

## EDITORIAL COMMENT

# A Big Call to Action

## Improving STEMI Management in Low- and Middle-Income Countries\*



Hyuck-Jun Yoon, MD, PhD

India is expected to become the world's most populous country by 2022.<sup>1</sup> Moreover, India is also experiencing a significant increase in the incidence of atherosclerotic cardiovascular disease as the country undergoes an epidemiologic transition and is expected to account for the most significant atherosclerotic cardiovascular disease burden globally.<sup>2</sup> In this issue of *JACC: Asia*, the NORIN-STEMI (North India ST-segment Elevation Myocardial Infarction) registry highlights a critical gap in the treatment of STEMI patients in low- and middle-income countries, particularly India.<sup>3</sup> Qamar et al<sup>3</sup> aimed to investigate the characteristics, practice patterns, outcomes, and sex differences in patients with STEMIs in India.

Compared with the current data from the United States and Europe, the median patient age was younger (55 years) and the smoking rate was higher (53%).<sup>4,5</sup> Most patients (93%) presented first to a non-percutaneous coronary intervention (PCI)-capable center, so the median time from the symptom onset to the coronary angiography was delayed significantly, and the reperfusion therapy was insufficient. One of the major findings of this study is the significant gap in the treatment of STEMIs between men and women in India. Women with STEMIs were less likely to receive PCI and had a higher 1-year mortality than men. Furthermore, women make up <20% of the patients with STEMI in this registry, meaning that a

significant number of female patients with STEMI may have been underdiagnosed.

The registry highlights the characteristics and practice patterns of patients with STEMI in India. Most patients initially present to non-PCI-capable facilities, leading to a median time of 71 hours from the symptom onset to the coronary angiography. Despite this delay, nearly all patients receive essential medications upon presentation, emphasizing the importance of prehospital management and timely transfer to tertiary care centers. In South Korea, the Korea Acute Myocardial Infarction Registry and regional cardiocerebrovascular centers have successfully reduced the door-to-balloon time for patients with STEMI within a short period. This practice has led to improved patient outcomes and a more timely delivery of primary PCI procedures.<sup>6</sup> However, this success may not translate easily for India owing to the differing infrastructural environments, transportation systems, and inconsistencies because of economic and geographic diversity and differences. The lack of a PCI, the strongest independent predictor of the inpatient and 30-day mortality, indicates the urgent need to improve the accessibility to PCI-capable centers and the overall STEMI care infrastructure in India. Telehealth and a hub-and-spoke model, like the Tamil Nadu STEMI initiative, could offer potential ways to increase a timely revascularization and enhance the standard of care for patients with STEMI in India.<sup>7</sup>

Significant disparities in acute myocardial infarction treatment patterns exist between urban and rural areas in countries like the United States and Korea.<sup>8,9</sup> However, those differences are likely more pronounced in low-income countries, where the infrastructure is limited. Improving health care access, particularly in rural and underserved regions, can help to ensure a timely and appropriate care for STEMIs, regardless of patient sex. This process may involve increasing emergency medical services

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From the Dongsan Hospital, Keimyung University College of Medicine, Daegu, South Korea.

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availability, enhancing transportation options, and equipping health care facilities to properly care for patients with STEMI.

This study also found that many patients with STEMI in India had a history of smoking, hypertension, and diabetes, which are known risk factors for coronary artery disease. This finding underscores the need for effective primary prevention strategies, such as smoking cessation and better management of hypertension and diabetes.

The exceptionally low prevalence of women in the NORIN STEMI registry suggests a potential underdiagnosis and inadequate treatment. The sex ratio in other myocardial infarction-related registries, particularly for STEMIs, has varied across different countries and regions. In this registry, women represented only 16% of the patients with STEMI. Globally, several registry's data have shown that women constituted  $\leq 31\%$  of all patients presenting with STEMIs.<sup>10,11</sup> These percentages may differ across the various studies and populations. For instance, in prior multicenter registry studies of ACS patients in India, the proportion of women varied between 18% and 23%.<sup>2,12,13</sup>

Sex differences in acute myocardial infarctions have long been recognized and accepted, as evidenced by studies such as the Framingham study.<sup>14</sup> Although significant efforts have been made in developed countries like the United States and Europe to decrease these disparities, the gap remains and is more pronounced in developing and underdeveloped countries. Although the annual cardiovascular disease mortality rate in the United States has been higher for women than men since 1984, there have been significant decreases in the past decade.<sup>15</sup> This decrease is partly attributed to

increased awareness, a greater focus on women's cardiovascular disease risk, and the implementation of evidence-based treatments for established coronary heart disease.<sup>16</sup> It is important to raise awareness among health care professionals about the unique presentation of acute myocardial infarction in women and to ensure equitable access to quality health care. Addressing these challenges is crucial for improving clinical outcomes and decreasing sex disparities in cardiovascular care.

In conclusion, addressing the sex gap in STEMI treatment in India necessitates a multifaceted approach focused on raising awareness, providing education and training for health care providers, and ensuring that all patients receive timely and appropriate care. By collaborating, health care providers, policymakers, and the public can work toward bridging the sex disparities in the STEMI management and outcomes, ultimately improving the health of countless individuals in India, regardless of their sex. Indian politicians must take this issue seriously, and with the recognition of this problem, I hope that the results of this analysis will contribute to saving many lives in the future.

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**ADDRESS FOR CORRESPONDENCE:** Dr Hyuck-Jun Yoon, Division of Cardiology, Department of Internal Medicine, Dongsan Hospital, Keimyung University College of Medicine, 42601, Dalgubeoldaero 1035, Dalseo-gu, Daegu, South Korea. E-mail: [hippsons@dsmc.or.kr](mailto:hippsons@dsmc.or.kr).

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