Factors Related to a Delay in Seeking Treatment for Acute Myocardial Infarction in Older Adults: An Integrative Review

Samoraphop Banharak*, Channarong Prasankok, Helen W. Lach

Abstract: Acute myocardial infarction is a significant world-wide problem, especially among older adults. More than 50% of older adults who experience this die before arriving at the hospital because of delaying seeking treatment. The aim of this integrative review was to describe factors related to a delay in seeking treatment among older adults with acute myocardial infarction. Studies published up to 2019 were extracted from the literature that dealt with a delay in treatment for acute myocardial infarction. These needed to be published in peer reviewed English or Thai journals or thesis/dissertations; and involved studies where at least 75% of participants were over 55 years. However, studies without comparisons about factors related to delay treatment were excluded. A total of 23 papers were selected for final review following standard methods for an integrative review.

Results revealed three phases related to delays in seeking treatment: patient/bystander recognition action, transportation, and hospital action phases. Most older adults spent the longest average of time delaying in the first phase. Factors associated with delay seeking treatment were in four categories: *socio-demographic* (advanced age, female, non-white, single/widowed/separated, low education, and low income); *physiological and environmental* (using private car, living alone, experiencing symptoms at home/weekday/night, and living in impoverished/rural area); *psychological and behavioral* (feelings and thoughts hesitancy/ambiguity/bother and self-management); and *clinical* (lack of cardiac history, positive history of diabetes mellitus, hypertension, stroke, heart failure, angina pectoris, smoking, and symptoms mismatch/low intensity/atypical symptoms). Findings suggest that nurses need to educate older populations about the early recognition of acute myocardial infarction symptoms and tailor interventions to improve understanding of symptoms and need for emergency treatment.

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Correspondence to: Samoraphop Banharak*, RN, PhD, Assistant Professor, Department of Gerontological Nursing, Faculty of Nursing, Khon Kaen University, Khon Kaen, Thailand. E-mail: sbanharak@kku.ac.th

Channarong Prasankok, RN, MNS, Cardiac Nurse, Queen Sirikit Heart Center of Northeast, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand. E-mail: chanclubpr@gmail.com

Helen W. Lach, RN, PhD, Professor, Trudy Busch Valentine School of Nursing, Saint Louis University, St. Louis, MO, USA. E-mail: helen.lach@slu.edu

Introduction

Acute myocardial infarction (AMI) occurs when the heart muscle lacks sufficient blood supply due to one or more blocked coronary arteries[1]. This event results in a high rate of hospital admissions, creates complications, increases mortality, and increases the cost of treatment[1;2]. For example, in the United States, more than 500,000 patients who experience an AMI die[3], and over 50% of this group die before they can receive proper treatment[1,4,5]. In 2016, the American Heart Association (AHA) reported that every 10 minutes,

seven people in the USA die from an AMI. Of those, about three out of five die because of delay in seeking treatment. In this critical condition, the heart needs reperfusion of blood and oxygen within two hours after the first symptoms occur, which is called the golden period[3]. Thrombolytic drugs and reperfusion methods are most effective when used during this early stage[6,7]. Unfortunately, over 70% of people who experience AMI symptoms also die prior to receiving these effective treatments[1,8].

Over 60% of people who experience an AMI are older adults[3]. They are more inclined to delay seeking treatment for AMI symptoms than younger adults, and the actual time for pre-hospital delay in treatment is typically longer[9]. These older adults miss the golden period for treatment which could give them the greatest benefit[9]. As a result, they are more prone to complications and higher mortality rates when compared to younger adults[10].

The main cause of delayed AMI treatment might be lack of knowledge and confusion about AMI symptoms[11,12]. Greenlund (2004) found that only 11% of interviewees from 17 states and the US Virgin Islands could correctly recognize an AMI[13]. The AMI symptom most commonly recognized is the classic symptom of chest pain, but more than 50% of AMI patients do not experience this pain, especially older adults[1]. More than 75% of interviewees failed to recognize atypical symptoms such as shortness of breath, chest discomfort, or fatigue[13,14]. If they do not recognize these AMI symptoms, they may not have serious concern about their symptoms, delay treatment, and experience increased mortality[15,16]. Other factors could influence seeking treatment, such as certain types of health insurance, and time of day when symptoms occur[17,18]. Until now, a comprehensive review of reasons why older adults delay seeking treatment for AMI cannot be found, so this review was done to guide future research, interventions and to inform practice.

Methods

This review was conducted following the standard methods for an integrative review[19]. The following steps were undertaken: problem formulation, literature search, evaluating the data from primary sources, data extraction, data analysis, interpretation, and discussion.

The literature search was conducted using 10 databases: PubMed, CINAHL, PsychInfo, Medline, SCOPUS, Ageline, ThaiJo, ThaiLis, ProQuest, and E-thesis, as well as an historical search of the references of identified studies and manual journal searches. Keywords included: "delay," "decision," "health seeking behavior," "prolong pre-hospital," "pre-hospital delay," "delaying factor," "care seeking," "help seeking," and "timely treatment." These keywords were combined using "AND" with the following terms: "chest pain," "unstable angina," "angina pectoris," "acute coronary syndrome," "heart attack," "myocardial infarction," "ST-elevated MI," "STEMI," and "cardiac event." Databases were searched for empirical articles without time limit through to March, 2019.

