



Perception about the Factors Leading to Delay of Door to Balloon Time (DTBT) in Acute Myocardial Infarction Management amongst Emergency Medical Professionals in Pune, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Acute Myocardial Infarction is one of the commonest medical emergencies encountered by Emergency Medical Professionals. The EMS professional is the first responder in the hospital emergency room. Primary percutaneous coronary intervention (PCI) performed in a timely manner is the preferred method of treatment for ST-elevation myocardial infarction (STEMI). This study aims to assess perception regarding factors causing delay of Door to Balloon Time (DTBT) in Acute Myocardial Infarction management amongst Emergency Medical Professionals.

Study Design: Cross Sectional Descriptive Study.

Place and Duration of Study: Symbiosis Centre for Health Skills, Pune in May 2021.

Materials and Methods: The study was conducted amongst 120 Emergency Medical Professionals in Pune, India. The data was collected during the month of May 2021. Professionals who have completed Post Graduate Diploma in Emergency Medical Services were included in the study. A pre tested and validated questionnaire developed by Jafery et al was utilized to assess the knowledge and perception level among Emergency Medical Professionals.

Results and Discussion: The study provided insight into the factors causing delay in DTBT. An

overwhelming majority of respondents blamed the shortage of general and specialist staff for the delay in DTBT. Shortage of CCU beds was also reported as the key factor in the hold up by as many as 71% of the respondents. Cardiac Cath lab availability and ECG equipment shortage were considered to be hindrances by nearly half the respondents. Lack of structured protocol and poor information communication was also hampering the achievement of ideal DTBT.

Conclusion: Emergency Medical Professionals have adequate knowledge of their role and the barriers that prevent timely clinical care. The study offers avenues for improvement in various clinical and non-clinical areas so as to achieve the desired clinical goals.

Keywords: Emergency medical professional; door to balloon time; perception; acute myocardial infarction.

1. INTRODUCTION

The World Health Organization in 2021 has labelled cardiovascular diseases (CVDs) as the leading cause of death globally with an estimated 17.9 million people dying from CVDs in 2019, representing 32% of all global deaths [1]. Acute myocardial infarction (AMI), commonly known as heart attack is one of the commonest cause of death in developing countries [2]. It occurs due to sudden cut off of blood supply to a part of the heart due to block in blood flow in one or more of the coronary arteries [3]. Severe block in the arteries can lead to sudden cessation of the heart function called as cardiac arrest.

AMI is of the commonest medical emergencies encountered by Emergency Medical Professionals. The patients present with severe chest pain and ECG is diagnostic in most cases. Prompt diagnosis and management are essential to prevent harmful sequelae like mitral regurgitation, rupture of the left ventricular wall or septum and cardiopulmonary arrest. The initial line of action for Acute MI is early recognition and prompt management towards restoration of perfusion to prevent further damage of the myocardium. Medical management using drugs followed by mechanical means, such as percutaneous coronary intervention (PCI), or coronary artery bypass graft (CABG) surgery are the preferred treatment of choice [4-5].

As per The American College of Cardiology/American Heart Association Guidelines Primary percutaneous coronary intervention (PCI) performed in a timely manner is the preferred method of treatment for ST-elevation myocardial infarction (STEMI). The success of PCI depends upon achieving a door-to-balloon time (DBT) of less than 90 minutes. DTBT is defined as amount of time between a arrival of patient with heart attack at the hospital

to the time he/she receives percutaneous coronary intervention (PCI) [6-9].

The EMS professional is the first responder in the hospital emergency room. Early recognition of AMI and prompt coordination with the interventional cardiologist are key roles required to be fulfilled by the Emergency Medical Professionals. Johstan et al. [10] in a study in 2006 concluded that 50- 70% of out of hospital cardiac arrest in AMI patients was due to late intervention and late admission to the hospital. Reducing the interval of definitive treatment is of utmost importance as every minute delay leads to loss of longevity among patient with AMI.

Another study by Callachan et al. [11] states that in STEMI prompt reopening of occluded vessel is important to restore myocardial perfusion as delay leads to increased mortality rates, therefore all possible measures should be taken to minimise the time interval between onset of symptoms and reperfusion therapy.

It is hence essential to gauge the knowledge and Perception regarding the concept of DTBT amongst Emergency Medical Professionals. This study aims to assess perception regarding factors causing delay of Door to Balloon Time (DTBT) in Acute Myocardial Infarction management amongst Emergency Medical Professionals.

2. MATERIALS AND METHODS

The study was conducted amongst 120 Emergency Medical Professionals in Pune, India. The data was collected during the month of May 2021. Professionals who have completed Post Graduate Diploma in Emergency Medical Services were included in the study. A pre tested and validated questionnaire developed by Jafery et al. [12] was utilized after obtaining permission from the author to assess the knowledge and

perception level among Emergency Medical Professionals.

