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Factors Contributing to Door-to-Balloon Delays Among STEMI Patients in Low- and Middle-Income Countries (LMICs): Literature Review

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Abstract

Low- and middle-income countries (LMICs) bear a disproportionate burden of mortality from ST-Elevation Myocardial Infarction (STEMI), largely due to difficulties in meeting the recommended door-to-balloon (D2B) time of ≤90 minutes, a delay proven to increase in-hospital mortality. This review aims to identify and map the factors influencing door-to-balloon (D2B) delay in ST-Elevation Myocardial Infarction (STEMI) patients in low- and middle-income countries (LMICs). This study employed a literature review methodology to identify factors influencing door-to-balloon (D2B) delays in STEMI patients in low- and middle-income countries (LMICs). A systematic search following PRISMA guidelines was conducted in ProQuest, Google Scholar, and EBSCO for publications from 2021–2025 using PCC-based keywords related to LMICs, STEMI, reperfusion, and delay. The results of this review show that factors causing door-to-balloon (D2B) delay can be grouped into four main pillars. Internal hospital factors were the most dominant, followed by patient-related factors, pre-hospital system barriers, and external factors such as pandemics and conflicts that further prolonged delays. It is recommended to strengthen collective commitment and synergy among all stakeholders, including policymakers, hospital management, healthcare workers, pre-hospital personnel, and the community. Improvements should be implemented through a simultaneous, holistic approach to achieve significant, sustainable outcomes.

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Introduction

Low- and middle-income countries (LMICs) continue to exhibit higher rates of complications and mortality from Acute Coronary Syndrome (ACS), with the risk increasing as a country's income level decreases (Nadarajah et al., 2023). Generally, ACS subtypes also have varying prognoses, where STEMI patients have a higher risk of mortality and morbidity compared to NSTEMI patients. They also

require longer hospital stays and incur greater treatment costs due to the high need for invasive interventions and the management of acute complications (Ma et al., 2024). The main challenge in STEMI care in LMICs relates to the gap in implementing guideline-directed therapies (Chandrashekhar et al., 2020), which contributes to high mortality rates, with in-hospital STEMI mortality in African countries reported to be around 5.7%–6.2% (Kassam et al., 2024; Ndaba et al., 2023). In the management of STEMI, time to reperfusion is a key factor that must be achieved through an integrated healthcare system, from the pre-hospital phase to the healthcare facility (Nakashima & Tahara, 2018). International guidelines recommend Primary PCI (PPCI) as the primary therapy because it is more effective than fibrinolytics in reducing mortality and complications (Gulati et al., 2021). International standards also set a door-to-balloon target of ≤ 90 minutes, as delays in reperfusion increase myocardial damage and the risk of death (Collet et al., 2021; Nakashima & Tahara, 2018; Nathan et al., 2020).

In low- and middle-income countries, such as India, only about one in ten STEMI patients receives timely reperfusion (Mathew et al., 2025). Studies in several African countries have shown that reperfusion time can reach 430 minutes, with a median door-to-balloon (D2B) time of approximately 169 minutes, far exceeding the international target of ≤ 90 minutes (Mesas et al., 2018). In contrast, in developed countries like Japan, the median onset-to-balloon time is recorded at 230 minutes and D2B time at around 80 minutes, while in South Korea, D2B time decreased from 72 minutes in 2008 to approximately 60 minutes in the 2012–2018 period, reflecting the success of the healthcare system in accelerating access to reperfusion (Dharma, 2020). The speed of STEMI management in developed countries is supported by an integrated system that includes ambulance service activation of the catheterization team, hospital protocols without administrative delays, and 24-hour availability of facilities and specialized personnel (Khraishah et al., 2020).

