Science, Technology, and Social Sciences Procedia
2025; 2025(2): ICSA03
https://wjst.wu.ac.th/index.php/stssp

The Self-care Potential of Patients with ACS in Nakhon Si Thammarat Province

Patthinan Boonrapheng[1], Rachadaporn Jantasuwan[2,*], Kiatkamjorn Kusol[2] and Thidarat Eksirinimit[2]

[1]Master of Nursing Science in Community Nurse Practitioner, School of Nursing, Walailak University, Nakhon Si Thammarat 80160, Thailand
[2]School of Nursing, The Excellence Center of Community Health Promotion, Walailak University, Nakhon Si Thammarat 80160, Thailand

([*]Corresponding author's e-mail: rachadaporn.wu@gmail.com)

Abstract

This study was a part of a larger research project titled "The Effectiveness of a Self-care Potential Development Program Using Social Support on Major Adverse Cardiovascular Events (MACE) within 30 Days Post-Hospital Discharge in Nakhon Si Thammarat Province." The present phase employed a descriptive research design to explore the self-care potential of patients with acute coronary syndrome (ACS).

The sample consisted of 72 ACS patients who had been admitted to a secondary hospital in Nakhon Si Thammarat Province. The sample size was calculated using the G*Power software. The inclusion criteria were as follows: 1) patients diagnosed with ACS, based on ICD-10 codes I20–I259, between September and December 2024, and scheduled for hospital discharge; 2) aged 18 years or older; 3) no speech or hearing impairments; 4) had a primary caregiver; and 5) voluntarily consented to participate in the study. The exclusion criterion was incomplete responses to the questionnaires or assessment forms. The research instruments included: 1) A personal information questionnaire, 2) A health status assessment tool (Content Validity Index [CVI] = 0.85), and 3) A self-care behavior assessment form (CVI = 0.85; Cronbach's alpha coefficient = 0.78). Data analysis of demographic characteristics, health status, and self-care capacity was performed using descriptive statistics, including mean, standard deviation (SD), frequency, and percentage.

The study results indicated that the participants had a mean age of 66.65 years (SD = 14.78). The majority were male (72.22 %) and married (59.72 %). Most had completed primary education (66.67 %) and had an average monthly income of 7,441.67 THB (SD = 4,760.45). A total of 36.11 % were unemployed. Regarding clinical characteristics, the majority of participants were diagnosed with non-ST-elevation myocardial infarction (NSTEMI) (83.33 %), followed by ST-elevation myocardial infarction (STEMI) (6.95 %) and unstable angina (9.72 %). Comorbidities were present in 84.72% of participants, with hypertension being the most common (72.13 %), followed by cardiovascular disease and dyslipidemia, both at 55.74 %. The mean BMI was 24.02 kg/m² (SD = 5.13), with most participants falling within the normal range (47.23 %), followed by those classified as overweight or

obese (45.83 %). Regarding overall self-care capacity, 58.33 % of the participants demonstrated a good to very good level, while 38.89 % exhibited a moderate level. When analyzed by domain, the proportions of participants with good to very good self-care capacity were as follows: 61.11 % for medication adherence, 66.67 % for self-management, 84.72 % for stress, anxiety, and depression management, and 77.77 % for sleep quality. For cardiac rehabilitation, most participants were at a moderate level (54.16 %), with 22.22 % at a low to fair level. In the domain of diet and fluid intake, 37.49 % were at a low to fair level, and 30.56 % were at a moderate level.

Based on the research findings, relevant stakeholders are encouraged to implement the program for patients with ACS, with a particular emphasis on cardiac rehabilitation and diet and fluid intake. Strengthening these areas may help prevent the occurrence of MACE in ACS patients.