The search yielded a total of 28,402 articles (**Figure 1**). The search was narrowed using the following inclusion criteria: articles reporting a study or project on factors related to a delay in seeking treatment for AMI; published in English or Thai in peer reviewed journals or were thesis/dissertations; and at least 75% of participants were >55 years. We chose the percentage of 55 years instead of mean age because several researchers used samples with mixed age groups with 55 years as a cut point for their comparison. Furthermore, the mean age (>60) of mixed age group studies such as participants between 18–80 years old is not a representative of older adults. The exclusion criteria was studies without comparisons of factors related to delay in treatment.

After removing duplicates and screening titles and abstracts, 23 articles were included for this integrative review. Evaluating data from the 23 primary
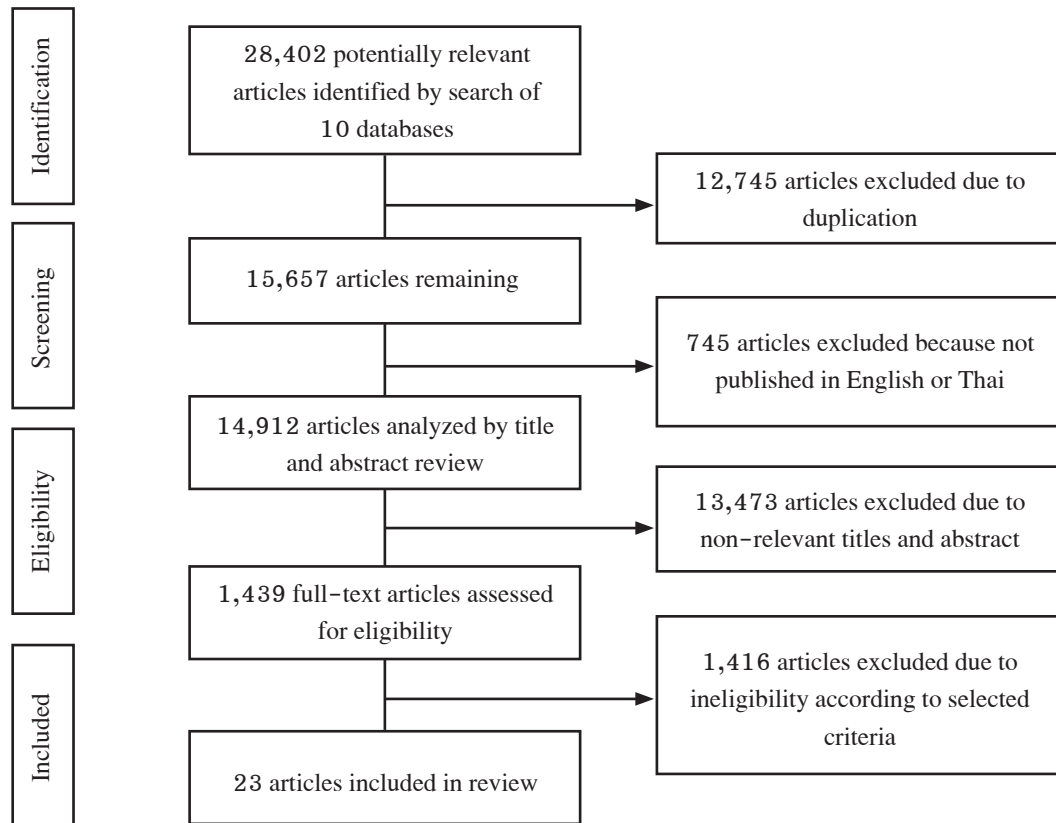
Figure 1 Flow Chart of the Review Process.

Figure content:

- **Identification:** 28,402 potentially relevant articles identified by search of 10 databases → 12,745 articles excluded due to duplication
- **Screening:** 15,657 articles remaining → 745 articles excluded because not published in English or Thai
- 14,912 articles analyzed by title and abstract review → 13,473 articles excluded due to non-relevant titles and abstract
- **Eligibility:** 1,439 full-text articles assessed for eligibility → 1,416 articles excluded due to ineligibility according to selected criteria
- **Included:** 23 articles included in review

sources was done by the two independent researchers to assess the validity of these primary studies. This integrative review included both qualitative and quantitative studies, and so due to the diverse representations of primary sources, the rigor of the studies was assessed and coded using methodological and theoretical quality assessment[19]. Data relevant to the review and quality of report were indicated as high or low. All 23 primary studies included were coded as high quality.

Mendeley reference management software was used to record data and researcher comments. A table of data extracted from the studies was developed in order to assure collection of all relevant data, minimize the risk of errors in transcription, guarantee precision when checking information, and to serve as a record for the review. This table was also used to identify themes across the studies. Data included the authors, year of publication, setting, research design, sample size, age/percentage of older adults, data sources, definition of treatment delay, phase of delay, and factors related to delay.

The two researchers reviewed articles independently after searching was completed. The titles and abstracts were reviewed to make consensus about which studies met the inclusion and exclusion criteria. If the two researchers did not agree with each other, a third researcher took part in independent assessment and judgement until a consensus was reached among the team. The researchers applied the same method for data extraction for the 23 studies, and there were only two occasions for disagreement. The three

researchers worked together to view the articles again and find evidence to reach consensus and confirm the findings. Finally, the results were reported based on the identified themes: characteristics of the studies, phases of treatment delay, definitions of delay, and factors associated with a delay in seeking treatment. Comparisons with other studies among younger groups or general populations are included in the discussion below.