The original questionnaire consisting of 21 items was reduced to 13 items as the remaining 7 items were irrelevant for the present study.

Five items in the questionnaire tested knowledge. Seven items were pertaining to the factors causing delay in DTBT while three items assessed the perception of the healthcare provider on DTBT. The question had multiple choices where one or more options could be selected by the respondent.

The Questionnaire was administered to the respondents through online mode after obtaining informed consent by the researchers. Responding to all questions was mandatory. The respondents were given one day to fill the questionnaire. Any queries pertaining to questionnaire were clarified during data collection.

All the 120 respondents reverted with the filled questionnaire. The data was tabulated and statistically analysed with the help SPSS version 23.

3. RESULTS AND DISCUSSION

As shown in Fig. 1. Majority of respondents had requisite knowledge of DTBT in STEMI.

Acute Myocardial infarction is one of the leading causes of mortality in developing countries. Yet a sizable number of deaths can be prevented with early recognition and timely management [13]. Emergency Medical Professionals are trained to diagnose cardiac emergencies and provide primary care. The promptness in recognition of symptoms by the Emergency Medical Professionals contributes to the final DTBT.

Table 1. Demographic data

Age	21-25 years: 51% 26-30 years: 41% >30 years: 8%
Sex	Female:72% Male: 28%
Qualification	BAMS with PGDEMS: 32% BHMS with PGDEMS: 43% BUMS with PGDEMS: 16% Others with PGDEMS: 9%
Work Experience	<1year: 55% 1 to 3 years: 33% >3 years: 12%

The knowledge level of respondents with regards to DTBT was found to be adequate. The respondents were aware about the application of DTBT, the optimal time and the role of chest pain duration in the outcome of primary PCI.

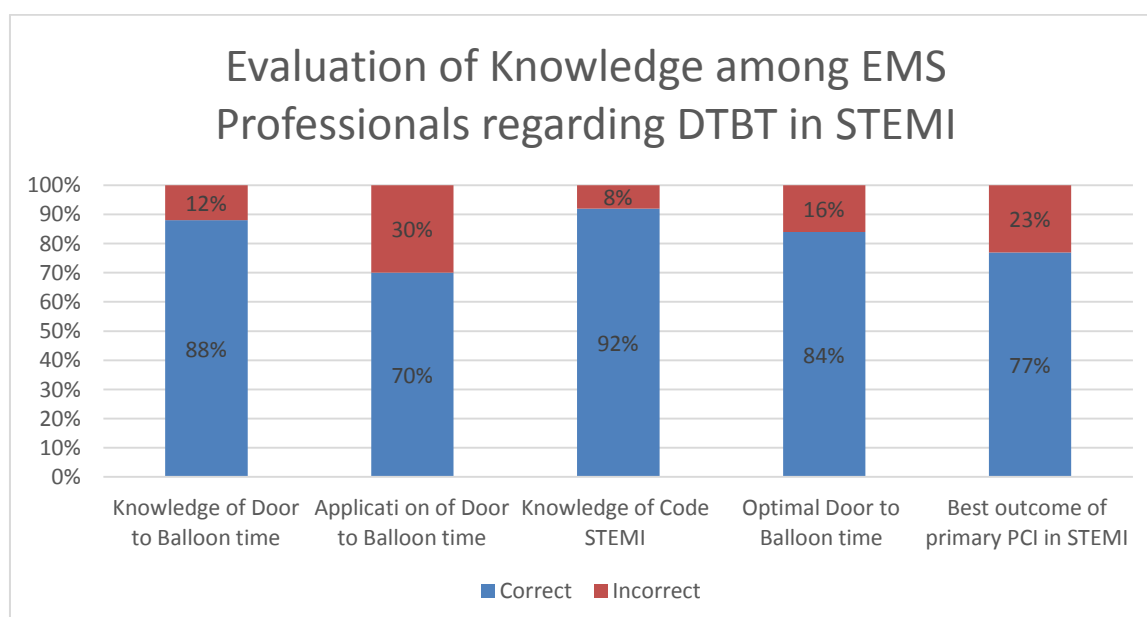


Fig. 1. Evaluation of Knowledge among EMS Professionals regarding DTBT in STEMI

Table 2. Factors causing delay in DTBT

Factors	N (%)
1. Due to Manpower:	
Shortage of staff in general	92 (63%)
Shortage of qualified and experienced staff	103 (71%)
2. Due to Infrastructure:	
Shortage Critical Care Unit (CCU) beds	103 (71%)
Appropriate cardiac Cath lab (ACCL) availability	71 (49%)
Shortage of ECG equipment	72 (50%)
3. No structured protocol	
No clear process of STEMI clinical pathway	94 (65%)
Poor arrangement	79 (55%)
No clear information communication	75 (52%)
4. Incomplete Data Collection	
Data collection is not clear & not well defined	109 (76%)
No apparent revision by cardiologist to data collected.	74 (51%)
Missing data in cortex & HIM chart	57 (50%)
5. External Factors:	
On call arranging schedule	77 (53%)
Road Traffic.	97 (67%)
Transportation	101 (70%)

