総　　説

Potential nursing interventions for treatment delay among patients with acute myocardial infarction in Japan - A literature review

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Abstract

　　Cardiovascular disease (CVD), including coronary artery disease and stroke, is a significant health problem in Japan regardless of well established health care and insurance system and various public campaigns and exhibitions in the contemporary Japanese society.　Higher and increasing prevalence and incidence of well-known risk factor of CVD, such as hypertension, diabetes, hyperlipidemia, obesity, and smoking, may contribute to increasing mortality and morbidity of CVD in the future.

　　Regardless of developing medical treatment for CVD, delay of seeking treatment at the onset of acute myocardial infarction (AMI) and inappropriate responses were characterized as behaviors among Japanese people with AMI when they experienced the initial symptoms.　A review of the professional literatures may support the notion that diverse symptom presentation, limited information on the media about symptoms and optimal actions, and interpersonal relationship with others specific to Japanese people may contribute to inappropriate responses, which in turn leading to treatment delay.　Potential nursing interventions addressing these factors related to treatment delay are proposed to help people with AMI obtain the advantage of current effective medical treatments for AMI.

I　Introduction

　　Cardiovascular disease (CVD) is a significant health problem in the world including Japan.[1-3]　CVD has been second only to cancer as the leading cause of death in Japan since 1981. The patho-physiological alteration of athero-sclerosis in the cardiovascular system includes coronary artery disease (CAD) and stroke.　The number of deaths attributed to CAD has been increasing since 1993, and now accounts for approximately 50% of age adjusted deaths in Japan.[3]

　　Risk factors for CVD in Japan are similar to those in other countries and consist of hypertension, diabetes, hyperlipidemia, obesity, and smoking.[1,2,4]　Results of recent surveys[3,5] indicated increasing prevalence and incidence of these factors in Japan with a corresponding increase in risk for CVD. These risk factors contribute to prolonged inflammatory responses, such as alteration of normal homeostasis in the endothelium and increase of endothelial adhesion and permeability, which in turn lead to atherosclerosis.[6-10]　These evidences, therefore, may support the notion that the Japanese society would face increase of morbidity and mortality of CVD in the near future.　Adverse consequences of CVD include immobility, disability, increased economic burden for health care service, and increased psychosocial and physical burden of care for family members.[1-3]　These adverse consequences of CVD may also impact the quality of life and well-being of people.

　　People have been received benefits of progress in medical treatments for CVD.　In particular, reperfusion therapy, coronary angioplasty procedure, and coronary artery bypass surgeries have provided optimal outcomes for people with CAD.[11-14]　It is highly recommended to seek immediate

medical treatment in order to minimize myocardial damage and reduce morbidity and mortality for people with CAD, especially acute myocardial infarction (AMI). However, the existing knowledge about characteristics of behaviors in seeking treatment for AMI indicated that Japanese people took inappropriate response to symptoms at the onset of AMI, which in turn leading to treatment delay.[15] This synthesis paper, therefore, aims to discuss factors underlying their behaviors related to treatment delay and to propose potential nursing interventions in order to maximize outcomes at the onset of AMI in Japan.