Results

Three studies were published between 1994 and 1999[20,21,22], and 20 studies after 2000[9,14,15,18,23–38] (**Table 1**). There were 21 published articles[9,14,15,18,20–27,29–30,32–38] and two doctoral dissertations[28,31]. Research study designs were six qualitative[14,15,26,28,33,35] and 17 quantitative studies including cross sectional ($n = 9$)[21,22,24,25,29,31,34,36,38], longitudinal ($n = 4$)[9,18,20,23], retrospective ($n = 2$)[32,37], prospective ($n = 1$)[27], and mixed methods ($n = 1$)[30]. Studies were conducted in the U.S. ($n = 9$)[20,22–24,28,29,31,35,38], multiple countries ($n = 4$)[18,21,25,27], Sweden ($n = 2$)[33,36], Australia ($n=2$)[15,37] and one each from China[34], Denmark[9], France[32], Hong Kong[26], Korea[30], and Thailand[14]. These 23 studies were deemed to have high methodological and theoretical rigor and to be relevant to this review. The total sample for this review was 811,827 with sample sizes ranging from 6 to 364,131. Seven studies focused exclusively on older adults who were ≥60 years; three studies had participants of 100% ages ≥55 years; and 13 studies used mixed age groups in which 75% of participants were >55 years. The mean ages of all participants ranged from 59.5 to 84.5 years old. The methods of data collection included medical records, patient interviews and questionnaires. Medical record reviews were used in 11 studies, patient interviews in eight studies, both in three studies, and questionnaires in one study.

Phases of treatment delay

Three phases related to delays in seeking treatment were identified: Phase 1, the patient/bystander recognition action; Phase 2, transportation; and Phase 3, hospital action. *The patient/bystander recognition action phase* was from the time a person experienced the first AMI symptom until the time a decision was made to seek treatment. This phase included any communication a person had with bystanders, family members, friends, and neighbors who might offer information and suggestions. Most delays occurred in this phase. *The transportation phase* began when a person/bystander made the decision to seek treatment, called the emergency response system or decided to use personal transportation, and lasted until arrival at the hospital. *The hospital action phase* encompassed the interval between a person's arrival at the emergency department and initiation of treatment (commonly referred to as door-to-needle or door-to-balloon times). This phase also included actions taken by clinicians. The majority of studies ($n = 17$) focused on the first two phases of treatment delay. Two studies concentrated only on the first phase, whereas four studies reported on all three phases.

Definitions of treatment delay

Researchers established cut points to categorize time intervals for delay in seeking treatment. Five categories were identified. Three researchers defined a delay as waiting longer than one hour to seek medical treatment after the first symptoms were experienced or arriving at the hospital after one hour. In the second category ($n = 8$), researchers used over two hours, while the third ($n = 1$), fourth ($n = 3$), and fifth categories ($n = 1$) used over 3, 6, and 12 hours, respectively, for defining the delay in treatment (**Table 1**). However, in seven studies, the qualitative ($n = 5$), cross sectional ($n = 1$) and prospective studies ($n = 1$), researchers did not define the time of delay in seeking treatment.

In addition to time categories, actual time to treatment was often reported. Most studies ($n = 19$) indicated that older adults waited over two hours before treatment. They spent from 101 minutes to 53.7 hours of total time until actual treatment. The wide range of times was because one study addressed each phase separately ($n = 1$) while others used the mean time across two or three phrases ($n = 14$). Some did not report any time interval ($n =6$).

Table 1 Summary of Studies on Treatment Delay in Older Adults with AMI.

Authors	Settings	Design	Sample Size	% of Older Adults/Age (Mean/SD)	Data Source	Def. of Delay (hours)	Phase of Delay	Average Time to Treatment	Factors Associated with Delay in Treatment for AMI/Findings
Yarzebski et al. (1994)	USA	Longitudinal	1,279	83.4 % > 55 years (–/–)	Medical records	2	1,2	4.1, 4.0, and 4.6 hours in 1986, 1988, and 1990	Advanced age, diabetes, type of insurance (having Medicare/Medicaid and health maintenance organization delayed longer than self–pay and private), previous AMI/angina pectoris, and night (6.00 pm – 6.00 am.) (Onset on weekday was not significant)
Ottesen et al. (1996)	International study (7 countries)	Descriptive cross sectional	5,978	83.9 % > 55 years (–/–)	Patient interviews and medical records	2	1, 2	9.1 hours	Advanced age, gender (male delayed longer than female), diabetes, night (6.00 pm–6.00 am), or weekday, history of angina pectoris, heart failure, chest pain, and smoking
Goldberg et al. (1999)	USA	Cross–sectional observation	364,131	About 78.5 % > 55 years (–/–)	Hospital medical records	3	1,2	5.5–5.7 hours	Advanced age, gender (female delayed longer than male), ethnicity (Blacks, Hispanics and Asians delayed longer than White patients), history of diabetes or hypertension, low severity of symptoms, and no history of AMI, angina pectoris and coronary angioplasty or bypass surgery
Goldberg et al. (2000)	USA	Longitudinal	3,837	81.54% > 55 years (–/–)	Medical records	2	1,2	4.1 hours (1986), and 4.3 hours (1997)	Advanced age, diabetes, history of angina pectoris or AMI, evening or night, history of hospital admission in past year, and experienced symptoms on weekend
Sheifer et al. (2000)	USA	Descriptive cross sectional	113,324	100% > 65 years (75.6/–)	Medical records	6	1,2	–	Gender (female delayed longer than male), ethnicity (Black delayed longer than White), living in impoverished area, diabetes, history of angina pectoris, no history of MI, angioplasty, bypass or cardiac arrest, visiting outpatient clinic, day time presentation, smoker, and difficulty in walking.
Goldberg et al. (2002)	International Study (14 countries)	Observational cross sectional	10,582	About 77.5 % > 55 years (67.0/–)	Hospital medical records	2	1,2	4.7 hours for STEMI*, 5.6 hours for Unstable angina, and 6.1 hours for NSTEMI**	Advanced age, gender (female delayed longer than male), history of heart failure, diabetes, stroke, hypertension, prior insulin therapy, shortness of breath, night time presentation, using private car delayed longer than ambulance)

