

# Factors Affecting Preventive Behaviors of Complications among Older Adults with Ischemic Heart Disease

Matutapoj Purimano, MSc<sup>1</sup>, Archin Songthap, PhD<sup>1</sup>, Rakfan Sawadpanich, MD<sup>2</sup>, A-dhus Jirasvetakul, MD<sup>2</sup>

<sup>1</sup> Faculty of Public Health, Naresuan University, Phitsanulok, Thailand; <sup>2</sup> Cardiovascular and Thoracic Surgery Department, Khon Kaen Hospital, Khon Kaen, Thailand

**Background:** Ischemic heart disease (IHD) complications in elderly patients affect quality of life, physical and mental health, disability, and death. Prevention behaviors help reduce the risk of IHD complications among elderly patients. The present study was an analytical cross-sectional study, aimed to determine prevention behaviors of complications among older adults with IHD, Khon Kaen Province, Thailand.

**Objective:** To predict factors affecting prevention behaviors of complications among older adults with IHD.

**Materials and Methods:** The present study sample included 300 elderly patients with IHD treated in Khon Kaen Hospital, Thailand. They were randomly selected by a simple sampling technique. Data were collected by a self-administered questionnaire consisting of eight parts, 1) sociodemographic characteristics, 2) knowledge about prevention behaviors of IHD complications, 3) perceived severity, 4) perceived susceptibility, 5) perceived outcome, 6) perceived self-efficacy, 7) social support, and 8) prevention behaviors of IHD complications. Frequencies, percentages, means, standard deviations, and multiple regression analysis were employed for data analyses.

**Results:** The majority of participants (85.3%) had high scores for prevention behaviors of IHD complications in elderly patients, with scores of 3.68 to 5.00. Factors that significantly affected prevention behaviors of IHD complications in elderly patients included information support (Beta=0.313), perceived severity of IHD complications (Beta=0.149), and knowledge (Beta=0.124). These three factors explained 17.5% of prevention behaviors of complications among older adults with IHD.

**Conclusion:** Health care providers and care givers should educate the elderly patients with IHD about the affecting factors to IHD including supported information, perceived severity, and knowledge. Therefore, the elders can change their behavior and reduce the risk of IHD complications.

**Keywords:** Factors affecting; Preventive behaviors; ischemic heart disease; Complications; Older adults

Received 1 May 2024 | Revised 17 May 2024 | Accepted 29 May 2024

**J Med Assoc Thai 2024; 107(8): 607-14**

**Website:** <http://www.jmatonline.com>

Aging is an inevitable trend in the world's population. In 2017, the number of people aged 60 years was approximately 962 million, or 13% from 7,550 million of the total world population, result in becoming an aging society<sup>(1)</sup>. Consequently, it is important to understand the physical changes that occur with aging to prepare for an aging population. These health conditions affect the preventive behaviors of complications among older adults with ischemic heart disease. Appropriate preventive

behaviors can prevent ischemic heart disease complications in elderly patients. It also helps elderly patients perform daily activities on their own when they are alone. Furthermore, preventing behaviors can reduce the risk of ischemic heart disease complications.

Thailand has changed from an aging society to a completely aged society in 2022, and the proportion of older adults is higher than 20% of the total population<sup>(2)</sup>. Being an aging society reflects changes in population structure in both urban and rural areas. In Thailand, the number of the aging population has grown rapidly and will increase continuously in the next decades. The number of people aged 60 years or older is 11 million (17%) from 65.5 million Thai population<sup>(3)</sup>. The Department of Disease Control, Ministry of Public Health, Thailand (2021) reported the incidence of ischemic heart disease in older adults was approximately 350,922 cases per year, and 20,556 died or 57 patients died per day<sup>(4,5)</sup>. Moreover, ischemic heart disease complications

## Correspondence to:

Songthap A.

Faculty of Public Health, Naresuan University, Phitsanulok, 99 Village 9, Thapho Subdistrict, Muang District, Phitsanulok 65000, Thailand.