Keywords: Patients with ACS, Self-care potential, Self-care behaviors

Introduction

ACS is a global public health concern, characterized by high morbidity and mortality rates. The condition is primarily caused by biological and behavioral risk factors, placing patients at high risk of developing MACE, such as death, recurrent myocardial infarction, hospital readmission, or complications (Okkonen et al., 2021). These events are particularly common during the early post-discharge period (World Health Organization, 2023). In 2023, cardiovascular diseases (CVDs) were responsible for 17.9 million deaths annually, accounting for 31.00 % of all global deaths. Among these, ACS contributed to approximately 10.00 - 15.00 % of deaths occurring within 30 days of symptom onset (World Health Organization, 2023).

In Thailand, ACS remains a leading cause of death. In 2021, it was the fourth leading cause, with a mortality rate of 29.9 per 100,000 population (Tosati, 2024), particularly in certain provinces such as Nakhon Si Thammarat, where the incidence rate is higher than the national average (Department of Medical Services, National Institute of Thoracic Diseases, 2022). In 2022, there were 1,331 reported cases of ACS in this province, including ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation myocardial infarction (NSTEMI), and unstable angina (UA). Additionally, 11.83 % of ACS patients were readmitted to the hospital within 30 days post-discharge (Thasala Hospital Medical Records Database, 2023).

Despite advancements in acute-phase treatment, a major challenge remains during the post-discharge period-particularly the prevention of MACE within 30 days after hospital discharge. Effective prevention in this phase requires more than just medical intervention; it also depends heavily on active patient engagement and strong self-management capacity. Although the post-discharge period is considered a recovery phase for patients with ACS, physiological risks stemming from biological and behavioral factors persist, potentially increasing the likelihood of MACE (Tran et al., 2023).

Previous studies have demonstrated that a substantial number of patients with ACS exhibit poor self-care behaviors (Chaichana et al., 2024). These include inconsistent medication adherence (Hafiz et al., 2025), inadequate participation in cardiac rehabilitation (Uithoven et al., 2020), engagement in unhealthy behaviors such as smoking, alcohol consumption, and substance use (Tessitore et al., 2024), poor

comorbidity management (Gouda et al., 2021), missed follow-up appointments, as well as experiences of stress, anxiety, depression, and poor sleep quality (Yang et al., 2024). These behaviors are not merely individual choices; rather, they reflect deeper issues related to limitations in self-care capacity-defined as the knowledge, decision-making ability, self-regulation, and the capacity to seek help or utilize social support. Self-care capacity plays a crucial role in determining post-discharge health outcomes, as patients with lower self-care capacity are at greater risk for MACE. Therefore, this study aims to investigate the self-care potential of ACS patients across multiple dimensions, including medication adherence, cardiac rehabilitation, self-management, stress/anxiety/depression management, sleep quality, and diet and fluid intake. The findings will serve as a foundation for the development of a self-care capacity enhancement program to prevent MACE, reduce mortality, psychological distress, and healthcare costs, and ultimately improve the quality of life of both patients and their families.

Research objectives

To examine the self-care potential of patients with ACS in the following domains: medication adherence, cardiac rehabilitation, self-management, stress/anxiety/depression management, sleep quality, and diet and fluid intake.

Methodology

Research design

This study was part of a broader research project entitled "The Effectiveness of a Self-care Potential Development Program Using Social Support on Major Adverse Cardiovascular Events (MACE) within 30 Days Post-Hospital Discharge in Nakhon Si Thammarat Province." This portion employed a descriptive research design to assess the self-care potential of patients diagnosed with ACS.

Population and sampling

The target population consisted of patients diagnosed with ACS (ICD-10 codes I20–I259) who were admitted to secondary-level hospitals in Nakhon Si Thammarat Province. The sample size was calculated using the G*Power statistical software, with a moderate test power of 0.80 (Burns & Grove, 2009), a significance level (α) of 0.05, and a medium effect size of 0.60 (Cohen, 1988). A one-tailed t-test was selected for hypothesis testing, resulting in a required sample size of 72 participants. Simple random sampling without replacement was employed to recruit participants from two secondary-level hospitals in Nakhon Si Thammarat Province: Thasala Hospital in Thasala District and Sichon Hospital in Sichon District. Participants were eligible for inclusion if they met the following criteria: 1) diagnosed with ACS based on ICD-10 codes I20-I259 between September and December 2024 and scheduled for hospital discharge; 2) aged 18 years or older; 3) had no speech or hearing impairments; 4) had a primary caregiver; and 5) provided informed consent to participate in the study. The exclusion criterion was the presence of incomplete responses to the questionnaires or assessment forms.

