

Breaking the Bias: Improving Medical Education on Sex Disparities in Myocardial Infarction

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To the Editor:

The recent article by Dr Haque and colleagues reveals an absence of education on sex-specific symptoms in females presenting with a myocardial infarction (MI).¹ Failure to educate medical students about sex-specific differences can lead to disparities in MI outcomes. Females often present atypically with symptoms of fatigue, nausea, and shortness of breath, all of which differ from the classic presentation of chest pain.¹ We appreciate the authors' findings highlighting the underrepresentation of sex-based differences in MI symptomology within first-line preparatory resources for medical students.

These sex-based discrepancies in MI clinical outcomes are large in magnitude. Females experience higher mortality rates, repeat MI, stroke, major bleeding, delays in care, and suboptimal treatment compared to males.² Despite medical advancements, these disparities are multifactorial and persistent. Educational shortfalls should be addressed to mitigate these outcomes at the root of medical training, such as in medical education curricula and physician training. We write to expand upon the authors' recommendations addressing these gaps.

The volume of sex-based MI content in medical curricula has not been explicitly studied. We recommend adjustments in preclinical curricula that integrate didactic sessions focusing specifically on the differences in risk and presentation for both MI and cardiovascular disease in males and females. Females have higher rates of nonobstructive coronary artery disease and microvascular dysfunction, causing a broader spectrum of non-chest pain symptoms.⁴ Symptom recognition training with the use of didactics, case-based learning, and standardized patient exercises can create a foundation that primes medical students to watch for these symptoms as they enter their clinical years. Mandating that students reach a certain number of female cardiovascular disease encounters during clinical rotations would provide further exposure and understanding of the atypical presentations seen in females.

Improved education should not be limited to trainees. We encourage clinicians to work toward consistently incorporating sex-specific MI diagnostic criteria. Electrocardiograms (EKG) and high-sensitivity cardiac troponin assays are widely used and critical MI diagnostic tools.⁴ EKG patterns in females differ from their male counterparts, including differences in QT interval, QRS duration, ST-segment elevation, and Q waves.⁵ Interpretation of troponins should take into consideration sex differences, rather than generalizing values, as the threshold differs between females (>16 ng/L) and males (>34 ng/L).⁴ Moreover, clinicians should have high suspicion of MI in females who present with clusters of symptoms. Although chest pain is observed in 93% of females with an MI, chest pain is rarely a primary symptom and occurs among additional symptoms that may cloud clinician judgement.⁴

In closing, we commend the authors' ability to highlight these educational shortfalls, starting with widely used United States Medical Licensing Exam Step 1 resources. Medical education at the student and clinician level should continue to evolve in addressing sex differences in pathophysiology and disease presentation. Implementing these strategies can ultimately reduce sex disparities in MI outcomes.

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