**Phone:** +66-88-7534822

**Email:** archins@nu.ac.th

## How to cite this article:

Purimano M, Songthap A, Sawadpanich R, Jirasvetakul A. Factors Affecting Preventive Behaviors of Complications among Older Adults with Ischemic Heart Disease. *J Med Assoc Thai* 2024;107:607-14.

DOI: 10.35755/jmedassocthai.2024.8.14024

in elderly patients often occur in males more than females. Aging is associated with a progressive decline in numerous physiological processes, leading to increased risk of health complications and chronic diseases. Over the past five years, between 2014 and 2018, coronary artery disease has been the number one cause of death in people aged 60 or older, roughly 12,996, 13,960, 15,227, 14,815, and 14,764 people, respectively, while the working age group, 15 to 59 years of age was only 5,083, 5,457, 5,773, 5,921, and 6,012 people, respectively<sup>(6,7)</sup>.

Especially, Khon Kaen Province has the most aged population in the North-East of Thailand. The rapid growth of the aging population in Khon Kaen is the second-highest number of elderly people in Thailand. In 2018, Khon Kaen Province had 292,217 elderly people (16%) and it is expected that in the year 2020, Khon Kaen Province will enter a complete elderly society<sup>(3)</sup>.

Ischemic heart disease complications in elderly patients cause disability from cardiogenic shock, myocardial infarction, congestive heart failure, acute mitral valve regurgitation, cardiac arrhythmia, pericarditis, and thromboembolism. These are the main cause of death among the elderly patients. Most ischemic heart disease complications in elderly patients result from heredity, gender, age, dyslipidemia, hypertension, smoking, obesity, diabetes mellitus, alcohol drinking, lack of exercise, and stress. Ischemic heart disease complications in elderly patients lead to damage, deterioration, and harm to other organs, such as ischemic stroke and kidney failure. Additionally, most elderly patients have underlying diseases such as hypertension, diabetes, dyslipidemia, kidney disease, stroke, cancer, dyspepsia, liver disease, and gout. These health problems contribute to an increased risk of ischemic heart disease complications in elderly patients<sup>(8)</sup>.

Previous studies revealed that factors affecting preventive behaviors of complications among older adults with ischemic heart disease include personal characteristics such as heredity, gender, age, obesity, dyslipidemia, diabetes mellitus, hypertension, smoking, alcohol drinking, lack of exercise, and stress<sup>(9)</sup>. Inappropriate preventive behaviors cause ischemic heart disease complications in elderly patients<sup>(10,11)</sup>. Moreover, knowledge, perceived severity, perceived susceptibility, perceived outcome, perceived self-efficacy, and social support are related to preventive behaviors of complications of ischemic heart disease among older adults<sup>(12)</sup>.

As older adults experience ischemic heart disease

complications and health conditions, ischemic heart disease complications among older adults affect their physical and mental health. Some of them become disabled and bedbound because of ischemic stroke from cardiac arrhythmia. Ischemic heart disease complications among older adults increase expenditures that their families must deal with, such as for health care services. Moreover, older adults with ischemic heart disease complications have an increased risk of death<sup>(8)</sup>.

Although previous studies have assessed factors influencing ischemic heart disease complications among older adults, there is little information about this topic in Khon Kaen Province, Thailand. The authors applied protection motivation theory (PMT) and social support theory to determine factors affecting preventive behaviors of complications among older adults with ischemic heart disease. The PMT theory describes how to influence individuals' perceptions of health problems can result in changing behaviors to prevent complications among older adults. Social support contributes to helping older adults change their behaviors based on suggestions from village health volunteers, caregivers, or health care providers. The results of the present study would be utilized for creating preventive behavior programs to reduce ischemic heart disease complications, disability, and death and improve the quality of life of older adults.