Table 1 Summary of Studies on Treatment Delay in Older Adults with AMI. (Cont.)

Authors	Settings	Design	Sample Size	% of Older Adults/Age (Mean/SD)	Data Source	Def. of Delay (hours)	Phase of Delay	Average Time to Treatment	Factors Associated with Delay in Treatment for AMI/Findings
Kaur et al. (2006)	Hong Kong	Qualitative descriptive	27	78% > 55 years (65.0/11.0)	In–depth interviews	–	1,2,3	15.6 hours for men and 53.7 hours for women	Using private car delayed longer than ambulance), gender (female delayed longer than male), symptoms mismatch with expectations, self–management and wait to see, place of experience (experiencing at home delayed longer than outside home during the day), and ambiguity and hesitancy
Ben–Shlomo, Naqvi, & Baker. (2008)	England and Wales	Prospective cohort	150,330	84.4% > 55 years (–/–)	The Myocardial Ischemia National Audit Project (MINAP database)	–	1,2,3	3.10 hours for phase 1+2 (3.07 hours for both Caucasian and South Asians), and 0.63 hour for phase 3 (0.63 hours for Caucasian and 0.66 hours for South Asians)	Ethnicity: South Asian had lower rate of calling emergency service than Caucasian but time to arrive hospital was not different (pre–hospital action phase). There were no differences in case of delay thrombolytic treatment (hospital action phase), cultural differences and geographical proximity to hospital
Goldberg et al. (2009)	International study (14 countries)	Longitudinal	44,695	100% > 55 years (59.5–67.8)	Hospital medical records	2	1,2	2.2–4.0 hours	Advanced age, gender (female delayed longer than male), history of angina, myocardial infarction, heart failure, diabetes mellitus, hypertension, smoker, no history of percutaneous coronary intervention, coronary bypass grafting, night time presentation, and not calling ambulance
Wilson (2009)	USA	Qualitative descriptive	6	83.33 > 60 years (63.3/8.8)	One–on–one face–to–face semi–structure interviews	–	1,2	–	Low income, employment, education, marital status (single, widow, or separate delayed longer than married), insufficient knowledge about symptoms, low level of pain, and symptoms mismatch with expectations
Banharak & Lertrat. (2010)	Thailand	Descriptive qualitative study	17	100% > 60 years (74.45/4.6)	Semi–structure interview	2	1,2,3	2.2 hours	Advanced age, atypical symptoms, and perceiving symptoms not related to heart problem or not severe,

Table 1 Summary of Studies on Treatment Delay in Older Adults with AMI. (Cont.)

Authors	Settings	Design	Sample Size	% of Older Adults/Age (Mean/SD)	Data Source	Def. of Delay (hours)	Phase of Delay	Average Time to Treatment	Factors Associated with Delay in Treatment for AMI/Findings
Ting et al. (2010)	USA	Cross sectional	104,622	79.7% > 55 years (−/−)	Medical records	1	1,2	2.6 hours	Advanced age, gender (female delayed longer than male), non–White, no history of AMI or percutaneous coronary intervention, diabetes, current smoking, weekday daytime presentation
Hwang & Jeong (2012)	Korea	Mixed methods	165	100% > 65 years (71.9/5.3 for men and 75.4/6.0 for women)	Semi–structured questionnaire interviews	6	1,2	12.0 hours	Diabetes, hypertension, low level of pain, low intensity of symptoms, low educational level, Lack of knowledge of symptoms, symptom mismatching/ symptoms were not related to heart problem, thinking that it is aging or other chronic diseases, no awareness of personal risk, denying seriousness of symptoms, overconfident about physical health, and not wanting to brother family members (income and living alone were not sig.)
Tanner (2012)	USA	Descriptive cross sectional	82	100% > 65 years (68/5.8)	In–person interviews	2	1,2	1938.44 minutes	No personal support, perceiving symptoms not related to heart problem or not severe, able to control, and no previous AMI
Grosmaitre et al. (2013)	France	Retrospective	255	100% > 75 years (84.6/6.1)	Computeri–zed patient records	12	1,2	–	Atypical symptoms (not chest pain)
Isaksson et al. (2013)	Sweden	Qualitative	20	100% > 65 years (73.0/−)	Individual interviews	–	1	–	Unfamiliar symptoms, low intensity of symptoms and slow progress, neglecting symptoms, and resistant behaviors (remain control and maintain social responsibility)
Wang et al. (2013)	China	Descriptive cross sectional	250	100% > 55 years (63.5/−)	Question–naires	1	1,2	130 minutes	Gender (female delayed longer than male), using private car delayed longer than ambulance, low level of pain, and not severity of symptoms
Jackson et al. (2014)	USA	Qualitative	33	100% > 65 years (76.5/−)	Face–to–face interviews	–	1	–	Difficulty identifying symptoms, no experience with symptoms, mismatch with expectation, wanting to maintain their privacy, believing that ambulance takes too long time, not wanting to bother relatives