Research instruments and their validity and reliability testing

The research employed three instruments. First, a personal information questionnaire collected demographic data including sex, age, marital status, educational level, religion, household income, income sufficiency, and occupation. Second, a health status assessment tool, developed by the researchers, gathered clinical data such as medical diagnosis, comorbidities, family health history, systolic and diastolic blood pressure (SBP and DBP) body mass index (BMI), medication use, smoking, alcohol consumption, and physical activity (CVI = 0.85). Third, a self-care behavior assessment form, also developed by the researchers, was used to evaluate self-care capacity. This tool included 24 items across six domains: 1) medication adherence, 2) cardiac rehabilitation, 3) self-management, 4) stress/anxiety/depression management, 5) sleep quality, and 6) dietary and fluid intake. This instrument demonstrated strong content validity (CVI = 0.85) and acceptable internal consistency reliability (Cronbach's alpha = 0.78).

Data collection

The researcher undertook the following procedures: 1) formal letters were sent to both hospitals to explain the research objectives, methodology, data collection procedures, and to obtain permission for data collection; 2) coordination was made with the heads of the internal medicine departments at both hospitals to introduce the researcher, clarify the study's purpose, explain the data collection procedures, and seek their cooperation; 3) one research assistant per hospital was prepared and trained using simulated participants with similar characteristics to the target population to ensure consistency and accuracy of data collection; 4) medical record databases were reviewed to identify ACS patients who met the inclusion criteria; 5) eligible participants were approached, and the researcher introduced themselves, established rapport, and invited them to participate in the study. The research purpose and procedures were clearly explained, and participants were given the opportunity to ask questions and make an informed, voluntary decision. Those who agreed to participate signed an informed consent form. 6) Data collection was conducted using structured questionnaires, taking approximately 15 - 20 min per participant.

Ethical consideration

This study received ethical approval from the Ethics Review Committee of Walailak University (WUEC-24/284/01). Prior to obtaining written informed consent, eligible participants were fully informed about the study's objectives, methodology, potential risks and benefits, confidentiality safeguards, and their right to withdraw at any time without penalty. All collected data were securely stored in a locked cabinet and treated with strict confidentiality. The data will be retained for three years, after which they will be permanently destroyed. Study results will be reported anonymously and used solely for academic and healthcare purposes.

Data analysis

Descriptive statistics, including frequency, percentage, mean, and standard deviation, were employed to analyze the participants' personal characteristics, health status, and self-care potential.

Results and discussion

General characteristics of the participants

The participants had a mean age of 66.65 years (SD = 14.78), with two-thirds classified as older adults (66.67 %). The majority were male (72.22 %) and more than half were married (59.72 %). Two-thirds had completed primary education (66.67 %). The average monthly household income was 7,441.67 THB (SD = 4,760.45), and most participants reported that their income was sufficient to meet their needs (79.16 %). Regarding occupation, 36.11 % were unemployed, followed by 26.39 % who worked as general laborers and 23.61 % who were farmers, as shown in **Table 1**.

Table 1 Frequency and percentage of participants by age, sex, marital status, educational level, religion, household income, income sufficiency, and occupation.