## Materials and Methods

### Study design, setting, and participants

The present study was an analytical cross-sectional study. The population was elderly patients with ischemic heart disease in Khon Kaen Hospital, Khon Kaen Province, Thailand. The sample included 300 elderly patients with ischemic heart disease. The sample size was calculated using the estimation of the population mean<sup>(13)</sup> based on 1,053 people, and the variance of preventing behaviors of ischemic heart disease complications in elderly patients was 0.36<sup>(14)</sup>. The authors set the error of estimation at 0.05, and the alpha was 0.05. The inclusion criteria included 1) being age 60 years or over, 2) able to write and read Thai, 3) having at least one year of living in Khon Kaen Province, and 4) willing to participate in the present study. The exclusion criteria included 1) sudden illness on the date of data collection and 2) inability to complete the questionnaire. A simple random sampling technique was utilized to recruit participants from Khon Kaen Hospital, Khon Kaen Province, Thailand, and was selected as a

representative sampling.

### Research tool

Data were obtained by a self-administered questionnaire developed based on the literature review and related theories consisting of eight parts, 1) sociodemographic characteristics, 2) knowledge about preventing behaviors of ischemic heart disease complications, 3) perceived severity of ischemic heart disease complications in elderly patients, 4) perceived susceptibility of ischemic heart disease complications, 5) perceived outcome of preventing behaviors of ischemic heart disease complications, 6) perceived self-efficacy of preventing behaviors of ischemic heart disease complications, 7) social support of preventing behaviors of ischemic heart disease complications, and 8) preventing behaviors of ischemic heart disease complications. Sociodemographic characteristics included 14 items regarding data on elderly patients with ischemic heart disease. Knowledge was assessed through 10 yes or no questions and classified into three categories using a sum score<sup>(15)</sup> as good with a score of 8 to 10, average with a score of 6 to 7.99, and low with a score of 0 to 5.99. The perceived severity, perceived susceptibility, and perceived outcome items consisted of five, eight and eight questions in order 5-level Likert scale starting from strongly agree to strongly disagree and classified into three groups<sup>(16)</sup> using mean scores for high with 3.68 to 5.00, average with 2.34 to 3.67, and low with 1 to 2.33. Perceived self-efficacy involved eight, 5-rating scale questions ranging from strongly believe to strongly disbelieve and was divided into three groups using mean scores for high for 3.68 to 5.00, average for 2.34 to 3.67, and low for 1 to 2.33. Social support items of preventing behaviors of ischemic heart disease complications involved seven 5-rating scale questions ranging from usually perform to never perform and were divided into three groups using mean scores for high for 3.68 to 5.00, average for 2.34 to 3.67, and low for 1 to 2.33. Preventing behaviors of ischemic heart disease complications had seven 5-rating scale questions ranging from usually perform to never perform and was divided into three groups using mean scores for high for 3.68 to 5.00, average for 2.34 to 3.67, and low for 1 to 2.33. All questions with an item objective congruence (IOC) index greater than 0.5 were considered to meet the standard criteria of the validity test. The reliability of the questionnaire was evaluated among 30 respondents who were not included in the present study. The reliability test yielded Cronbach's

alpha coefficients, except for knowledge, which was assessed by the Kuder-Richardson 20 (KR-20). The reliability scores of knowledge, perceived severity, perceived susceptibility, perceived outcome, perceived self-efficacy, emotional support, material support, information support, and preventing behaviors of ischemic heart disease complications were 0.93, 0.97, 0.91, 0.96, 0.88, 0.70, 0.77, 0.79, and 0.86, respectively.

### Data collection

The present study was carried out between February and March 2024. Data was collected in Khon Kaen Hospital using a self-administered questionnaire. Participants who met the inclusion criteria and were willing to participate were requested to complete the questionnaire. Participants were spaciouly seated to maximize confidentiality and to minimize contamination of information due to peer discussions. Responding to the questionnaire took approximately 50 minutes. Then, all complete questionnaires were used for data analyses.

### Statistical analysis

Data were analyzed using a statistical software program. Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were used to describe sociodemographic characteristics, knowledge, perceived severity, perceived susceptibility, perceived self-efficacy, perceived outcome, social support, and preventing behaviors of ischemic heart disease complications. Stepwise multiple regression analysis was employed to determine factors that affected preventive behaviors of complications among older adults with ischemic heart disease. All significant levels were set at 0.05. The present study covers both the basics of descriptive statistical analysis and multivariable logistic regression analysis using IBM SPSS Statistics, version 25.0 (IBM Corp., Armonk, NY, USA).