Table 1 Summary of Studies on Treatment Delay in Older Adults with AMI. (Cont.)

Authors	Settings	Design	Sample Size	% of Older Adults/Age (Mean/SD)	Def. of Delay (hours)	Phase of Delay	Average Time to Treatment	Factors Associated with Delay in Treatment for AMI/Findings
Libungan et al. (2014)	Sweden	Cross sectional	2,588	100.00% >65 years (86.0/4.0 for older group and 54.0/16.0 for younger group)	–	1,2,3	212 minutes for older group and 217 for younger group	Advanced age and not experiencing chest pain
Coventry et al. (2015)	Australia	Retrospective cohort study	1003	75.27% > 60 years (–/–)	1	1,2	2.2 hours	Advanced age, gender (female delayed longer than male), place of experience (experiencing at home delayed longer than outside home), afternoon time experience (onset on weekday was not sig.), atypical (no chest pain), intermittent and gradual onset, symptoms over a period of time, and visit to primary health care provider
Coventry et al. (2016)	Australia	Prospective qualitative descriptive design	255	100% > 55 years (64.0/–)	–	1,2	3.9	Unfamiliar symptoms, low intensity, thinking about harmless causes, and slow progress, being alone or unfamiliar surroundings, wait and see, wait for their partners, atypical symptoms or did not recognize symptoms or symptoms mismatch, visit or consult general practitioner, self–relief or management.
Nielsen et al. (2017)	Denmark	Longitudinal	5848	76.7 % > 5 5 years Median age 64	2	1,2	101 (2003), 98 (2004), 94 (2005), 93 (2006), 89 (2007), 92 (2008), and 85 (2009)	Advanced age, gender (female delayed longer than male), night time presentation (22.00 pm –05.59 am), history of AMI and hypertension (non–sig.), history of diabetes mellitus (sig.), current smoker (non–sig.), and history of percutaneous coronary intervention (having history of percutaneous coronary intervention delayed longer than not have)
Ouellet et al. (2017)	USA	Cross–sectional and observational study	2,500	100% > 65 years (81.5/4.93)	6	1,2	–	Non–white, atypical symptoms, and heart failure

*STEMI is ST–elevation myocardial infarction **NSTEMI is non–ST–elevation myocardial infarction*

Factors Associated with Delay Seeking Treatment

To identify factors associated with delay seeking treatment among older adults, findings were categorized into four categories including socio-demographic factors and patient characteristics, environmental factors, psychological and behavioral factors, and clinical factors. The significant factors related to delay and their details are provided under these four categories, as well as details of each study (**Table 1**).

Socio-demographic Factors and Patient Characteristics

The effect of socio-demographic factors on delayed treatment was inconsistent (**Table 1**). In 11 studies, advanced age was positively related with a time to delay treatment[9,14,18,20,21,22,23,25,31,36,37]. Nine large studies indicated being female and advanced age were associated with treatment delay[9,18,22,24,25,26,29,34,37], whereas another study found a longer time in males[25]. Older adults who were single, widowed, or divorced had significantly prolonged pre-hospital delays compared to those who were married[28]. Ethnicity showed no effect in one study[27], but in another study older African Americans took longer to seek treatment than Caucasians[24,38]. Older Hispanics and Asians experienced longer delays before seeking treatment than did Caucasians[22,29,27].

Low educational level was related to delay in treatment, with the combination of lower levels of education and lack of knowledge or experience about AMI symptoms significantly increasing the time for older adults to seek treatment[28,30]. Although Wilson found lower income and financial problems associated with a longer treatment delay[28], Hwang and Jeong did not find this[30]. Yarzebski et al. found that older adults with Medicare/Medicaid and a health maintenance organization spent longer times seeking treatment when compared to those with self-pay and private insurance[20].

Environmental Factors

Transportation and residence were identified as environmental factors in the delay of treatment for AMI. Older adults who drove took longer to get treatment than those who called for an ambulance[18,25,26,27,34]. Older adults perceived the travel time for an ambulance would be too long[35]. Those living in rural, suburban, or impoverished areas had longer times to treatment than those in urban areas[24].

The location where older adults first experienced symptoms was an important factor. Having symptoms at home was associated with longer delays compared to other sites, such as the work place or public areas[26,37]. One study found living alone was not a significant factor[30], but another demonstrated that living alone was related to a delay in seeking treatment[15]. A lack of suggestions or personal support from others was associated with longer pre-hospital delays[31].

