

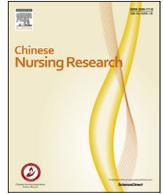
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## Review article

## Factors influencing pre-hospital patient delay in patients with acute myocardial infarction

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## ARTICLE INFO

## Article history:

Received 21 December 2014

Received in revised form

10 February 2015

Accepted 11 April 2015

Available online 15 September 2015

## Keywords:

Acute myocardial infarction

Pre-hospital delay

Factors

## ABSTRACT

**Objective:** To finding out the factors Influencing Pre-hospital Patient Delay in Patients with Acute Myocardial Infarction.

**Sources of information:** From CNKI, Wanfang, PubMed and Yizhi databases.

**Inclusion criteria:** Searching criteria is AMI and/or pre-hospital delay and/or factors.

**Results:** Factors include essential information, Symptoms, Contextual factors, Cognitive and affective factors, behavioural factors.

**Conclusions:** Providing targeted intervention measures based on these factors.

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## 1. Introduction

Acute myocardial infarction is a dangerous disease with a high mortality rate. For AMI patients, the fate of the heart and the patient's life depends on time to beginning of effective treatment in addition to other factors such as severity of disease and involved vessels etc. The key factor is whether reperfusion therapy is started timely after the onset of symptoms, and the benefit of reperfusion therapy depends on the time.<sup>1</sup> Guidelines emphasise the need to minimise reperfusion delay time for patients with acute myocardial infarction.<sup>2</sup> Delay before the initiation of reperfusion therapy for AMI can be divided into two distinct time periods: pre-hospital delay and in-hospital delay. Pre-hospital delay is the time from onset of symptoms to arrival to the hospital. In-hospital delay, also known as door-to-treatment, is defined as the time from arriving to the hospital to the initiation of reperfusion therapy. Pre-hospital delay can be divided into two time periods: patient delay (PD) time and transportation delay (TD) time. Patient delay is time from the onset of symptoms to making the initial decision to seek for professional healthcare facility, and transportation delay is the time from making the initial decision to seek professional healthcare facility to arrival at the hospital.<sup>3</sup> Pre-hospital delay is mainly caused by the patient's own decisions and is much longer than in-

hospital delay and the time needed to decide on initiating reperfusion therapy.<sup>4</sup> Regardless of how to shorten in-hospital delay, if the pre-hospital delay is not reduced, then reperfusion therapy cannot achieve the best results.<sup>5</sup> However, patient delay time, which accounts for 75% of the total pre-hospital delay time,<sup>6</sup> has not changed in the past 10 years.<sup>7,8</sup> Thus, reducing patient delay time is very important for AMI patients.<sup>9</sup> To analyse the literature on pre-hospital delay, the CNKI, Wanfang, PubMed and Yizhi databases were searched. PD for AMI patients is summarised in this study.

## 2. Essential information

## 2.1. Age

Increased age has been associated with a longer pre-hospital delay in many studies.<sup>10–18</sup> This may be explained by the following several reasons: (1) The elderly have reduced physiological function and a lower ability to perceive pain. (2) Older patients are more likely to have atypical symptoms compared with younger patients and have more comorbidities, which may result in a delay for seeking medical care<sup>19,20</sup> and limit their correct recognition of warning symptoms.<sup>21,22</sup> (3) The elderly have insufficient perceptions of AMI and do not want to trouble the family with their symptoms, and thus, the actual rescue time will be longer.<sup>23</sup> However, other researchers did not find a statistically significant result for the effect of age on delay.<sup>5,24,25</sup>

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Peer review under responsibility of Shanxi Medical Periodical Press.

## 2.2. Gender

Female gender was a significant variable in predicting delay. Female patients with AMI had a prolonged decision-making process compared with males.<sup>5,12,15,26,27</sup> There are several potential explanations for this finding: (1) The incidence of AMI for males corresponds to that of older females.<sup>28–31</sup> Older female patients often have other chronic diseases, which is a disadvantage for them in terms of their medical care and treatment.<sup>26,32</sup> (2) Females are more likely to have atypical symptoms compared with males,<sup>22,28,33–37</sup> making females less apt to interpret their symptoms, such as being related to a heart attack.<sup>38–40</sup> (3) Females appear to have a belief that AMI is a “male” disease and that they are associated with a lower risk of AMI.<sup>40,41</sup> In contrast, other studies have not found significant gender differences.<sup>14,20,24,29,42</sup>