Efforts to accelerate reperfusion in STEMI patients depend not only on facility readiness but also on the effectiveness of hospital care systems, including workflow optimization in the emergency department, interprofessional communication, and a responsive catheterization laboratory activation system (Zeng et al., 2025). Door-to-balloon (D2B) delays exceeding 90 minutes have been shown to increase the risk of in-hospital mortality (Akber et al., 2024). Furthermore, the door-to-ECG interval is the phase that most significantly influences survival in STEMI patients, followed by the time from arrival in the catheterization laboratory to balloon inflation (Champasri et al., 2023; Saito et al., 2024). Based on the above description, delays in STEMI management are influenced by various interrelated factors; however, literature specifically mapping the determinants of door-to-balloon (D2B) delay in low- and middle-income countries remains limited. Therefore, this study aims to identify and map the factors influencing D2B delay in STEMI patients in low- and middle-income countries through a literature review, providing a comprehensive overview of the determinants of reperfusion delay.

Materials and Methods

This study employed a literature review methodology to examine factors affecting door-to-balloon (D2B) delays among patients with ST-elevation myocardial infarction (STEMI) in low- and middle-income countries (LMICs). The review followed PRISMA guidelines and included studies published between 2021 and 2025. A systematic search was conducted across ProQuest, Google Scholar, and EBSCO using keywords related to LMICs, STEMI, D2B time, reperfusion, PCI, and treatment delays, combined with Boolean operators (AND/OR) using the Population, Concept, and Context (PCC) framework. The search identified 589 records, of which 19 studies met the inclusion criteria and were included in the final review.