### Ethical approval

The present study was approved by the Naresuan University Institutional Review Board with certificate of approval number P3-0001/2567, and Khon Kaen Hospital Institute Review Board in Human Research with certificate of approval number KF66049. Informed consent was obtained from all subjects and from the legal guardian(s) of illiterate participants. All methods were undertaken in accordance with the relevant guidelines and regulations.

**Table 1.** Sociodemographic characteristics of elderly patients with ischemic heart disease (n=300)

| Variables                                 | n (%)      | Variables  | n (%)      |
|---|------------|--|------------|
| <b>Sex</b>                                |            | <b>Time spent becoming IHD (continued)</b>           |            |
| Male                                      | 197 (65.7) | Mean 1.216, SD 0.59236                               |            |
| Female                                    | 103 (34.3) | <b>Ischemic heart disease complications</b>          |            |
| <b>Age (years)</b>                        |            | No complication                                      | 183 (61.0) |
| 60 to 70                                  | 186 (62.0) | Complication   | 117 (39.0) |
| 71 to 80                                  | 102 (34.0) | <b>Type of ischemic heart disease complications</b>  |            |
| 81 to 90                                  | 12 (4.0)   | Cardiac arrhythmia                                   | 54 (26.3)  |
| Mean 45.25, SD 13.52                      |            | Cardiogenic shock                                    | 41 (20.0)  |
| <b>Marital status</b>                     |            | Mitral valve regurgitation                           | 33 (16.1)  |
| Single                                    | 30 (10.0)  | Congestive heart failure                             | 31 (5.1)   |
| Married                                   | 216 (72.0) | Others   | 141 (32.5) |
| Widowed/divorced/separated                | 54 (18.0)  | <b>Relative caregiver</b>                            |            |
| <b>Education level</b>                    |            | Self-care  | 25 (8.3)   |
| Primary school                            | 193 (64.4) | Spouse   | 138 (46.0) |
| Secondary school                          | 64 (21.3)  | Offspring  | 107 (35.7) |
| Diploma/equivalent                        | 15 (5.0)   | Kin  | 30 (10.0)  |
| Bachelor's degree/higher                  | 28 (9.3)   | <b>Chronic health conditions in elderly patients</b> |            |
| <b>Current occupation</b>                 |            | No   | 131 (39.9) |
| Unemployed                                | 64 (21.3)  | Yes  | 197 (60.1) |
| Government officer                        | 73 (24.3)  | <b>Type of chronic health conditions</b>             |            |
| State enterprise employee                 | 21 (7.0)   | Diabetes mellitus                                    | 191 (63.7) |
| Employee                                  | 15 (5.0)   | Hypertension   | 172 (57.3) |
| Agriculturalists                          | 98 (32.7)  | Dyslipidemia   | 90 (30.0)  |
| Business                                  | 29 (9.7)   | Obesity  | 115 (38.0) |
| <b>Average monthly income (Thai Baht)</b> |            | <b>Smoking behavior</b>                              |            |
| No income                                 | 64 (21.3)  | No   | 212 (70.6) |
| 1 to 50,000                               | 232 (77.3) | Yes  | 20 (6.7)   |
| 50,001 to 100,000                         | 2 (0.7)    | Used to  | 68 (22.7)  |
| 100,000 to 150,000                        | 2 (0.7)    | <b>Alcohol drinking</b>                              |            |
| Mean 7,307.67, SD 16,324.925              |            | No   | 270 (90.0) |
| <b>Time spent becoming IHD (years)</b>    |            | Yes  | 30 (10.0)  |
| <6  | 253 (84.3) | <b>Stress</b>  |            |
| 6 to 10                                   | 38 (12.7)  | No   | 280 (93.3) |
| >10                                       | 9 (3.0)    | Yes  | 20 (6.7)   |

IHD=ischemic heart disease; SD=standard deviation

## Results

The results of the present study were presented based on the structure of the questionnaires, including, sociodemographic characteristics of participants, knowledge, perception, social support, behaviors, and factors affecting preventive behaviors of complications among older adults with ischemic heart disease as follows. The authors inserted the data before presenting the results.