Two studies found that experiencing AMI symptoms during weekdays was associated with longer delays in treatment than on weekends[21,29], whilst another reported the opposite[23]. Two studies found no difference by day of the week[20,37]. Symptoms during the evening or night resulted in a longer time in seeking treatment than during the morning or afternoon[18,20,21,23,25]. However, two research studies reported the opposite: symptoms in the morning or afternoon took longer than evening or night[24,37].

Psychological and Behavioral Factors

Hesitancy and ambiguity about symptoms were associated with delays in treatment[26]. Older adults did not want to bother their relatives to take them to the hospital when experiencing symptoms[26,29,35], especially older adults with mobility issues[24].

Resistance behaviors, such as neglecting the symptoms, maintaining privacy, waiting, self-managing, or continuing activities despite pain, were associated with increased time to seek treatment[15,26,33,35]. Some older adults went to outpatient services, others to their primary health care provider, or visited a health center rather than going to the hospital[15,24,37]. Some older adults tried to self-manage their symptoms and did not initiate an emergency call[26,37].

Clinical Factors

Researchers reported a variety of conditions/symptoms that were associated with longer delays in treatment: diabetes[9,18,20,21,22,23,24,25,29,30], hypertension[18,22,25,30], heart failure[18,21,25,38], stroke[25], unable to walk[24], angina pectoris[18,20,21,23,24], being a current smoker[18,21,25,29], and history of hospital admission[23]. In eight studies, there were contrasting findings for having a history of AMI. Three research teams reported that delay was longer in older adults with a history of AMI than those without this history[18,20,23], but four studies conflicted with those results[22,24,29,31]. However, one study found no differencet between having and not having history of AMI[9]. Finally, researchers found older adults with no history of coronary artery bypass graft or percutaneous coronary intervention (CABG/PCI) delayed treatment longer than those who had these medical histories[9,18,22,24,29].

Atypical symptoms confused older adults and delayed their treatment. Those who experienced shortness of breath, sweating, and nausea delayed treatment compared to those with classic chest pain[14,15,23,26,28,32,35,36,37,38]. In both quantitative and qualitative studies, a mismatch between symptom presentation and symptom expectation was an important problem[14,15,26,28,30,35]. Low intensity of symptoms, initial mildness, and slow progression were associated with prolonged pre-hospital delay[15,22,28,30,33,34,37]. Lack of knowledge, no experience, and unfamiliarity with symptoms were noted as factors in delaying treatment[15,28,30,33,35].

Discussion

Timely treatment of AMI is crucial to achieve the best outcomes for older adults. The survival rate improves by 50% for those who receive treatment within one hour after an onset of AMI symptoms compared with people with a longer delay, but decreases to 25% when treatment is delayed at least three hours[39]. In this review, we identified factors related to treatment delay from type of symptoms to environmental, belief, and clinical factors. We now compare our findings of older adults with studies of the general adult population and address implications.

Although the overall time to treatment for older adults, including pre-hospital (patient/bystander recognition action and transportation phase) and hospital phases, has generally improved in recent decades[40], the pre-hospital action phase is still a challenge, especially the patient/bystander recognition action phase. Older adults spent over half the delay time in the patient/bystander recognition action phase. Similar findings have been reported for the general population as well[17,40,41]. Future studies should address interventions to shorten this phase of delay.

We found that the socio-demographic factors of older adults, including age, gender, lower education, and socioeconomic status, are associated with delays in treatment. Similar findings have been reported in reviews of the general population[42,43]. However, older adults experience more atypical symptoms and delay times longer than general population[44,45]. Unfortunately, women are more likely to consider that an AMI is a men's disease, discounting the importance of their symptoms and not seeking treatment in a timely fashion[17]. Advanced age and female gender should be further explored when studying older aged groups.

Adults with low household incomes and no health insurance take longer to call emergency medical services (EMS); they must consider the costs of treatment or out-of-pocket expenses and EMS services[44,46,47]. Older adults from this review also did not want to call EMS for the same reasons, even although this provided a fast response for emergency situations[34,46]. People who used EMS spent a shorter time getting treatment, yet the location of residence contributed to treatment delay because of traffic or distance to a hospital[48,49]. Traffic regulation and belief in EMS services across different countries should be a focus in future studies on the topic.

A lack of knowledge of the signs and atypical symptoms of AMI by older adults results in delayed treatment[44,45]. In the general population, 70% of the

delay in treatment is also because of the lack of knowledge and mismatch of adult's knowledge about AMI symptoms[47]. People delay treatment if they lack this knowledge, discount the seriousness of symptoms, or deny their susceptibility to an AMI[43]. Unfortunately, women are more likely to discount their symptoms[17]. Moreover, living alone, being unmarried, or not having others to encourage treatment can also contribute to a delay in seeking treatment[42,43].

We also found that a person's clinical history led to delay in seeking treatment. In a study of the general population, older women delayed seeking treatment longer if they also had more medical conditions, especially diabetes and hypertension[47]. There is a high prevalence of diabetes in older women, which is linked to autonomic neuropathies that may mask chest discomfort instead of chest pain[50]. Thus, people with diabetes often experience "silent MIs" and delay seeking treatment[47,51].