General information	Total (n = 72)	
	Frequency	Percentage
Age	($\overline{X}$ = 66.65, SD = 14.78, Min - Max = 29 - 92)	
Age group		
18 - 40 year (Early adulthood)	3	4.17
41 - 59 year (Late adulthood)	21	29.16
Age ≥ 60 (Elderly)	48	66.67
Sex		
Male	52	72.22
Female	20	27.78
Status		
Marital	43	59.72
Single	7	9.73
Widowed/Divorced/Separated	22	33.55
Education		
No Formal Education	3	4.17
Primary Education	48	66.67
Secondary Education	18	24.99
Diploma Education	3	4.17
Religion		
Buddhism	57	79.16
Islam	15	20.84

General information	Total (n = 72)	
	Frequency	Percentage
Household income	($\bar{X}$ = 7,441.67, S.D. = 4,760.45, Min - Max = 0 - 20,000)	
Income Sufficiency		
Sufficiency	57	79.16
Insufficiency	15	20.84
Occupation		
No occupation	26	36.11
Laborer	19	26.39
Vendor/Business owner	10	13.89
Farmer	17	23.61

Health status of the participants

The majority of participants were diagnosed with Non-ST-Elevation Myocardial Infarction (NSTEMI) (83.33 %), followed by ST-Elevation Myocardial Infarction (STEMI) (6.95 %) and Unstable Angina (9.72 %). A total of 84.72 % had at least one comorbidity. The most common comorbidity was hypertension (72.13 %), followed by cardiovascular disease and dyslipidemia, both reported at 55.74 %. The average SBP was 136.75 mmHg (SD = 19.50), and the average DBP was 78.00 mmHg (SD = 11.63). The mean BMI was 24.02 kg/m² (SD = 5.13), with most participants classified as having a normal BMI (47.23 %), followed by overweight or obese (45.83 %). Regarding medication adherence, more than half of the participants (55.55 %) reported taking their medications regularly, while 27.78 % sometimes forgot, and 12.50 % often forgot to take their medications. These findings are presented in **Table 2**.

Table 2 Frequency and percentage of participants by diagnosis, comorbidities, family history of illness, SBP, DBP, BMI, and Medication Adherence Behavior

Health information	Totals (n=72)	
	Frequency	Percentage
Diagnosis		
STEMI	5	6.95
NSTEMI	60	83.33
Unstable Angina	7	9.72
Comorbidities		
No	11	15.28

Health information	Totals (n=72)	
	Frequency	Percentage
Yes (n = 61, select more than 1)	61	84.72
Hypertension	44	72.13
Cardiovascular disease	34	55.74
Dyslipidemia	34	55.74
Diabetes mellitus	31	50.82
Chronic kidney disease	7	11.48
Other	26	42.62
Family history		
No	53	73.61
Yes	19	26.39
SBP	($\bar{X}$ = 136.75, SD = 19.50, Min-Max = 94.171)	
DBP	($\bar{X}$ = 78.00, SD = 11.63, Min-Max = 45 - 99)	
BMI (kg/m^2)	($\bar{X}$ = 24.02, SD = 5.13, Min-Max = 14.98 - 43.27)	
BMI group (kg/m^2)		
Above standard (< 1 8.5 kg/m^2)	5	6.94
Standard (18.5 - 24.99 kg/m^2)	34	47.23
Obesity (≥ 25 kg/m^2)	33	45.83
Medication adherence behavior		
regular	40	55.55
Sometimes forget	20	27.78
Often forget	9	12.50
Often adjust my medication	3	4.17

Self-care potential of the participants

Overall, 58.33 % of participants demonstrated a good to very good level of self-care capacity, followed by 38.89 % at a moderate level. Domain-specific analysis revealed the following: in the medication adherence domain, 61.11 % were at a good to very good level, followed by 31.95 % at a moderate level. In cardiac rehabilitation, 54.16 % were rated as moderate, 23.62 % as good to very good, and 22.22 % as low to fair. In the self-management domain, 66.67 % achieved a good to very good level, with 22.22 % at a moderate level. For stress, anxiety, and depression management, 84.72 % of participants were in the good to very good category, followed by 9.72 % at a moderate level. In terms of sleep quality, 77.77 % were rated good to very good, and 16.67 % moderate. Finally, in the diet and fluid intake domain, 37.49 % were at a low to fair level, 31.95 % at a good to very good level, and 30.56 % at a moderate level. These results are presented in **Table 3**.