Age and gender can affect each other. The elderly have a large gender difference for pre-hospital delay, and older females delay significantly longer than males; however, the reason may be because the incidence of heart disease of women corresponds to that of men who are 10 years younger.<sup>20,43</sup>

## 2.3. Marital status

Single, widowed or divorced patients have a longer delay time for seeking care compared to patients who are married.<sup>14,28,44</sup> The reason may be that there is no one to consult immediately. Among males, married or common law status was strongly associated with earlier health-seeking behaviour in the setting of acute myocardial infarction. Among females, married or common law status was not associated with a similar reduction in delay before seeking medical attention.<sup>45</sup> However, a study reported that marital status is not associated with pre-hospital delay.<sup>42</sup>

## 2.4. Previous history

Patients with a history of diabetes,<sup>22,46–48</sup> hypertension<sup>22</sup> or angina pectoris<sup>49</sup> have been found to delay longer than those without these conditions. However, several studies<sup>15</sup> have reported that patients with prior AMI delay less, but many others did not find any association between delay and history of AMI.<sup>5,9,50</sup>

## 2.5. Health insurance

Patients with health insurance have a shorter delay than those without insurance.<sup>51–53</sup>

## 2.6. Economic level

Several studies have reported that the economic level is associated with pre-hospital delay,<sup>54,55</sup> e.g., patients with a higher income have an earlier presentation for care. Conversely, other studies have found that economic level has no effect on pre-hospital delay time.<sup>56</sup>

## 2.7. Education level

Low-education levels were a significant determinant of longer pre-hospital delay.<sup>11,12,44,55,57</sup>

## 2.8. Living condition

Living alone was an independent predictor of longer delay time,<sup>4,28</sup> but another study reported that living condition was not associated with pre-hospital delay.<sup>14</sup>

## 2.9. Race

Minorities who were more likely to have specific cultural health beliefs and perceptions related to medical behaviour were associated with a significantly longer delay.<sup>16,58</sup>

## 3. Symptoms

### 3.1. Types

The classic symptoms of an AMI include chest pain, but some investigators found that 20%–33.3% of patients with AMI did not experience central chest pain at all.<sup>5,28,59</sup> Some atypical symptoms, such as weakness, shortness of breath, anxiety, abdominal discomfort or sweating can occur when experiencing an AMI<sup>60</sup> and were associated with a substantially longer pre-hospital delay.<sup>29,57</sup>

### 3.2. Intensity

Increased symptom intensity and having fast onset symptoms (symptoms that develop rapidly) were associated with a shorter pre-hospital delay.<sup>5,24,25,61</sup>

### 3.3. Duration

Having continuous symptoms predicted a short pre-hospital delay<sup>5,37,38</sup> and having intermittent symptoms predicted a longer delay.<sup>14,42</sup>

## 4. Contextual factors

### 4.1. Time when the symptoms occur

Having symptom onset at night was associated with a longer pre-hospital delay.<sup>62</sup> There may be no other person available to help at night, and thus, the patients did not want to trouble others and planned to seek healthcare during the daytime. Another reason may be that it is difficult to find a way of transportation and a person to help at night.<sup>46</sup>

### 4.2. Location where symptoms occur

Being home<sup>14,24</sup> or in a public place<sup>24</sup> when symptoms began resulted in a longer delay to treatment. However, one study found no significant differences between early and late responders with regard to location of where the symptoms began.<sup>63</sup>

### 4.3. Whether there is a bystander when the symptoms occur

Patients who experienced symptoms alone had longer delays compared to patients who had company.<sup>25</sup> Having someone present when the symptoms occur can not only reduce fear but also lead to a responsible decision regarding treatment and thus a shorter pre-hospital delay.<sup>64</sup>

## 5. Cognitive and affective factors

### 5.1. Cognitive factors

#### 5.1.1. Symptom identification

The patient's correct identification of symptoms was an important predictor for delay time.<sup>65</sup> Patients who experienced symptoms that are different from those expected to be associated with AMI delayed care, and patients who correctly recognised the symptoms of AMI experienced less delay.<sup>14,41,42</sup>

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