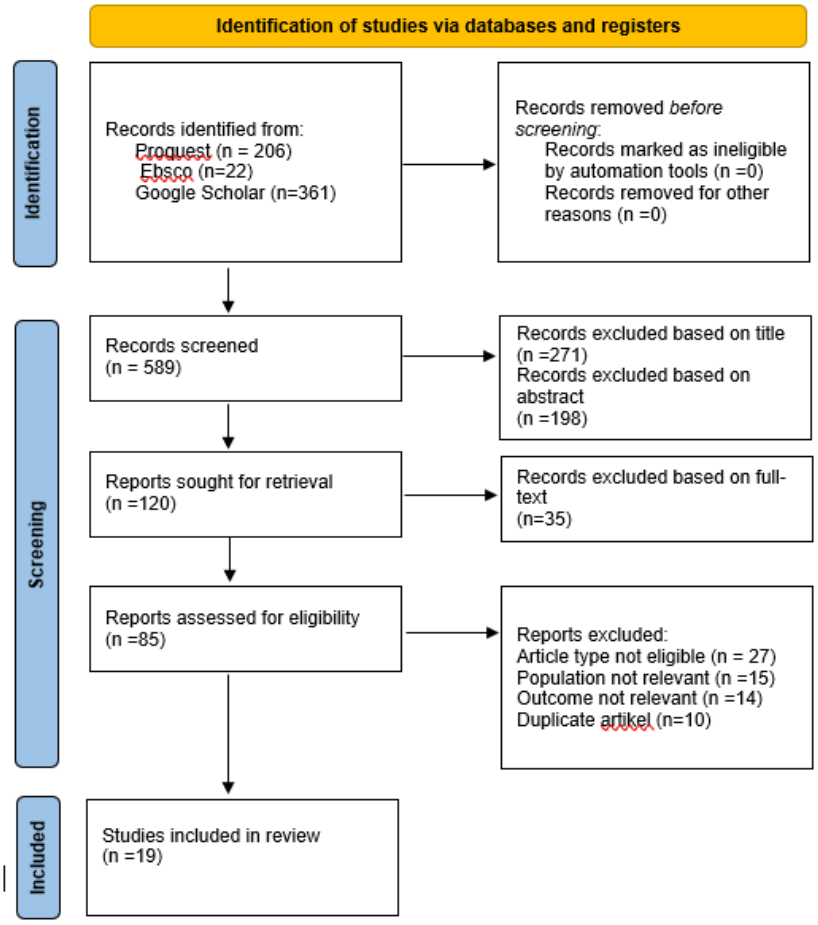

Figure 1. PRISMA Flow Diagram of the Study Identification and Selection Process

Figure 1 presents a PRISMA flow diagram illustrating the literature selection process in this literature review. From a total of 589 articles identified (ProQuest = 206, EBSCO = 22, Google Scholar = 361), a title-and-abstract screening yielded 120 articles for further review. Following full-text assessment, 85 articles were deemed eligible, after which some were excluded due to inappropriate article type, population, research outcomes, or duplication. Ultimately, 19 articles met the criteria and were included in the review.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were established using the Population, Concept, and Context (PCC) framework to ensure consistency with this review's objectives. Studies were included if they involved patients with ST-elevation myocardial infarction (STEMI) undergoing percutaneous coronary intervention (PCI), investigated factors influencing door-to-balloon (D2B) delay, and were conducted in low- and middle-income countries (LMICs) as classified by the World Bank. Studies were excluded if they focused on populations other than STEMI patients undergoing PCI, did not examine factors associated with D2B delay, or were conducted in high-income, developed, or industrialized countries.

Data Sources and Article Search

The literature search process in this study followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The search strategy was systematically conducted across several major electronic databases, namely Proquest, Google Scholar, and EBSCO. Keywords were determined based on the PCC (Population, Concept, Context) approach, combining relevant keywords, namely (Low and Middle Income Countries, OR LMIC, OR Developing countries, OR Resource-limited settings) AND (Door-to-balloon, OR D2B, OR Reperfusion, OR PCI, OR Door-to-reperfusion time) AND (ST-elevation myocardial infarction, OR STEMI, OR Acute coronary syndrome with ST elevation) AND (delay, OR prolonged, OR timely).

Article Selection Process

Following the initial database search, all retrieved records were documented and screened for duplicates. Subsequently, title and abstract screening was conducted to identify studies relevant to the review objectives. Studies that met the preliminary screening criteria were assessed for full-text eligibility against the established inclusion criteria.

Results and Discussions

Following the screening and eligibility assessment process, 19 articles met all predefined inclusion criteria and were included in the final review. These studies were systematically analyzed to identify and synthesize evidence regarding factors associated with door-to-balloon (D2B) delays among STEMI patients undergoing PCI in low- and middle-income countries (LMICs).

Table 1. Summary of Study Findings on Factors Influencing Door-to-Balloon Delay in STEMI Patients in Low- and Middle-Income Countries

No	Title	Authors	Studi setting	Main findings
1	Percutaneous coronary interventions in Sudan: insights from a severely influenced conflict zone	(Humida et al., 2025)	Sudan	War disrupts PCI services through resource limitations and increased reperfusion delays, although some centers in Sudan remain capable of performing primary PCI safely.
2	Time to Treatment Delay and Clinical Indicators in Patients with ST-Segment Elevation Myocardial Infarction: A Descriptive Cross-sectional Study	(Motadayen et al., 2024)	Tabriz, Iran	The results of the statistical analysis indicated that patient residence, referral type, and pre-PCI delay time were significantly associated with door-to-balloon delay.
3	Door-to-Balloon Time in ST-Elevation Myocardial Infarction (STEMI) Patients Undergoing Primary Angioplasty in Myocardial Infarction	(Shah et al., 2024)	Mumbai, India	Patient-related delays were mainly due to consent issues, while hospital-level delays were due to limited cath lab availability and diagnostic challenges**.**

