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Editorial

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Global Awareness of Myocardial Infarction Symptoms in General Population

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Cardiovascular diseases (CVDs) are the most common cause of morbidity and mortality worldwide and their incidence is on a steady rise. Among them, coronary artery disease, especially acute myocardial infarction (AMI), remains a leading cause of mortality despite enormous progress in its management.[1] The prevalence of AMI approaches 3 million people worldwide, with more than one million deaths in the United States annually. AMI causes irreversible damage to cardiomyocyte due to discontinuation of oxygen supply and may lead to impairment in diastolic and systolic function. In addition, AMI makes the patient prone to arrhythmias and other serious complications. Therefore, prompt restoration of blood flow to cardiac cell by reperfusion therapy is essential in the management of AMI. Since mortality or subsequent morbidity of AMI drastically decreases with a shorter time from symptom onset to reperfusion, it is very important to reduce any delays in getting accurate diagnosis and treatment.[2] Among the reasons for delay to reperfusion in AMI, patient-induced delay from the occurrence of symptoms to medical contact is possible and one substantial component to ensure a timely treatment. Therefore, prompt recognition of symptoms of AMI and appropriate rapid emergency response by patient are crucial.[3] After contacting medical service, the history taking and physical examination are paramount for the diagnosis of AMI in addition to electrocardiogram (ECG) finding and troponin assay. Patients should be asked about the characteristics of chest pain and associated symptoms, risk factors or history of CVD.[4] There are five major symptoms of AMI as presented by the United States Centers for Disease Control and Prevention: (1) pain or discomfort in the jaw, neck, or back, (2) weakness, dizziness, nausea, and/or cold sweat, (3) pain, pressure, or squeezing in the chest, (4) sudden pain or discomfort in the arm/shoulder, and (5) sudden shortness of breath. Among them, chest pain or discomfort is the most common symptom of AMI and has been recognized as the predominant symptom of AMI in surveys conducted worldwide.[5] However, there is a lack of knowledge about the other atypical presentation of AMI and its recognition in the world's common population, which might be related to patient delay. In fact, disparities in awareness and response to AMI symptoms corresponded closely with the disparities seen in delays in hospital presentation and outcomes after myocardial infarction.[6] In general, men complained of typical symptoms including chest pain and chills, whereas women often complained of atypical symptoms like pain in the back, jaw, and neck, upper abdominal discomfort, dyspnea, fatigue, and dizziness, even without chest pain. In case of elderly patients, shortness of breath is more common as their

presenting symptom for AMI. In order for patients to know if their symptoms are due to AMI, it is important to make people have the whole knowledge for symptoms of AMI and the ability to perceive them.