### Sociodemographic characteristics of participants

Of 300 participants, 65.7% were male, and 62.0% were aged 60 to 70 years (mean 68.45, SD

6.19). Approximately three-fourths (72.0%) were married. Slightly more than two-thirds (64.4%) of the participants had finished primary education. One-third (32.7%) of elderly patients were agriculturalists and 77.3% had an average monthly income of 1 to 50,000 Thai Baht (mean 7,307.67, SD 16,324.93). The majority of participants (84.3%) had spent less than five years having ischemic heart disease (mean 1.22, SD 0.59), and 61.0% had ischemic heart disease complications. Slightly more than one-fourth (26.3%) of the elderly patients with ischemic heart disease complications were suffering from cardiac arrhythmia, 46.0% were looked after by their

**Table 2.** Overall knowledge, perceived severity, perceived susceptibility, perceived outcome, perceived self-efficacy, emotional support, material support, information support, and preventive behaviors complications of ischemic heart disease distributed by levels (n=300)

| Variables  | n (%)      | Variables  | n (%)      |
|--|------------|--|------------|
| Knowledge about preventive behaviors complications of ischemic heart disease             |            | Perceived self to efficacy of preventive behaviors complications of ischemic heart disease (continued) |            |
| Low (scores of 0 to 5.99)  | 4 (1.3)    | High (3.68 to 5.00)  | 277 (92.3) |
| Average (scores of 6 to 7.99)  | 49 (16.3)  | Mean 2.97, SD 0.18   |            |
| High (scores 8 to 10)  | 247 (82.4) | Emotional support of preventive behaviors complications of ischemic heart disease                      |            |
| Mean 2.81, SD 0.43   |            | Low (1 to 2.33)  | 74 (24.7)  |
| Perceived severity to preventive behaviors complications of ischemic heart disease       |            | Average (2.34 to 3.67)   | 108 (36.0) |
| Low (1 to 2.33)  | 4 (1.3)    | High (3.68 to 5.00)  | 118 (39.3) |
| Average (2.34 to 3.67)   | 44 (14.7)  | Mean 2.30, SD 0.69   |            |
| High (3.68 to 5.00)  | 252 (84.0) | Material support of preventive behaviors complications of ischemic heart disease                       |            |
| Mean 2.91, SD 0.33   |            | Low (1 to 2.33)  | 36 (12.0)  |
| Perceived susceptibility of preventive behaviors complications of ischemic heart disease |            | Average (2.34 to 3.67)   | 17 (5.7)   |
| Low (1 to 2.33)  | 4 (1.3)    | High (3.68 to 5.00)  | 247 (82.3) |
| Average (2.34 to 3.67)   | 71 (23.7)  | Mean 2.77, SD 0.55   |            |
| High (3.68 to 5.00)  | 225 (75.0) | Information support of preventive behaviors complications of ischemic heart disease                    |            |
| Mean 2.91, SD 0.29   |            | Low (1 to 2.33)  | 81 (27.0)  |
| Perceived outcome of preventive behaviors complications of ischemic heart disease        |            | Average (2.34 to 3.67)   | 102 (34.0) |
| Average (2.34 to 3.67)   | 161 (53.7) | High (3.68 to 5.00)  | 117 (39.0) |
| High (3.68 to 5.00)  | 139 (46.3) | Mean 2.35, SD 0.67   |            |
| Mean 2.81, SD 0.39   |            | Preventive behaviors complications of ischemic heart disease   |            |
| Perceived self-efficacy of preventive behaviors complications of ischemic heart disease  |            | Average (2.34 to 3.67)   | 44 (14.7)  |
| Average (2.34 to 3.67)   | 23 (7.7)   | High (3.68 to 5.00)  | 256 (85.3) |
|  |            | Mean 2.85, SD 0.35   |            |

SD=standard deviation

spouses, and 60.1% had chronic health conditions. Furthermore, 63.7% had diabetes mellitus, 57.3% were hypertensive, 30% dyslipidemia, and 38.0% were obese. A majority (70.6%) of the participants did not smoke, 90.0% were not alcohol drinking, and 93.3% had no stress (Table 1).