	(PAMI): An Observational Study From a Tertiary Care Center			
4	Pre-hospital Factors Contributing to Delays in the Timely Management of ST-Elevation Myocardial Infarction	(Gooshva et al., 2024)	Iran	The most influential factors for PPCI delay were female gender, nighttime symptom onset, and ambulance transport, while the presence of a caregiver at home was the strongest protective factor
5	A Cross-Sectional Study To Evaluate Door-To Ecg Time In Patients Presenting With Chest Pain In The Emergency Department Of A Tertiary Care Hospital Of Pakistan	(Munir et al., 2025)	Pakistan	The most common causes of delay were emergency department overcrowding, triage priority issues, and lack of awareness among healthcare staff.
6	Door-to-balloon Time in Cardiovascular Emergency Care in a Hospital of Northern Brazil	(Amoras et al., 2021)	Brazil	Door-to-ECG time and ECG-to-activation time contributed to delays in performing primary percutaneous coronary intervention.
7	Evaluation of the Causes of Door-to-Balloon Time Delays in Patients with ST-Elevation Myocardial Infarction at Tehran Heart Center	(Emami et al., 2023)	Teheran, Iran	Catheterization laboratory in use and misdiagnosis were the main causes of door-to-balloon (D2B) delay.
8	Associated Factors with Delayed Door-to-Balloon Time in STEMI Patients	(Zamani et al., 2021)	Ardabil, Iran	The main contributors to door-to-balloon (D2B) delay were prolonged door-to-ECG, ECG-to-code, and code-to-cath phases, each of which was significantly associated with total treatment time.
9	Patients Undergoing Primary PCI, Challenges and Experience from Somalia's Largest PCI Center	(Hassan et al., 2024a)	Somalia	Door-to-balloon (D2B) delays were common, with a median time of 169 minutes, often caused by social issues and financial constraints.
10	A Prospective Study of Door-to-Balloon Time in STEMI Patients Presenting to a Tertiary Emergency Department in North Kerala	(Akkal et al., 2025)	North Kerala, India	Consent duration showed a strong correlation with delay, and nighttime presentation and prolonged consent process were identified as independent predictors of door-to-balloon (D2B) exceeding the standard.
11	Improving Door-to-Balloon Time for Patients With Acute ST-Elevation	(Namdar et al., 2021)	Iran	STEMI code implementation, early notification, and good work planning accelerated door-to-balloon (D2B) time by improving coordination and service efficiency.

	Myocardial Infarction: A Controlled Clinical Trial			
12	Sociodemographic determinants of gender disparity in primary percutaneous coronary intervention in Pakistan	(Sohail et al., 2023)	Pakistan	The main findings revealed significant gender disparities in Primary Percutaneous Coronary Intervention (PPCI) management in Pakistan
13	Reducing the Wire Crossing Time in Primary Percutaneous Coronary Angioplasty: A Study From a Tier II City in India	(Prakash et al., 2022a)	India	The main causes of prolonged reperfusion delay were delayed STEMI diagnosis in the ED, delayed informed consent from family, financial constraints, and limited availability of cath lab technicians after hours.
14	Door-to-Balloon Time and Mortality Among Patients Undergoing Primary PCI, Challenges and Experience from Somalia's Largest PCI Center	(Hassan et al., 2024)	Somalia	The median D2B time was 169 minutes, largely due to social factors and financial constraints, which contributed to delays in diagnosis, consent, and access to catheterization facilities.
15	Variations and Associated Factors in Symptom-to-Balloon (STB) Time and Door-to-Balloon (DTB) Time Before and After the COVID-19 Lockdown: A Hospital-Based Cross-Sectional Study	(Mohandas et al., 2023)	India	This study found that the referral process was a significant determinant contributing to prolonged door-to-balloon (D2B) time.
16	Age and sex-related differences in epidemiology, treatment, and mortality of patients with ST-segment elevation myocardial infarction in Iran	(Darabi et al., 2023)	Iran	This study found that elderly patients experienced delayed door-to-balloon time.
17	Factors Affecting Total Ischemic Time of Patients with ST-elevation Myocardial Infarction: A Cross-sectional Study from a Tertiary Care Hospital in Kerala, India	(Avanthika et al., 2023)	India	Nighttime arrival (20.00–08.00) was significantly associated with faster D2B time compared to daytime arrival.

18	Comparison of Time to Perform Primary Percutaneous Intervention in the Capital and a Provincial Capital	(Hadizadeh et al., 2024)	Iran	Hospital capacity and resources significantly influenced D2B time, with marked differences between the two hospitals (54.8 min vs. 88.3 min). Additionally, advanced age (>70 years) was associated with longer patient wait times, indirectly impacting D2B.
19	A Study to Evaluate Time Delays and Management Strategy in Patients Presenting with Acute Coronary Syndrome (ACS) in the Only Armed Forces Tertiary Cardiac Care Center in Eastern India during the COVID-19 Pandemic	(Sharma, 2024)	India	Primary causes of the delay were pandemic health protocols (including required COVID-19 testing before procedures) and healthcare system overload.