Ⅱ　Characteristics of Behaviors in Seeking Treatment for AMI among Japanese

A prospective study[15], including 913 patients with AMI in the United States, England, Australia, South Korea, and Japan, compared delay and circumstances of decision made for seeking treatment of AMI. The study participants were patients diagnosed with AMI consisting of 192 from the United States, 141 from England, 317 from Australia, 127 from South Korea, and 136 from Japan. Some of the demographic data of the participants from Australia were missing; however, the participants from all countries were not statistically different regarding their demographic characteristics, such as age, education, smoking status, marital status, and the percentage of male participants. Among 136 Japanese patients with AMI included in this study, the mean time from symptom onset to hospital admission was 21.7 in hours, whereas the mean time from symptom onset to hospital admission was 22.5 hours for Americans, 14.7 hours for South Korean, 8.0 hours for English, and 17.4 hours for Australian[15]. In addition, the median time from symptom onset to hospital admission was 4.5 hours for Japanese, 3.3 hours for Americans, 4.4 hours for South Korean, 2.5 hours for English, and 6.4 hours for Australian[15]. A half of Japanese patients included in this study identified the heart as the origin of symptoms. Among Japanese patients with AMI, 55.7% of those were at home, 12.9% of those were at work, and 10.7% of those were in public place when they were experiencing initial symptoms. In addition, more than 60% of those were with others, such as spouse/partner, other family members, friends, or coworkers when they were experiencing initial symptoms. These individuals could help the patients at the onset of the initial symptoms of AMI because these individuals seemed to have the close relationship with the patients. However, the responses after initial symptoms experiences were diverse and a limited number of Japanese patients appropriately responded to their initial symptoms of AMI.[15] Results pertaining to Japanese patients with AMI included in this study are summarized in Table 1.

TABLE 1　Results pertaining to Japanese patients with AMI summarized from a study by Dracup et al.[15]

The number of sample		136
Age (Mean ± SD)		61±11 years
Education (Mean ± SD)		12.8±3.1 years
Male		80.1 %
Current smoker		68.4 %
Residence	Rural	5.9 %
	Urban	80.9 %
	Suburban	12.5 %
Married		86.0 %
History of	Hypertension	54.8 %
	Diabetes	34.8 %
	AMI	15.4 %
	Coronary bypass	2.9 %
	Angioplasty	8.1 %
Place at the symptom onset	At home	55.7 %
	At work	12.9 %
	At public place	10.7 %
	In vehicle	5.7 %
	At other's home	1.4 %
	None of these	13.6 %
Persons with at the symptom onset	Alone	32.9 %
	Spouse or Partner or Other family members	48.6 %
		8.6 %
	Friend	7.1 %
	Coworkers	2.9 %
	Other	
Transportation measures at the symptom onset	Ambulance	67.1 %
	Private car	13.6 %
	Public transportation	10.0 %
	Other	9.3 %
Identified origin of symptoms	As the heart	50.0 %
	As the stomach	16.7 %
	As fatigue	12.3 %
	As muscle pain	9.4 %
	As respiratory	8.0 %
	As flu	1.4 %
	Other	2.2 %
First response of the patients	Tried self-help remedy	23.7 %
	Took medications	17.3 %
	Tried to relax	16.5 %
	Wished or prayed symptoms would go away	15.8 %
	Told someone nearby	10.1 %
	Called emergency medical services	4.3 %
	Transported to the hospital without emergency medical services	3.6 %
	Drove to physician's office or clinic	2.9 %
	Called physician	2.2 %
	Pretended nothing was wrong	0.7 %
	Tried not to think about it	0.7 %
	Other	2.2 %
First response of person consulted	Suggested medical help	25.0 %
	No one else knew	23.6 %
	Did nothing	13.6 %
	Called emergency medical services	12.9 %
	Took to hospital	7.1 %
	Suggested rest or medications	6.4 %
	Comforted patients	5.0 %
	Encouraged not to worry	3.6 %
	Became upset	0.7 %
	Other	2.1 %

Health care systems and insurance systems in seeking emergency care at the onset of AMI vary depending on the countries. Various factors associated with these systems may contribute to the time from symptom onset to hospital admission. Therefore, it is important to consider the context of each country and the difference of these systems among five countries in order to appropriately interpret the results of this study. This study examined predictability of treatment delay among factors, such as sex, age, years of formal education, residence areas, annual household income, marital status, maximum pain levels experienced during AMI, admission systolic blood pressure, admission pulse, smoking status, and history of hypertension, diabetes mellitus or previous AMI. None of these factors could statistically predict treatment delay in any of the countries.