**Knowledge about preventive behaviors of ischemic heart disease complications, perceived severity, perceived susceptibility, perceived outcome, perceived self-efficacy of preventive behaviors of complications among older adults with ischemic heart disease, emotional support, material support, and information support about preventive behaviors of complications among older adults with ischemic heart disease**

Overall, participants had a high level of knowledge, perceived severity, perceived susceptibility, perceived self-efficacy, had emotional support, material support, information support, and preventive behaviors complications of ischemic heart disease at 82.4%, 84.0%, 75.0%, 92.3%, 39.3%, 82.3%, 39.0%, and 85.3%, with means of 2.81 (SD

0.43), 2.91 (SD 0.33), 2.91 (SD 0.29), 2.97 (SD 0.18), 2.30 (SD 0.69), 2.77 (SD 0.55), 2.35 (SD 0.67), and 2.85 (SD 0.35), respectively. Moreover, participants had an average level of perceived outcome at 53.7% and mean of 2.81 (SD 0.39) (Table 2).

**Factors affecting preventive behaviors of complications among older adults with ischemic heart disease**

The results revealed that participants who had higher mean scores for information support tended to have better preventive behaviors of ischemic heart disease complications than those with lower mean scores (Beta=0.313). Similarly, participants who had perceived severity were more likely to have better preventive behaviors than those with lower mean scores (Beta=0.149). Lastly, participants who had greater mean scores for knowledge seemed to have better mean scores for preventive behaviors of ischemic heart disease complications than those with lower mean scores (Beta=0.124). All of these significant factors explained 17.5% of preventive

**Table 3.** Factors affecting preventive behaviors of complications among older adults with ischemic heart disease (n=300)

| Independent variables | b     | Beta  | p-value |
|-----------------------|-------|-------|---------|
| Information support   | 0.168 | 0.313 | 0.000   |
| Perceived severity    | 0.145 | 0.149 | 0.006   |
| Knowledge             | 0.550 | 0.124 | 0.024   |

Constant (a)=2.566, R square=0.175, adjusted R square=0.167, F=20.946, p<0.001

behaviors of complications among older adults with ischemic heart disease (adjusted R square=0.175) (Table 3).

## Discussion

The authors proposed to determine factors that affected preventive behaviors of complications among older adults with ischemic heart disease. The factors that significantly affected preventive behaviors of ischemic heart disease complications ( $p<0.05$ ) included information support, perceived severity, and knowledge about preventive behaviors of ischemic heart disease complications.

The current study suggested that participants who had higher mean scores of information support were more likely to have better preventive behaviors of ischemic heart disease complications than those with lower mean scores. This finding was in line with the study by Cukor et al. (2017)<sup>(17)</sup>, which found that information support was positively associated with preventive behaviors of complications among older adults who received the information from village health volunteers, caregivers, or health care providers, tend to change their behaviors to prevent complications of ischemic heart disease than those without any information support. It might be because, if an elderly patient expected that the preventive behaviors could prevent complications among older adults with ischemic heart disease, he or she could take care of themselves and receive supported information from health providers.

The present research indicated that greater mean scores for perceived severity of preventive behaviors of ischemic heart disease complications tended to have better preventive behaviors of ischemic heart disease complications than those with lower mean scores. This finding was consistent with those of previous studies<sup>(12,18)</sup>. These studies found that the perceived severity of preventive behaviors of complications among older adults with ischemic heart disease caused organ damage, physical and mental impairment, and disability. Consequently, participants in the present study performed the preventive

behaviors of ischemic heart disease complications. In other words, if the participants knew that an ischemic heart disease complication is dangerous to their health, they immediately take action to prevent ischemic heart disease complications for themselves<sup>(18)</sup>. Additionally, the perceived severity of diseases assists people in being concerned about their health behaviors to prevent diseases that can cause disability or death<sup>(19)</sup>.