Door-to-balloon (D2B) delay in STEMI patients in low- and middle-income countries (LMICs) is a multifactorial phenomenon influenced by hospital system factors, patient-related factors, pre-hospital system factors, and external factors.

Factors Related to the Hospital System

The performance of the hospital system in managing ST-Elevation Myocardial Infarction (STEMI) is a direct reflection of the efficiency of its protocols and the availability of its resources. This review's findings indicate that delays often originate at the emergency department door, where overcrowding and triage-priority issues (Munir et al., 2025) slow the initial ECG examination, which is the primary trigger for the STEMI code (Namdar et al., 2021). Evidence indicates that the door-to-ECG interval is the phase most frequently delayed, thereby significantly contributing to total management time for STEMI patients (Amoras et al., 2021; Namdar et al., 2021; Zamani et al., 2021). ED overcrowding acts as a systemic factor that disrupts the entire continuum of care for emergency patients. This condition not only creates delays in the early phases, such as triage and door-to-ECG, but also prolongs subsequent critical phases, most notably the door-to-balloon time for STEMI patients, which directly implies increased morbidity and mortality (Bhatia et al., 2018; Rasouli et al., 2019; Vianthy Kundiman et al., 2019). Delays in activating the team and obtaining procedural consent are also causes of D2B delay (Amoras et al., 2021; Prakash et al., 2022a; Zamani et al., 2021). ECG-to-activation delay is caused by the high prevalence of STEMI equivalents or covert occlusions that are not detected by automated ECG interpretation, as well as low clinical recognition of these atypical patterns during the initial presentation phase (McLaren et al., 2021).

Furthermore, obtaining informed consent in emergencies poses an ethical dilemma because time constraints often conflict with the principles of informed consent (Agozzino et al., 2019; Kituuka et al., 2023). Delays in obtaining consent can directly delay the provision of medical treatment, potentially worsening patients' clinical condition and reducing the effectiveness of treatment (Yin et al., 2025). However, the most significant challenges are often structural, such as the limited capacity of catheterization laboratories, which is compounded by patient arrivals after working hours, resulting in suboptimal management of ST-Elevation Myocardial Infarction (STEMI) (Al-Rumhi et al., 2024; Prakash et al., 2022; Shah et al., 2024). The limited number and uneven distribution of cath labs constitute a major structural barrier hindering equitable and timely access to life-saving Percutaneous Coronary Intervention (PCI) procedures in many LMICs (Beza et al., 2021; Muharram

et al., 2024; Rwebembera et al., 2021). As a low- to middle-income country (LMIC), Indonesia provides a concrete example of the inequity in Percutaneous Coronary Intervention (PCI) services, where facilities and specialists are disproportionately concentrated in urban centers (Muharram et al., 2024). In addition to facility limitations, low awareness among healthcare workers and an inadequate number of trained personnel synergistically prolong door-to-balloon time (Hadizadeh et al., 2024; Munir et al., 2025). Percutaneous Coronary Intervention (PCI) services in LMICs face the fundamental challenge of a scarcity of trained and certified human resources, including both interventional cardiologists and multidisciplinary support teams (such as catheterization nurses and radiology technicians), thereby creating a dependency on specific service centers and widening the gap in access to cardiovascular care (Aderinto & Olatunji, 2023; Rwebembera et al., 2021).

Another factor influencing door-to-balloon (D2B) delay is diagnostic obstacles and misdiagnosis, which can lead to the termination of the care pathway for patients with atypical symptoms (Emami et al., 2023). This is due to inadequate medical equipment and suboptimal competency of healthcare workers, which are primary causes of misdiagnosis in many healthcare facilities (Sheffel et al., 2024; Zakaria et al., 2025). In many healthcare facilities in low- and middle-income countries (LMICs), the reliance on a limited on-call staff for 24-hour cath lab services results in variations in the quality of care depending on the time of arrival, where patients presenting with chest pain at night disproportionately experience delays in receiving life-saving interventions (Akkal et al., 2025; Al-Rumhi et al., 2024; Darabi et al., 2023; Prakash et al., 2022).