However, the results of this study[15] delineated the unique characteristics of behaviors in seeking treatment for AMI among Japanese. The majority of Japanese patients with AMI participated in this study took more than 4 hours to seek medical treatment. This period of time may support the notion that Japanese people with AMI were less likely to obtain advantage of current advanced treatment to minimize myocardial damage.[12-13] The majority of AMI patients participated in this study might be able to seek help from individuals they were with when they had the initial experiences of symptoms. Although many of them were also able to identify the heart as the origin of symptoms, their inappropriate responses to symptoms at the onset of AMI may contribute to treatment delay. It is important to consider factors underlying these behaviors in order to maximize outcomes among people with AMI in Japan. This is because several health behavior models, such as Leventhal's self-regulatory model and Janz' health belief model, indicated that symptom presentation and environmental stimuli including stimuli from family, coworkers, friends, health care providers, and the media contribute to care-seeking behaviors and behavioral change.[16-17]

Ⅲ Factors Related to Treatment Delay at the Onset of AMI

The results of the study by Dracup et al.[15] indicated that the majority of Japanese patients were able to identify the heart as the origin of symptoms and could seek help from individuals they were with when they had the initial experiences of AMI symptoms. However, they took inappropriate responses to symptoms. Although it is premature to conclude that only these behaviors contributed to treatment delay, factors underlying these behaviors should be considered in order to maximize outcomes among people with

AMI in Japan. The following sections discuss factors which could be related to treatment delay at the onset of AMI.

1 Diverse symptom presentation of AMI

Typical symptoms of AMI include pain or discomfort in the chest, shoulder, arm, or hand, shortness of breath, and sweating. From 1073 people with AMI in the United States and England, Ryan et al. identified 12 symptoms including not only typical symptoms mentioned above but also nausea or vomiting, general weakness, fatigue, dizziness or lightheadedness, indigestion, pain or discomfort in the neck, the jaw, the back, and the abdomen.[18] The results of this study indicated that none of people with AMI experienced a single symptom of AMI. In addition, 16.6% of the individuals with AMI participated in this study experienced no chest pain. Intensity of chest discomfort was also experienced more among women than men. Although the investigators identified five distinct clusters of symptoms of AMI, the combination of symptoms of AMI varied depending on individuals. The results of this study[18] may support the notion that individuals with AMI experience the combination of diverse symptom instead of a single typical symptom of AMI. It is important to better understand that alternative symptoms other than the chest pain may accompany by AMI.

The results of another study[19] also indicated that 110 of men and women with AMI experienced diverse symptoms including pain, pressure, or discomfort in the chest, shoulder, or arm, shortness of breath, sweating, tiredness or fatigue, and lightheadedness or feeling faint. In addition symptoms experienced among men with AMI included in this study were not congruent with their counterparts.[19] Cheek et al. indicated that the chest pain is a more common symptom of AMI for men, whereas women with AMI experienced the discomfort not only in the chest but also in the abdomen, the mid-back, the shoulder, or the arm.[20] The discomfort of AMI was experienced more generalized or subtle among women. The results of these studies[19-20] may also support the notion that symptoms of AMI are diverse and an individual may experience various symptoms of AMI.

The results of the study by Dracup et al.[15] showed that a half of Japanese patients were able to identify the heart as the origin of symptoms but another half of those could not. It may be difficult for them to identify the symptoms they experienced were stemming from AMI despite the origin of symptoms. This is because symptoms of AMI are diverse. Atypical symptoms of AMI could be also experienced at the onset of AMI. Accordingly, diverse symptom presentation may underlie inappropriate responses to symptoms at the onset of AMI and contribute to treatment delay.