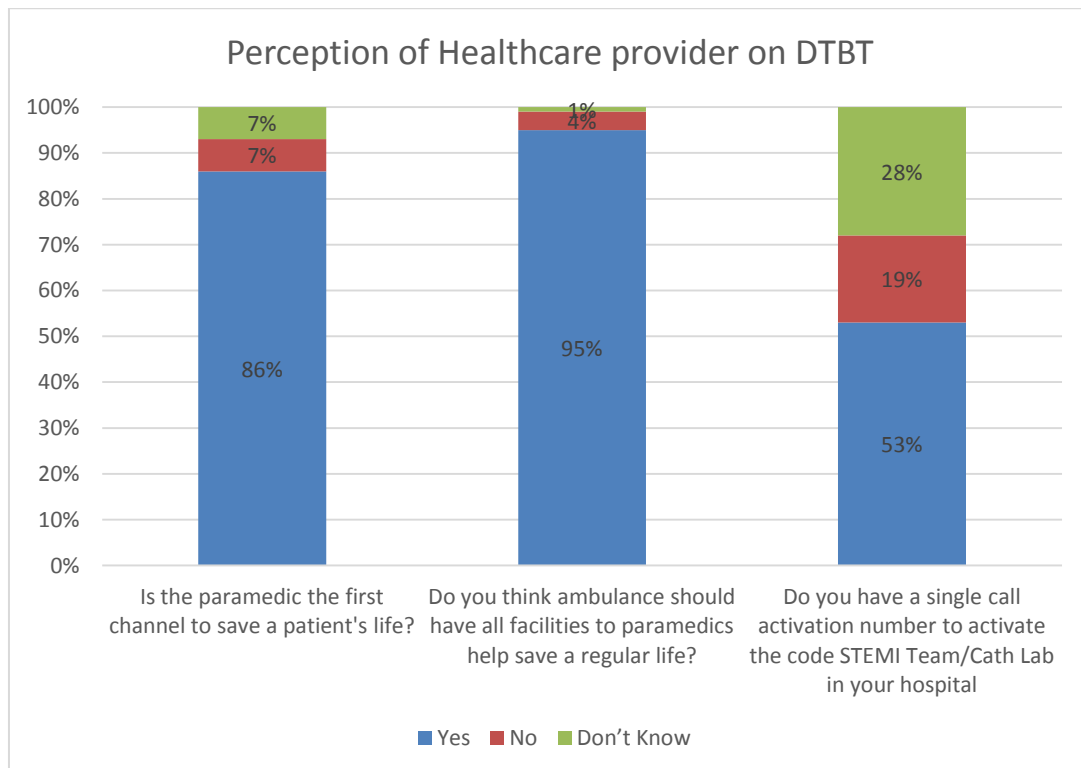


Fig. 2. Perception of healthcare provider on DTBT

The study provided insight into the factors causing delay in DTBT. An overwhelming majority of respondents blamed the shortage of general and specialist staff for the delay in DTBT. Shortage of CCU beds was also reported as the key factor in the hold up by as many as 71% of

the respondents. Cardiac Cath lab availability and ECG equipment shortage were considered to be hindrances by nearly half the respondents. Lack of structured protocol and poor information communication was also hampering the achievement of ideal DTBT. In the current

scenario, the data collection and recording of exact DTBT is lacking in most clinical settings.

The cardiologist plays a crucial role as the head of the team and he/she should take the lead in efficient data management. Certain external factors like scheduling, transportation barriers and road traffic also contribute to the overall delay in DTBT. Healthcare infrastructure and human resource availability are integral to achieving clinical growth. Adoption of clinical protocols can go a long way in standardization of treatment and enhancement of decision making [14].

The respondents in the study were aware of their role as the first responder to save the life of a patient in a cardiac emergency. Almost all Emergency Medical Professionals felt that the ambulance should be fully equipped with lifesaving equipment.

4. CONCLUSION

The study is an attempt to characterise the role of Emergency Medical Professionals in the larger canvas of management of cardiac emergencies. Emergency Medical Professionals have adequate knowledge and perception of their role and the barriers that prevent timely clinical care. The study offers avenues for improvement in various clinical and non-clinical areas so as to achieve the desired clinical goals.

CONSENT

The Questionnaire was administered to the respondents through online mode after obtaining informed consent by the researchers

ETHICAL CLEARANCE

Was obtained from Independent Ethics Committee, SIU

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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