Adults and older adults with a history of hospital admission, AMI, heart failure, and past experiences of angina pectoris often delay seeking treatment longer than those without these medical conditions[42]. However, reasons for this are unclear. They may erroneously believe they can control their heart disease because they have thus far been successful in managing their health[31]. Regrettably, "experience is not [always] a good teacher"[41].

Comparable to our findings, Beckley reported similar psychological and behavioral factors in the general population contributed to a delay in seeking treatment[42]. People do not want to disturb or bother their family members. This is better understood when combined with environmental (times of occurrence) and clinical factors (severities of symptom). Adults delay treatment when symptoms occur during the night and avoid possible embarrassment by not going to the hospital if the symptoms are perceived as nonthreatening[42,52]. This explanation is more meaningful especially for older adults who may be dependent and need assistance.

As older adults may have poorer outcomes of AMI than younger people[53], improving time to treatment is an important goal. The different factors relating to a delay in treatment for AMI found in this review suggest targeted populations for interventions to increase knowledge of symptoms and importance of timely treatment. In addition, improving understanding of the health care system and emergency services may encourage their use. People who have health disparities may also be targets for education about AMI as low educational level and lack of insurance were noted as factors. Further exploration of racial/ethnic/minority and immigrant populations may help identify specific factors to guide interventions.

Limitations

A limitation of our review was that all studies were descriptive or observational in design. Only seven studies were restricted to older adults, although we only included those where at least 75% of participants were >55 years. Other limitations were different definitions of delay and mixed phases in studies. Inconsistent operationalizations of time frames to define treatment delay challenged our ability to compare research findings across studies. This led to conflicting results, even when we used the same data source[40]. El-Masri and Fox-Wasylyshyn explored outcomes for AMI patients from the same data set based on different cut-off point time to treatment[54]. They recommended using either one or two hours from the first symptoms until making the decision to seek medical care. This can provide for more meaningful comparisons of outcomes in both clinical and research situations. Moreover, researchers in this review used different or mixed phases of delay for their studies and different strategies to identify symptom onset. It would be desirable to have clearer definitions of the three phases of treatment delay and a better understanding how symptom onset is defined (i.e., when to start counting). This would facilitate a more precise determination of the origin of the problem, the factors causing delay, and provide meaningful comparison across studies[40,54]. Our ability to advance knowledge in this area has thus been limited by different

definitions of delay and mixed phases in studies. Finally, we may have missed studies, for this review included only published articles written in English and Thai, which may have excluded relevant studies from other countries or cultures. Studies in other languages need to be examined on the topic in future reviews.

Implications for Research

Future studies need to address the patient/bystander recognition action phase since most older adults wasted time in this phase. Moreover, this review demonstrated the need for further well-designed studies to better understand the factors related to delay in seeking treatment among older adults and resolve the controversy surrounding these associations. Standardized benchmarks should be established to identify times periods related to treatment delay to avoid using inconsistent time periods. Until benchmarks are established, the primary purpose of future studies should be to identify the predictors of a given outcome, using theoretical and/or clinical evidence to guide the definition of a time period that constitutes a delay.

Although calling EMS decreases time to receive treatment, different societal or country contexts may affect the confidence of people in the EMS. Relevant issues include understanding traffic patterns, street congestion, rules and regulations that establish a right-of-way for ambulances, and the professional capacity for effective EMS services. Researchers might consider exploring people's beliefs and attitudes about ambulance service.

Implications for Nursing

After factors and phases of treatment delay are determined, strategic interventions to decrease treatment delays should be undertaken. The knowledge about symptoms of AMI needs to be strengthened by nurses and physician in disadvantaged subgroups, especially older adults, females, immigrants, and people from low-income backgrounds, by increasing health education activities in the community to increase the likelihood of early recognition of AMI symptoms. Partners and family members should be included in all programs, as well as the general public. Strengthening and promoting credibility of EMS service would promote people's confidence in calling for emergency help when experiencing AMI.

Conclusion and Implications for Nursing Practice

Acute myocardial infarction (AMI) is still a number one silent killer world-wide because there is insufficient understanding of the causes of treatment delay and high mortality rates, especially among older adults. Most participants in the studies reviewed wasted time in the patient/bystander recognition action phase. Factors associated with delays in seeking treatment included socio-demographic, environmental, psychological and behavioral, and clinical factors. We therefore recommend that nurses promote and educate people about early recognition of AMI, especially in older populations. This involves understanding of symptoms and emergency treatment of AMI, especially among women, immigrants and populations with low-income. Additionally, more well-designed studies are needed to better understand the factors related to delay in seeking treatment among older adults and resolve the controversy surrounding these associations.