2 Limited Information on the Media about Symptoms and Optimal Actions

The Japanese government commented on emerging health issues associated with CVD based on findings of epidemiological studies. The government declared The Healthy Japan 21 in 2000 and developed a policy and regulations to promote appropriate diet, nutrition, physical activities, psychological wellness, smoking cessation, alcohol use, and dental health in order to address issues of mortality and morbidity of CVD.[3] Various campaigns and exhibitions have been displayed and held by the central and local governments, mass media, and private and commercial organizations to elicit the awareness of CVD and to promote healthier lifestyle change among Japanese public. In addition, the Japanese government developed a new policy for an annual physical examination and a public health education program which focused on insulin resistance, abdominal obesity, hypertension, and hyperlipidemia in order to prevent CVD. Reflecting to this policy, the local public health department began to provide the new public health education program in April, 2007, followed by a new annual physical examination in April, 2008.[3]

A study[21] examined the characteristics of information related to CVD and risk factors for CVD appeared on the media from January to December of 2007. Information on the media appeared during this period of time may be skewed because of the new policy for an annual physical examination and public health education program focusing on insulin resistance, abdominal obesity, hypertension, and hyperlipidemia in order to prevent CVD. The results of this study[21] identified 533 pieces of relevant information to CVD and risk factors for CVD. Among 533 pieces of information, 14.8% of information on the media addressed about signs, symptoms, and disease process, 15.0% of those about prognosis, and 14.8% of those about treatment and diagnostic tests. In addition, 6.2% of information on the media focused on myocardial infarction. The information on the media may play the pivotal role to educate the public about symptoms of AMI and optimal actions to receive advantage of medical treatments for AMI.[22] The health belief model also claimed the significant influences of information on the media over perception of threats against health and likelihood of behavioral change.[17] Information on the media could activate Japanese people's readiness responding to diverse symptoms of AMI and instigate an individual's action to seek immediate treatment at the onset of AMI. The results of this study[21], however, may support the notion that not enough information on the media was available to increase public awareness and knowledge about symptoms and optimal actions at the onset of AMI.

Another descriptive study[23] investigated thoughts and actions during and after the onset of initial AMI symptoms from the interviews with 13 patients of AMI and 14 relatives. The results of this study[23] indicated that both patients and relatives often felt uncertainty about the origin of symptoms and thought less serious at the onset of AMI. These results may also support the notion that information on the media is critical to decrease uncertainty about the origin of symptoms and enhance awareness and knowledge about diversity of AMI symptoms.

Accordingly, limited information on the media about symptoms of AMI and optimal actions at the onset of the initial symptoms of AMI may allow explaining inappropriate responses, which in turn contributing to treatment delay. Symptoms of AMI are diverse and an individual may experience various symptoms at the onset of AMI. However, limited information on the media were available to help them identify the symptoms they experienced were stemming from the onset of AMI and elicit appropriate responses to symptoms. This could be another factor underlying the behaviors related to treatment delay among Japanese people with AMI.

3 Interpersonal Relationship in Seeking Immedi-ate Treatment for AMI

The results of a study indicated that relatives tried to comfort symptoms of AMI in various ways although both patients and relatives often felt uncertainty about the origin of symptoms and thought less serious at the onset of AMI.[23] According to the study by Dracup et al.[15], two-thirds of Japanese AMI patients studied were with spouse, partner, other family members, friend, and coworkers when those studied had their initial symptoms of AMI. Many of those might be able to seek help from those they were with when they had the initial experiences of symptoms. The patients responded to the initial AMI symptoms in diverse ways, whereas approximately a half of individuals consulted by the patients suggested medical help, called emergency medical services, or took the patients to hospitals. As Dracup et al. acknowledged, there was an "important role of others in helping patients choose the best course of action when faced with AMI symptoms."[15] Leventhal's self-regulatory model also claimed that stimuli from family, coworkers, friends, health care providers, and the media contribute to care-seeking behaviors and behavioral change.[16] Thus, patients with AMI could take appropriate actions and seek immediate treatment for AMI depending on input and suggestions from others, in particular family members and other close people.