There have been several studies on public knowledge of AMI symptoms. The cross-sectional study using data from the 2017 National Health Interview Survey including 25,271 adults resided in the United States assessed the awareness of the major 5 AMI symptoms and the response to a perceived AMI among different sociodemographic subgroups.[7] This study found that 23,383 adults (91.8%) considered chest pain or discomfort a symptom of AMI. The prevalence of considering shortness of breath, pain or discomfort in arm, feeling weak, lightheaded, or faint, and pain in the jaw, neck, or back was 87.0%, 85.7%, 77.0%, and 62.6%, respectively. However, only about half (53%) of the people were aware of all 5 symptoms. On the contrary, the incidence of not being aware of any symptoms of AMI was 5.8% and associated with male sex (odds ratio [OR], 1.23; 95% confidence interval [CI], 1.05–1.44; p=0.01), Hispanic ethnicity (OR, 1.89; 95% CI, 1.47–2.43; p<0.001), not having been born in the United States (OR, 1.85; 95% CI, 1.47–2.33; p<0.001), and having a lower education level (OR, 1.31; 95% CI, 1.09–1.58; p=0.004). There was a stepwise increase in the proportion of individuals who were not aware of any AMI symptoms as the number of these high risk characteristics increased. Moreover, nearly 4.5% of individuals chose a different response than immediately calling emergency medical services in response to AMI and this proportion was more than double (9.8%) among adults who were not aware of any AMI symptoms. This study also demonstrated a nearly 10% higher awareness of all 5 AMI symptoms and better use of emergency medical services among women compared with men. In 2020 Korean cross-sectional study using 2017 Korea Community Health Survey with 228,281 participants, 42.4% were aware of all major 5 AMI symptoms.[8] Conversely, 11.8% of participants were not aware of any symptoms. There was a high level of awareness of chest pain and shortness of breath, but a low level of awareness of gastrointestinal symptoms and pain in the arm, shoulder, jaw, neck, and back. Although women showed higher level of overall awareness compared to men, they showed a lower level of awareness regarding chest pain and discomfort. Gender, age, education level, occupation, smoking, drinking, physical inactivity, and CVD risk factors were related to the level of awareness of AMI symptoms. Birnbach et al.[9] presented the current research status on AMI symptoms knowledge by systematically reviewing the 86 literatures including 354,497 participants and comparing the knowledge levels among the general population and cardiac patients. The weighed mean of the knowledge scores for chest pain as a symptom of AMI was similar with 74.3% and 82.0% in the general population and cardiac patients group, respectively. However, the weighted mean of the overall knowledge scores for the symptoms of AMI was 42.1% and 69.5% for general population and cardiac patients, respectively, and this difference was mainly driven by the knowledge level of atypical symptoms. There was insufficient knowledge of atypical symptoms such as 'stomach or abdominal discomfort', 'nausea or vomiting', 'headache', and 'feeling of anxiety' (8.7–36.7%) compared to typical major AMI symptoms including 'chest pain or discomfort', 'shortness of breath', 'pain or discomfort in arms or shoulders', 'feeling weak, lightheaded, or faint', 'pain or discomfort in the jaw, neck, or back', and 'sweating' (49.8–88.5%), which is especially relevant for women as they presented atypical symptoms more frequently than men. Less than half (45.1%) of acute coronary syndrome patients correctly attributed their symptoms to the heart.

Although there have been some studies introduced above on the level of knowledge of AMI symptoms, they have focused on specific groups. Moreover, no study addressed the

worldwide knowledge levels of the AMI symptoms and symptom attribution. Sharma and colleagues[10] have conducted systematic review and meta-analysis to estimate the prevalence of awareness of AMI symptoms among the general population. A total of 120,988,548 individuals from 124 studies across 35 different countries were included. Chest pain is the most identifiable symptom of AMI with the pooled prevalence of 70%, while the feeling of light-headedness and pain in the jaw, neck, and back are the least identifiable symptoms. Patients with a history of the previous AMI showed higher prevalence than those without. However, seeking medical attention lately by delaying from the onset of heart attack symptoms is of international concern. The prevalence of the awareness for all typical symptoms of AMI varies according to the region; less than 5% in African countries such as Kenya, Tanzania and Asian countries such as Nepal to as high as nearly 90% in Germany. It depends on the presence of other overwhelming disease such as infectious disease, gender disparity, or incidence of previous AMI history in each country. There was no gender-specific difference in this awareness (57% [95% CI, 51–62%] in male vs. 57% [95% CI, 52–63%] in female). There was a significant difference in the level of knowledge for AMI symptoms according to the ethnic group; higher in the Caucasian white, white, and non-Hispanic white groups than in the other groups.

There are several limitations of the current study. Most of the studies included in this meta-analysis used the self-reporting method which might lead to under- or over-estimation of results. Some studies used open and some close-ended questionnaires; the validity of such studies could not be deduced, leading to reporting bias in results. Some studies involved patients who have been previously diagnosed as AMI, and these patients had higher prevalence of awareness than the other general populations. This would have resulted in an overestimation of knowledge levels. Finally, the main purposes of most studies included in this meta-analysis were heterogeneous and those in some studies were not related to the level of the knowledge of AMI symptoms.

In conclusion, prompt diagnosis based on the symptoms with ECG and laboratory tests and rapid restoration of coronary blood flow are essential in the management of AMI. For the early detection of symptom without any delay to contact medical service, people must be aware of both typical and atypical symptoms related to AMI. However, the level of knowledge for AMI symptoms is still not satisfactory and varies depending on the region, race and various socioeconomic factors. Therefore, further efforts including the development of strategy and programs to improve the awareness of AMI symptoms are needed worldwide, and more significant efforts with targeted education and enlightenment according to the region where the awareness of AMI symptoms is low are necessary.

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