Table 3 Frequency and percentage of self-care potential by domain and overall

Self-care Potential	Totals (n = 72)	
	Frequency	Percentage
Medication adherence		
Low/Fair	5	6.94
Moderate	23	31.95
Good/Very good	44	61.11
Cardiac rehabilitation		
Low/Fair	16	22.22
Moderate	39	54.16
Good/Very good	17	23.62
Self-management		
Low/Fair	8	11.11
Moderate	16	22.22
Good/Very good	48	66.67
Stress Anxiety and Depression management		
Low/Fair	4	5.56
Moderate	7	9.72
Good/Very good	61	84.72
Sleep quality		
Low/Fair	4	5.56
Moderate	12	16.67
Good/Very good	56	77.77
Diet and fluid intake		
Low/Fair	27	37.49
Moderate	22	30.56
Good/Very good	23	31.95
Over all		
Low/Fair	2	2.78
Moderate	28	38.89
Good/Very good	42	58.33

Discussion

The results indicated that most patients with ACS demonstrated a good to very good level of self-care capacity (58.33 %), reflecting adequate knowledge and the ability to follow health recommendations in several domains-particularly medication adherence, self-management, stress, anxiety, and depression management, and sleep quality. However, the cardiac rehabilitation domain was primarily rated at a moderate level (54.16 %) and low level (22.22 %), while behaviors related

to diet and fluid intake were most commonly rated at a low level (37.49 %) and moderate level (30.56 %). These findings suggest potential influences from health system limitations, individual-level factors, and social determinants, which warrant further investigation.

Medication adherence behaviors

The study revealed that most participants consistently adhered to their prescribed medication regimens. This may be attributed to the use of user-friendly educational materials, such as self-care manuals and instructional videos, which were specifically designed to be easy to understand and implement. This finding aligns with Hafiz et al. (2025), who demonstrated that consistent medication adherence significantly reduces the risk of MACE ($p < 0.01$).

Cardiac rehabilitation behaviors

The findings of this study revealed that most participants had a moderate and low level of engagement in cardiac rehabilitation activities. This issue may be attributed to insufficient knowledge and the lack of a structured cardiac rehabilitation system within the community. Additionally, the majority of participants were older adults with multiple comorbidities, many of whom expressed concerns about symptom recurrence or potential complications from vigorous physical activity. These barriers highlight not only a significant deficiency in health education and system-level support but also the inherent challenges of promoting behavioral change among elderly patients. Consequently, there is a critical need to design cardiac rehabilitation programs that are accessible, safe, and tailored to individual needs. Such programs should aim to reduce fear, build confidence in participation, and ultimately help prevent MACE while enhancing long-term quality of life. (Uithoven et al., 2020)

Self-management behaviors

The study indicated that participants generally demonstrated proficient self-management practices, particularly in symptom monitoring and attending follow-up appointments. This positive outcome may be attributed to the provision of clear and comprehensive information, along with timely and equitable access to healthcare services. Conversely, over two-thirds of participants exhibited low to moderate performance in overall self-management. Contributing factors may include transportation barriers, the absence of a primary caregiver, or limited access to digital health tools such as LINE OpenChat. (Hydzik et al., 2021)

Stress anxiety and depression management behaviors

The study found that most participants demonstrated effective stress management and emotional regulation. This positive result may be linked to strong social support systems, particularly emotional encouragement provided by healthcare professionals and family members, which likely played a key role in reducing anxiety and feelings of isolation. These findings are consistent with the work of Kanthamat (2022), who reported that social support delivered through home visits significantly benefits both patients and caregivers. Such support was shown to reduce caregiver burden, improve

patients' quality of life, facilitate self-management at home, and enhance emotional well-being by minimizing loneliness and fostering a greater sense of overall satisfaction.