In addition, it is important to take account of interpersonal relationship with others. The results of a study[21] showed the

important role of others, such as friends, neighbors, acquaintances, and health care providers, in helping individuals evaluate seriousness of CVD, their health states, and their managing strategies regardless of reliability of information. The analysis of the data in this study showed that participants were concerned over their family while perceiving risk for CVD and taking actions to manage their risk for CVD.[21] It was important for Japanese people not to be family's troubles, not to bear a burden on their family, not expect too much to their family, and not to restrict their family's life. They tried to protect their family from suffering and loss of quality of their daily life. They also hesitated to ask their family to conform their changed lifestyle. In addition, participants in this study hesitated to count on others' cooperation to manage their risk for CVD.[21] Japanese specific values of family and social and interpersonal relationship might underlie their responses and behaviors.

Accordingly, responses of Japanese people to the onset of initial symptoms of AMI may include not only taking preventive actions but also hesitating to ask help because of their values of family and interpersonal relationship with others. On the other hand, individuals with the patients at the onset of the initial symptoms of AMI, in particular their family, relatives, and other close people, took more appropriate actions than the patients.[15), 23)] Thus, consequent behaviors at the onset of AMI to choose the best course of action might vary depending on the relationship with others, suggestions from others, and interpersonal distance with others. The cultural value of family and interpersonal relationship with others could be another factor underlying the behaviors related to treatment delay.

IV Implication of Nursing Practice

Based on review of factors underlying behaviors associated with delay of seeking immediate treatment for AMI among Japanese patients, several potential nursing interventions could be proposed to maximize outcomes. As one of potential nursing interventions, information about diverse symptoms of AMI should be distributed to the public. It is also important to educate the public about appropriate actions at the onset of AMI. Individuals with AMI may experience diverse symptom at the onset of AMI and symptom presentation are different depending on gender. Limited information on the media about AMI could be one of factors underlying inappropriate responses to the initial symptoms of AMI. Therefore, dissemination of information about diverse symptoms presentation at the onset of AMI may be critical to better understand signs and symptoms of AMI and to elicit appropriate responses.

It is important to provide not only public campaign but also individualized education about symptoms of AMI to elicit appropriate responses at the onset of AMI. The results of a randomized controlled study[24], including 200 patients with a history of CAD, showed that an individualized 40 to 50-minutes face-to-face education and counseling led to improved knowledge of symptoms of AMI and appropriate response to symptoms. The results of another study also indicated that the consequent behaviors after perceiving risk for CVD included seeking information and confirmation to evaluate their condition.[21] Although information on the media may help individuals obtain knowledge about diverse symptoms of AMI, information on the media does not answer their specific questions. In addition, understanding of lay people about information on the media might have been wrong and inappropriate. Therefore, nurses could develop and design tailored educational sessions with a direct interaction to provide individualized information and confirmation addressing specific questions in order to elicit appropriate responses at the onset of AMI.

Providing support and credible authority for individuals feeling uncertainty about the symptoms could be another proposing nursing intervention addressing factors underlying behaviors related to treatment delay. As the results of the study by Henriksson et al. indicated, both patients and relatives often felt uncertainty about the origin of symptoms at the onset of AMI.[23] Mishel claimed that "the opportunity to clarify a situation through discussion and supportive interactions with others clarifies contingencies and aids the patient in forming a cognitive schema."[25] Individuals are more likely to seek confirmation from health care providers if they are uncertain about their appraisal of symptoms.[25] Health care providers could provide consistent and open contacts with individuals with uncertainty of symptoms and help them choose actions appropriate at the onset of AMI. These potential nursing interventions may address delay for immediate treatments and provide benefits of advanced medical treatments for AMI.

In summary, the review of existing knowledge from recent studies and health behaviors models may support the notion that diverse symptom presentation, limited information on the media about symptoms and optimal actions at the onset of AMI, and interpersonal relationship with others may underlie the behaviors specifically found among Japanese patients with AMI, which in turn contributing to treatment delay. Nursing interventions addressing these factors may possess the potential to increase awareness and knowledge about the diversity of AMI symptoms and elicit appropriate responses to obtain the advantage of current medical treatment and optimal

outcomes for Japanese patients with AMI.

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