Acknowledgements

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ปัจจัยที่มีผลต่อการเข้ารับการรักษาล่าช้าในผู้สูงอายุที่มีภาวะกล้ามเนื้อหัวใจตายเฉียบพลัน: การทบทวนวรรณกรรมแบบบูรณาการ

สมรภพ บรรหารักษ์* ชาญณรงค์ ประสารกก Helen W. Lach

บทคัดย่อ: ภาวะกล้ามเนื้อหัวใจตายเฉียบพลันเป็นปัญหาสาธารณสุขที่สำคัญทั่วโรคโดยเฉพาะอย่างยิ่ง ในกลุ่มผู้สูงอายุ มากกว่าร้อยละ 50 ของผู้สูงอายุที่มีภาวะกล้ามเนื้อหัวใจตายเฉียบพลันจะเสียชีวิตก่อนถึง โรงพยาบาลโดยมีสาเหตุสำคัญมาจากการเข้ารับการรักษาล่าช้า การทบทวนวรรณกรรมแบบบูรณาการครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีผลต่อการเข้ารับการรักษาล่าช้าในผู้สูงอายุที่มีภาวะกล้ามเนื้อหัวใจตาย เฉียบพลัน ผู้วิจัยได้ทำการสืบค้นรายงานการวิจัยโดยคัดเลือกงานวิจัยตามเกณฑ์คัดเข้าได้แก่ ศึกษา การเข้ารับการรักษาล่าช้าของภาวะกล้ามเนื้อหัวใจตายเฉียบพลัน ตีพิมพ์รายงานการวิจัย วิทยานิพนธ์ หรือดุษฎีนิพนธ์เป็นภาษาไทยและภาษาอังกฤษ อย่างน้อย 75%ของผู้ร่วมวิจัยเป็นผู้ที่มีอายุตั้งแต่ 55 ปีขึ้นไป อย่างไรก็ตาม รายงานการวิจัยที่ไม่มีการเปรียบเทียบปัจจัยที่ทำให้เกิดการรักษาล่าช้าจะถูกคัดออกจาก การศึกษา โดยการทบทวนวรรณกรรมครั้งนี้ดำเนินการตามกระบวนการมาตรฐานของการทบทวนวรรณกรรม แบบบูรณาการและมีรายงานการวิจัยและวิทยานิพนธ์ที่ผ่านการคัดเข้าศึกษาทั้งสิ้น 23 เรื่อง ผลการทบทวน วรรณกรรมพบว่า การเข้ารับการรักษาล่าช้าถูกแบ่งออกเป็น 3 ระยะ ได้แก่ ระยะรับรู้อาการโดยผู้สูงอายุเอง หรือผู้พบเห็น ระยะตัดสินใจเข้ารับการรักษาโดยยานพาหนะ และระยะการเข้ารับการรักษาในโรงพยาบาล ทั้งนี้ พบว่าผู้สูงอายุใช้เวลากับระยะแรกนานที่สุด ในส่วนปัจจัยที่มีผลต่อการเข้ารับการรักษาล่าช้า ประกอบไปด้วย ปัจจัยด้านลักษณะพื้นฐานทางประชากร ได้แก่ ความสูงอายุ เพศหญิง สถานภาพสมรสโสด หม้าย หย่า แยก ระดับการศึกษาและรายได้น้อย ปัจจัยด้านกายภาพและสิ่งแวดล้อม ได้แก่ การใช้รถส่วนตัว การอาศัยอยู่ตามลำพัง การมีอาการขณะอยู่ที่บ้าน ในวันหยุด และเวลากลางคืน และการอาศัยอยู่ในพื้นที่ ห่างไกลจากโรงพยาบาล ปัจจัยด้านจิตใจหรือพฤติกรรม ได้แก่ ความรู้สึกเกรงใจและไม่อยากรบกวนผู้อื่น รวมทั้งการพยายามจัดการอาการด้วยตนเอง ปัจจัยด้านคลินิกได้แก่ การไม่มีประวัติเกี่ยวกับโรคหัวใจ การมีประวัติเกี่ยวกับโรคเบาหวาน ความดันโลหิตสูง สโตร๊ก หัวใจล้มเหลว การเจ็บหน้าอกแบบแองไจนา การสูบบุหรี่ การมีอาการไม่สอดคล้องกับอาการของโรคหัวใจตามที่คาดหวัง อาการที่ไม่เฉพาะเจาะจง อาการไม่รุนแรง เป็นๆหายๆ หรืออาการที่ค่อยๆทวีความรุนแรงทีละน้อย ผลจากการทบทวนวรรณกรรม แบบบูรณาการครั้งนี้สะท้อนให้เห็นว่าพยาบาลควรส่งเสริมความสามารถในการตรวจจับอาการตั้งแต่เริ่มแรก ในกลุ่มผู้ที่มีอายุมากด้วยโปรแกรมส่งเสริมความเข้าใจเกี่ยวกับอาการและความสำคัญของการรักษาที่เร่งด่วน ของภาวะกล้ามเนื้อหัวใจตายเฉียบพลัน

คำสำคัญ: กล้ามเนื้อหัวใจตายเฉียบพลัน การทบทวนวรรณกรรมแบบบูรณาการ ผู้สูงอายุ ระยะเวลาในการเข้ารับการรักษา

*ติดต่อที่ : **สมรภพ บรรหารักษ์** ผู้ช่วยศาสตราจารย์ สาขาวิชาการพยาบาลผู้สูงอายุ คณะพยาบาลศาสตร์ มหาวิทยาลัยขอนแก่น E-mail: sbanharak@kku.ac.th*
***ชาญณรงค์ ประสารกก** พยาบาลวิชาชีพ ศูนย์หัวใจสิริกิติ์ภาคตะวันออกเฉียงเหนือ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น E-mail: chanclubpr@gmail.com*
***Helen W. Lach**, Professor, Trudy Busch Valentine School of Nursing, Saint Louis University, St. Louis, MO, USA. E-mail: helen.lach@slu.edu*