Sleep quality behaviors

Although most participants demonstrated positive sleep-related behaviors, approximately one-fifth still reported poor sleep quality. This finding suggests that achieving consistent and restorative sleep may require emotional adjustment, time for behavioral adaptation, and the use of effective self-regulation strategies. These results align with the study by Chaput et al. (2024), which reported that individuals with irregular sleep patterns had a 26 % higher risk of experiencing MACE compared to those with consistent sleep schedules—even when total sleep duration met the recommended 7 - 9 hours per night.

Diet and fluid intake behaviors

This study found that nearly half of the participants exhibited moderate to low levels of appropriate dietary and fluid intake behaviors. Several contributing factors were identified, including inadequate or incomplete nutritional counseling during hospital discharge preparation, the absence of a primary caregiver to assist with meal planning, and external barriers, such as economic hardship, which limited access to healthy food choices (Han et al., 2024). These challenges reflect significant structural and socioeconomic constraints that compromise patients' ability to manage their nutrition effectively. Therefore, it is essential to provide continuous and comprehensive dietary counseling, tailored to the financial realities of patients, along with active involvement from family members or caregivers. Such support is vital for promoting healthy dietary behaviors and reducing the risk of MACE associated with poor nutrition.

Although the overall self-care potential scores were largely rated as good to very good, a closer examination of individual domains revealed significant variability across different aspects of self-care. These findings highlight the critical need for implementing comprehensive and multidimensional interventions aimed at enhancing self-care capacity in patients with ACS after hospital discharge. In particular, targeted improvements in cardiac rehabilitation and dietary and fluid intake behaviors are essential to effectively mitigate the risk of MACE.

Conclusions

The study titled "The Self-Care Potential of Patients with ACS in Nakhon Si Thammarat Province" aimed to examine the self-care potential of patients with ACS. The sample consisted of 72 ACS patients admitted to secondary-level hospitals in Nakhon Si Thammarat Province, diagnosed under ICD-10 codes I20-I259. The findings revealed that the majority of participants demonstrated an overall self-care capacity at a good to very good level (58.33 %), followed by a moderate level (38.89 %). Domain-specific results showed that participants had the highest self-care capacity in medication adherence (61.1 %), self-management (66.67 %), stress, anxiety, and depression management (84.72 %), and sleep quality (77.77 %), all at the good to very good level. In contrast, cardiac rehabilitation was most frequently rated at the moderate level (54.16 %), with 22.22 % at a low to fair level. For diet and fluid intake, 37.49 % were rated at a low to fair level, followed by 30.56 % at a moderate level. These findings suggest that relevant stakeholders should focus on enhancing

cardiac rehabilitation and diet and fluid intake management to help prevent MACE in patients with ACS.

Acknowledgements

We express our appreciation to the School of Nursing at Walailak University. We extend our heartfelt gratitude to all participants for their significant contributions and willingness to offer vital insights, which substantially enhanced the research process.

References

Burns, N., & Grove, S. K. (2009). *The practice of nursing research: Appraisal, synthesis and generation of evidence* (6th ed.). Philadelphia: Saunders Elsevier.

Chaichana, N., Siripitayakunkit, A., & Duangbubpha, S. (2024). Effectiveness of the self-care support program for people with acute coronary syndrome: A quasi-experimental study. *Pacific Rim International Journal of Nursing Research, 28*(4), 855-871.

Chaput, J. P., Biswas, R. K., Ahmadi, M., Cistulli, P. A., Rajaratnam, S. M. W., Bian, W., St-Onge, M. P., & Stamatakis, E. (2024). Sleep regularity and major adverse cardiovascular events: A device-based prospective study in 72,269 UK adults. *Journal of Epidemiology & Community Health, 79*(4), 257-264.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Department of Medical Services, National Institute of Thoracic Diseases. (2022). *THAI ACS Registry 65 update 101065-2*. Nonthaburi, Thailand: Department of Medical Services, Ministry of Public Health.