The present study revealed that knowledge about preventive behaviors of complications among older adults with ischemic heart disease is beneficial in preventing ischemic heart disease complications. This finding was similar to the study of Lasutham et al. (2018)<sup>(20)</sup>, which reported that knowledge about ischemic heart disease is associated with preventing behaviors of ischemic heart disease complications. This might be due to the participant's knowledge of reducing risk factors of ischemic heart disease complications, therefore, the participants gave up smoking, which caused coronary artery stenosis, and took pills regularly. This helps increase physical activity and controlling food consumption<sup>(21)</sup>.

The authors collected data from older adults with ischemic heart disease. Elderly patients with ischemic heart disease are able to prevent ischemic heart disease complications by receiving supported information, perceiving severity, and obtaining knowledge about the complications from village health volunteers, caregivers, and health care providers.

## Limitation and recommendation

The limitations that might have affected the results were the other factors that the authors did not explore, such as home visits to collect cross-sectional study data in the village community from the elderly patients who did not have follow-up in the hospital. This factor might be associated with ischemic heart disease complications for prevention behaviors for older adults in the village community context. Further studies should include home visits to determine whether they influence preventive behaviors of complications among older adults with ischemic heart disease in the hometown context.

## Conclusion

The present study revealed that factors affecting preventive behaviors of complications among older adults with ischemic heart disease involved information support, perceived severity, and knowledge of preventive behaviors of ischemic heart

disease complications. As a result, elderly patients with ischemic heart disease should be educated to promote the perceived severity of the disease information. Furthermore, the patients should be supported with information by health care providers about the severity of the disease and the complications in order to change their behavior and reduce the risk of ischemic heart disease complications.

### **What is already known on this topic?**

It is well-known that ischemic heart disease complications cause heart attack and death. Furthermore, it was found that older adults are more likely to suffer from more complications than younger age groups. Factors that can prevent complications include exercise, food consumption, stress management, alcohol control, and quitting smoking.

### **What does this study add?**

The research indicated that preventive behaviors of ischemic heart disease complications is associated with information support, perceive severity, and knowledge among older adults who received medical service in Khon Kaen, Public Health Service Region 7. These findings can be utilized as a guideline to develop the model or program to prevent ischemic heart disease complications for older adults in this area.

### **Acknowledgement**

The authors would like to express their gratitude to all participants and relatives of elderly patients with ischemic heart disease in Khon Kaen Hospital settings who devoted their valuable time to the study procedures.

### **Authors' contributions**

AS assisted in the design of the study, developed the materials, and collected and analyzed the data. PS assisted in recruiting participants and provided support for data collection. JR assisted in data collection and the literature review. All the authors have read and approved the final manuscript.

### **Availability of data and materials**

The dataset of this study is strictly protected under the terms of the Naresuan University Ethical Committee for Dissemination. Furthermore, Thailand's Official Information Act 1997 prohibits the release of identifiable data relating to public bodies. Due to these limitations, interested parties

may contact the secretary of the Naresuan University Research Ethics Committee.

### **Funding disclosure**

The present study was funded by the Faculty of Public Health, Naresuan University.

### **Conflicts of interest**

The authors reported no conflicts of interest, financial, or otherwise.

