risk?					Q9. Do you know heart muscle dies every second during heart attack?					Q10. Do you know coming late to hospital during heart attack has more complications?				
		Good knowledge		Poor knowledge		p- value	Good knowledge		Poor knowledge		p- value	Good knowledge		Poor knowledge		p- value
		N	%	N	%		N	%	N	%		N	%	N	%	
Gender	Male	30	55.6	24	44.4	0.431	34	63.0	20	37.0	0.336	33	61.1	21	38.9	0.300
	Female	23	63.9	13	36.1		19	52.8	17	47.2		20	55.6	16	44.4	
Age	30-39	5	55.6	4	44.4	0.012	4	44.4	5	55.6	0.725	3	33.3	6	66.7	0.028
	40-49	8	61.5	5	38.5		8	61.5	5	38.5		6	46.2	7	53.8	
	50-59	22	71.0	9	29.0		20	64.5	11	35.5		19	61.3	12	38.7	
	60-69	11	36.7	19	63.3		16	53.3	14	46.7		21	70.0	9	30.0	
	70-79	7	100.0	0	0.0		5	71.4	2	28.6		4	57.1	3	42.9	
Education	Illiterate	6	75.0	2	25.0	0.586	6	75.0	2	25.0	0.586	6	75.0	2	25.0	0.450
	Schooling	25	55.6	20	44.4		25	55.6	20	44.4		23	62.2	14	37.8	
	College	22	59.5	15	40.5		22	59.5	15	40.5		24	53.3	21	46.7	

The study investigated knowledge of the morbidity and mortality associated with late arrival for treatment after chest pain onset. Participants were asked if they recognized that delayed treatment could lead to mortality risk (Q4). Nearly half of the study population demonstrated good knowledge, as shown in Table 7, with no significant differences observed based on gender or education. Notably, all participants aged 70-79 showed significant awareness of this issue ($p < 0.05$). Before evaluating knowledge of the complications related to late presentation, participants were asked whether they understood that heart muscle dies each second during a heart attack (Q9). Fifty-three individuals (58.9%) responded that they had good knowledge in this area, with no significant associations found among socio-demographic parameters. When assessing awareness of complications due to late presentation (Q10), only 53 participants (58.9%) from the STEMI population displayed good knowledge, although 70% of those aged 60-69 were aware of the complications related to delayed treatment ($p < 0.05$).

DISCUSSION

The findings of this study align with previous research on patient delays in seeking treatment for STEMI. For instance, Alexander et al [5]. reported an average delay of 2.85 hours for patients to reach the hospital, while Mohan et al [9]. found that 42% of patients presented more than 6 hours after symptom onset. Similarly, Mohanna et al [10]. observed that 41.2% of patients arrived at the hospital more than 12 hours after experiencing symptoms. In comparison, George et al [11]. from Puducherry reported an average window period of 4.8 hours for patients to reach the hospital. In the present study, 35.6% of patients believed the window period was 1-2 hours, 31.1% thought it was 3-5 hours, 22.2% believed it was more than 6 hours, and 11.1% thought it was more than 12 hours.

This study identifies key knowledge gaps among adults in recognizing and responding to heart attack symptoms. Although 54.4% reported understanding how to address chest pain, only 55% recognized the urgency for immediate action. Illiteracy was a barrier, as 75% of illiterate participants lacked this understanding. Knowledge of differential chest pain origins was evident in 63.3% of STEMI patients. Awareness of heart attack diagnostic methods was low, with only 42% understanding the diagnostic process. Familiarity with the importance of ECG for diagnosis was moderate, with 57.8% demonstrating knowledge. Regarding the risks of delayed treatment, 58.9% of participants recognized the associated mortality and morbidity.

CONCLUSION

The study found that 33.3% of patients presented to the

Overall, approximately half of the participants, regardless of gender, age, or educational background, demonstrated a good understanding of ECG's role in heart attack diagnosis.

hospital more than 6 hours after symptom onset, significantly contributing to the morbidity associated with cardiovascular disease and its complications. Therefore, it is essential for the public to understand the importance of the STEMI window period and the need for timely hospital arrival. Increasing awareness through community outreach and targeted health education initiatives could further reduce treatment delays, ultimately improving patient outcomes.

Limitations

This single-center pilot study on STEMI patients has limited generalizability and statistical power due to its small sample size.

Ethical Declarations

This study adhered to the Declaration of Helsinki principles and received approval from the Scientific Review Committee (Ref. no. SVMC/SRC/2023/09/CTR 886) and the Institutional Ethics Committee (Ref. no. 69/SVMCH/IEC-Cert/February24) of Sri Venkateswara Medical College, Puducherry. Written informed consent was obtained from all participants.

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