Patient-Related Factors

Factors originating from the patient represent the first and most critical barrier in efforts to shorten door-to-balloon (D2B) time. A lack of knowledge about the symptoms of ST-Elevation Myocardial Infarction (STEMI) has been shown to delay D2B time (Avanthika et al., 2023). This low awareness of STEMI symptoms contributes to pre-hospital delay, which, in turn, influences the length of door-to-balloon (D2B) time at healthcare facilities (Albarqouni et al., 2016). Adequate knowledge of disease symptoms, the importance of early detection, and the right to access healthcare services are key factors that encourage individuals to utilize healthcare facilities more actively and promptly (Goto et al., 2019; Rasu et al., 2015; Yenti et al., 2022). Low public awareness is also associated with inappropriate use of Emergency Medical Services (EMS), ultimately prolonging ambulance response times for true emergencies. These findings underscore the need for synergy between raising public awareness through national programs and providing more contextual training for Emergency Medical Services (EMS) operators (Binhotan et al., 2025; Gunawan et al., 2022).

Furthermore, residing far from a Percutaneous Coronary Intervention (PCI) facility hinders achieving the door-to-balloon (D2B) time target of ≤ 90 minutes due to transportation delays (Hassan et al., 2024; Motadayen et al., 2024). Other research findings indicate that the uneven distribution of emergency facilities leaves many regions located more than 180 minutes away from complex care services. This limits access, worsens health outcomes, and increases mortality (Isaacson et al., 2021; Rocha et al., 2017). Other factors, such as financial and social constraints, impede achieving optimal door-to-balloon (D2B) time by slowing the entire chain of cardiac emergency care (Hassan et al., 2024; Prakash et al., 2022). In low- and middle-income countries (LMICs), unfavorable socioeconomic conditions can create both financial and non-financial barriers to accessing and utilizing necessary healthcare services (Baten et al., 2025; Cheng et al., 2025).

The emergence of atypical symptoms also contributes to delayed D2B time in patients with ST-Elevation Myocardial Infarction (STEMI) (Al-Rumhi et al., 2024). The absence of chest pain as a hallmark symptom of STEMI makes the condition difficult to recognize. Consequently, patients with atypical symptoms often experience delays in ECG acquisition and diagnosis, which subsequently prolongs door-to-balloon (D2B) time (Eileen & Sara, 2018). Female gender and advanced age are also contributing factors to delayed door-to-balloon (D2B) time in hospitals (Darabi et al., 2023; Sohail et

al., 2023). This is because women more frequently present with atypical symptoms, leading to delayed recognition and management of STEMI. Additionally, women generally have a higher burden of comorbidities such as diabetes, hypertension, and obesity, which can further slow down the diagnostic and interventional process (Lawesson et al., 2018). In the elderly, delays are often associated with difficulties in assessing and interpreting STEMI symptoms in patients with multiple comorbidities, which subsequently affects door-to-balloon (D2B) time (Calé et al., 2019). In contrast to younger patients who typically present with typical chest pain, elderly patients with STEMI tend to present with atypical symptoms such as dyspnea, diaphoresis, nausea/vomiting, or syncope, which can obscure the diagnosis and worsen the prognosis (Wenger & Engberding, 2017).

Factors Related to the Pre-Hospital System

The pre-hospital system plays a critical role in determining the direction of care for patients with ST-Elevation Myocardial Infarction (STEMI). Findings from this review reveal that the type and process of referral influence door-to-balloon (D2B) time (Mohandas et al., 2023). The referral process of patients from primary and secondary healthcare facilities significantly affects D2B time, as inter-facility travel time and patient transfer coordination can add delays before the patient finally arrives at a Percutaneous Coronary Intervention (PCI) center. Patients referred from non-PCI facilities, although arriving in a more stable condition, often experience longer pre-PCI delays due to bureaucratic complexity and the need for secondary transfer (Lee et al., 2022). These delays are further exacerbated by challenges in accessing PCI centers, which not only prolong transportation times but also limit the strategic options available to field personnel (Hassan et al., 2024; Motadayen et al., 2024). In the context of health systems in low- and middle-income countries, ambulance use is an independent risk factor for delays in Percutaneous Coronary Intervention (PCI). This finding reflects challenges such as limited resources, suboptimal referral processes, or the tendency for patients with more severe conditions and those who have already experienced pre-hospital delay to eventually call an ambulance (Gooshva et al., 2024).