### **References**

1. Foundation of Thai Gerontology Research and Development Institute (TGRI). Situation of the Thai elderly 2017. Bangkok: TGRI; 2017.
2. United Nations, Department of Economic and Social Affairs, Population Division. Global and regional trends in population ageing. In: World population ageing 2019. New York: United Nations; 2020. p. 5-12.
3. Sihapark S, Amornrojanavaravutti W, Kam-on N, Srioad P, Srihanoo P, Tupjai T. Problems and needs of long-term care for elderly community dwellers supported by long term care fund in Khon Kaen province. *Regional Health Promotion Center 9 Journal* 2021;15:44-62. [in Thai]
4. Department of Disease Control, Ministry of Public Health, Thailand. Fall in the elderly: prevention and risk management. Nonthaburi: Department of Disease Control; 2020.
5. National Institute for Emergency Medicine (NIEM). Report of fall injury among the elderly in Thailand. Nonthaburi: NIEM; 2019.
6. Suthipong N, Intarakamhang U, Peungposop N. Causal relationship model of process of change and health promotion behavior among elderly at risks with ischemic heart disease. *Thai J Cardiothorac Nurs* 2021;32:90-105.
7. Prateepmanowong J. Nursing care for older persons with non-ST elevation acute coronary syndrome. *Thai Red Cross Nurs J* 2021;14:66-68.
8. The Heart Association of Thailand under the Royal Patronage of H.M. The King. Guideline for ischemic heart disease, edition 2014. Bangkok: Srimuang Printing; 2022.
9. Ciumărnean L, Milaciu MV, Negrean V, Orășan OH, Vesa SC, Sălăgean O, et al. Cardiovascular risk factors and physical activity for the prevention of cardiovascular diseases in the elderly. *Int J Environ Res Public Health* 2021;19:207. doi: 10.3390/ijerph19010207.
10. Padphai I, Chotklang D, Chanaboon A. The relationship between health literacy and good serum lipid level of the population at risk for ischemic heart disease in The Northeast, Thailand. *Nursing Journal of the Ministry of Public Health* 2021;31:125-37.

11. Daranisorn S, Boonchuang P, Pinyokum N. Effects of a transitional care program on health behaviors and functional capacity among acute coronary syndrome patients. *Nusing Journal CMU* 2013;40:103-13.
12. Prentice-Dunn S, Rogers RW. Protection motivation theory and preventive health: Beyond the health belief model. *Health Educ Res* 1986;1:153-61.
13. Daniel WW. Confidence interval for a population proportion. In: Daniel WW, editor. *Biostatistics: A foundation of analysis in health sciences*. 6th ed. New Jersey: Johns Willey & Sons; 1995. p. 176-7.
14. Tawa N, Chiwisit P. The environmental management and housing for the elderly in Muang District, Nakhon Si Thammarat. *Association of Private Higher Education Institutes of Thailand Journal (APHEIT Journal)* 2016;5:31-9.
15. Bloom BS, Hastings JT, Madaus FG, Baldwin ST. Education and evaluation. In: Bloom BS, Hastings JT, Madaus FG, Baldwin ST, editors. *Hand book on formative and summative evaluation of student learning*. New York: Mc Graw-Hill; 1971. p. 5-60.
16. Best JW. *Research in education*. 3rd ed. Englewood Cliffs, NJ: Prentice Hall; 1977.
17. Cukor D, Pencille M, Rosenthal D, Kimmel PL. Psychosocial issues in dialysis patients. In: Nissenson AR, Fine RN, editors. *Handbook of dialysis therapy*. 5th ed. Philadelphia, PA: Elsevier; 2017. p. 844-54. e4.
18. Chinphan S, Sirisophon N, Onsiri S, Wattanaburanon A. Factors correlated with instent restenosis in coronary heart disease patients. *J Royal Thai Army Nurs* 2019;20:218-26.
19. Pojmanapong P. Health literacy of cardiac rehabilitation phase II in elderly patients with myocardial infarction after revascularization. *Thai Journal of Public Health and Health Sciences (TJPHS)* 2019;2;63-72.
20. Lasutham K, Siripitayakunkit A, Panpakdee O. Factors related to self-care behavior of Thai Buddhist monks with coronary artery disease. *Rama Nurs J* 2018;24;313-27.
21. Mahasaranon W, Tangkawanich T, Chairat R. The effect of supportive and education nursing program on self care and quality of life in ischemic heart disease patients. *Thai J Cardiothorac Nurs* 2019;30;103-16.