Gouda, P., Savu, A., Bainey, K. R., Kaul, P., & Welsh, R. C. (2021). Long-term risk of death and recurrent cardiovascular events following acute coronary syndromes. *PLoS ONE, 16*(7), e0254008.

Hafiz, A., Aljohani, S., Kutbi, H., Fatani, N., Alkhathran, L., Alyaqub, M., Alhamed, M. S., Alhaqbani, A. O., Alhadlaq, A. A., Alsalman, M. A., Yami, M. S. A., & Almohammed, O. A. (2025). Statin use and major adverse cardiovascular events among patients with ischemic heart diseases: A multi-center retrospective study. *Journal of Clinical Medicine, 14*(3), 908.

Han, C. Y., Middleton, G., Doh, J., Yaxley, A., Sharma, Y., Baldwin, C., & Miller, M. (2024). Barriers and enablers to a hospital-to-home, combined exercise and nutrition, self-managed program for pre-frail and frail hospitalized older adults. *Healthcare (Basel), 12*(6), 678.

Hydzik, P., Kolarczyk, E., Kustrzycki, W., Kubielas, G., Kałużna-Oleksy, M., Szczepanowski, R., & Uchmanowicz, B. (2021). Readiness for discharge from hospital after myocardial infarction: A cross-sectional study. *International Journal of Environmental Research and Public Health, 18*(13), 6937.

Kanthamat, B. (2022). *The effect of a social support program on caregiver burnout among bedridden patient caregivers* (Master's thesis). Thailand: Thammasat University.

Keivanlou, N., Babaieasl, F., Jamali, J., Baghyari, S., Dalir, Z., & Davoudi, N. (2025). The effect of education using the interactive avatar application on self-care and the ability to identify and

respond to the symptoms of heart attack in patients with acute coronary syndrome: A randomized clinical trial. *BMC Health Services Research, 25*, 572.

Okkonen, M., Havulinna, A. S., Ukkola, O., Huikuri, H., Pietilä, A., Koukkunen, H., Lehto, S., Mustonen, J., Ketonen, M., Airaksinen, J., Kesäniemi, Y. A., & Salomaa, V. (2021). Risk factors for major adverse cardiac events after the first acute coronary syndrome. *Annals of Medicine*, *53*(1), 817-823.

Tessitore, E., Branca, M., Heg, D., Nanchen, D., Auer, R., Räber, L., Klingenberg, R., Windecker, S., Lüscher, T. F., Carballo, S., Matter, C. M., Gmel, G., Mukamal, K. J., Rodondi, N., Carballo, D., Mach, F., & Gencer, B. (2024). Drinking patterns of alcohol and risk of major adverse cardiovascular events after an acute coronary syndrome. *European Journal of Preventive Cardiology, 31*(7), 845-855.

Thasala Hospital Medical Records Database. (2023). *Report on patients with acute myocardial infarction in fiscal year 2023*. Nakhon Si Thammarat, Thailand: Thasala Hospital, Ministry of Public Health.

Tosati, S. (2024). *Nursing care for patients with acute myocardial infarction and shock*. Trad, Thailand: Trad Hospital Press.

Tran, P., Barroso, C., & Tran, L. (2023). A cross-sectional examination of post-myocardial infarction physical activity levels among US rural and urban residents: Findings from the 2017 - 2019 behavioral risk factor surveillance system. *PLoS ONE, 18*(10), e0293343.

Uithoven, K. E., Heisler, G. B., & Coe, G. (2020). The role of cardiac rehabilitation in reducing major adverse cardiac events in heart transplant patients. *Journal of Cardiac Failure, 26*(4), 321-328.

World Health Organization. (2023). *Cardiovascular diseases (CVDs) fact sheet*. Retrieved from https://www.who.int

Yang, J., Wang, K., Wang, W., Niu, J., Liu, X., Shen, H., Sun, Y., Ge, H., & Han, H. (2024). The effect of sleep quality on coronary lesion severity and prognosis in the young acute coronary syndrome population. *Journal of Cardiovascular Development and Disease, 11*(2), 68.