Furthermore, pre-hospital care systems in low- and middle-income countries face fundamental challenges of fragmentation and lack of coordination. Critical resource deficits, including a shortage of trained medical personnel and first responders, inadequate availability of basic equipment, and substandard infrastructure, exacerbate this condition. Structurally, the development of optimally functioning systems is hindered by broader social, geographic, economic, and political factors that shape the health ecosystem in these countries (Bhattarai et al., 2023; Quake et al., 2024).

On the other hand, extreme geographical disparities in many LMICs, such as long distances between healthcare centers and population settlements, lack of paved roads, and minimal emergency transport facilities, create systemic barriers that exacerbate inequities in access to pre-hospital services, particularly for communities in rural and remote areas (Evans et al., 2022; Tegegne et al., 2018). Consequently, this system often creates a domino effect on hospital care, requiring the cath lab team to catch up on the time already accumulated during the pre-hospital phase. Strong evidence indicates that Emergency Medical Services (EMS) systems equipped with early diagnosis and notification capabilities can compensate for the negative impact of geographical disparities by maintaining system performance despite variations in patient distance to definitive care facilities. Thus, these early diagnosis and notification initiatives play a critical role in the ST-Elevation Myocardial Infarction (STEMI) care system to offset transportation delays from distant locations (Mumma et al., 2014; Reddy et al., 2025).

External Factors

The findings of this scoping review identify armed conflict and pandemics as external factors that fundamentally disrupt the entire chain of care for ST-Elevation Myocardial Infarction (STEMI) (Sharma, 2024; Zeldetz et al., 2025). This is due to the extreme pressure on Emergency Departments

(EDs) during conflict. On the one hand, the number of patients increases dramatically. On the other hand, the number of healthcare workers, particularly nurses and doctors, is inadequate to bear the burden and meet the specific demands of the conflict environment (Qtait et al., 2025). During war, ED personnel are highly vulnerable to burnout, triggered by extreme workloads and exposure to trauma, while simultaneously having very limited access to mental health services (Aldabbour et al., 2025). This will affect the ED service delivery system, including care for patients with ST-elevation myocardial infarction (STEMI).

In addition to armed conflict, a pandemic in a country also significantly impacts Emergency Department (ED) services. Healthcare workers face a more intense workload with long working hours, as well as higher levels of depression and anxiety, which have the potential to disrupt the ED service delivery system (Yeo et al., 2021). Consequently, this significantly impacts routine healthcare and emergency services in hospitals, as evidenced by resource reallocation, delays in elective procedures, and increased burden on the emergency system (Kuandyk et al., 2024).

Conclusion

Door-to-Balloon Time (D2B) delay is a complex, multifactorial issue in low- and middle-income countries. Based on the findings, the causative factors can be summarized into four main pillars: internal hospital factors, which represent the largest point of delay, encompassing triage and diagnosis in the Emergency Department (ED), resource availability (catheterization laboratory, personnel), protocol process efficiency (door-to-ECG, lab activation), and administrative issues. Patient-related factors, such as demographic characteristics (age, gender), socioeconomic status, level of symptom awareness, and mode of transportation, constitute the initial barrier in the ST-Elevation Myocardial Infarction (STEMI) care chain. Pre-hospital system factors, including suboptimal referral processes, transportation time, and limited access to PCI centers, act as critical barriers before the patient arrives at the appropriate hospital. External factors, such as pandemics and conflict, can paralyze the entire health system and serve as fundamental drivers of delays. The necessity of collective commitment and synergy among all stakeholders, including policymakers and hospital management, healthcare workers, pre-hospital personnel, and the community. Improvement will only be significant and sustainable if achieved through a simultaneous, holistic approach.

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