FACTORS INFLUENCING SELF-MANAGEMENT BEHAVIORS AMONG ADULTS WITH CORONARY HEART DISEASE AFTER PERCUTANEOUS CORONARY INTERVENTION

WENQIN LIU

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR MASTER DEGREE OF NURSING SCIENCE
(INTERNATIONAL PROGRAM)
IN ADULT NURSING PATHWAY
FACULTY OF NURSING
BURAPHA UNIVERSITY
2023

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรพยาบาลศาสตรมหาบัณฑิต (หลักสูตรนานาชาติ)

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ลิขสิทธิ์เป็นของมหาวิทยาลัยบูรพา

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Coronary heart disease (CHD) is one of the main causes of death and disability in China. The objective of this study was to investigate self-management behaviors and its influencing factors after PCI in adults with coronary heart disease. The four factors include self-efficacy, health literacy, self-perceived burden, and social support. The sample included 149 adult patients with coronary heart disease at 1 to 3 months after PCI who were followed up in the Outpatient Department of the Second Affiliated Hospital of Wenzhou Medical University. The sample was recruited using simple random sampling technique. Data collection was conducted from September to December 2022. Data collection tools included :1) Personal information of adults with coronary heart disease after PCI 2) general self-efficacy questionnaire 3) health literacy questionnaire 4) self-perceived burden questionnaire 5) perceived social support questionnaire 6) self-management behaviors questionnaire. The reliability of Cronbach's Alpha coefficients for questionnaires 2-6 were 0.921, 0.918, 0.926, 0.880 and 0.906, respectively.

The results showed that the average self-management behaviors of adults with coronary heart disease after PCI was 3.07 (SD = 0.41), which belonged to the lower medium level. Together, these four factors explain 47.3% of the variance in self-management behavior. ($R2 = 0.473$, $F(4, 144) = 32.26$, $p < .001$). The best predictor was self-efficacy ($\beta = .671$, $p < .001$), followed by social support ($\beta = .358$, $p < .001$), followed by health literacy ($\beta = .228$, $p < .05$). While self-perceived

burden (β = -.243, $p > .05$) had no statistical significant influence on self-management behaviors.

The results of this study provide preliminary information on self-management behaviors and its predictive factors in adults with coronary heart disease after PCI. Important influencing factors, including self-efficacy, health literacy and social support, should be taken into account when developing nursing intervention to improve patients'self-management behaviours.

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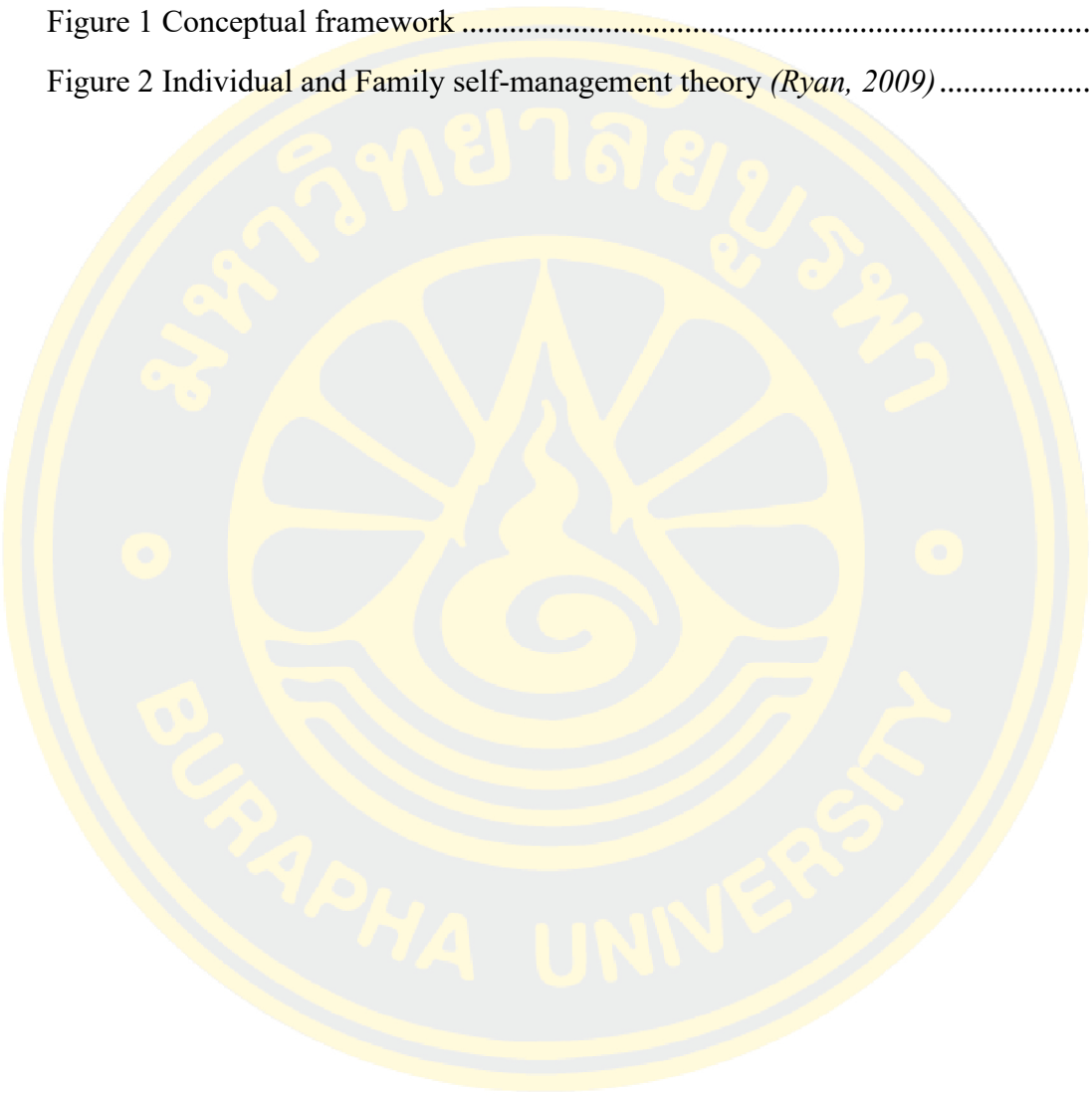

CHAPTER 1
INTRODUCTION

Background and significance

Coronary atherosclerotic heart disease (CAD) refers to the functional changes of the coronary arteries, including spasm and vascular obstruction caused by coronary atherosclerosis, which can lead to myocardial ischemia and even death due to coronary heart disease (CHD) in a short period of time (Shi et al., 2023). According to the Global Burden of Disease Study, approximately 170 million individuals worldwide were affected by coronary heart disease in 2017, with it being the primary cause of cardiovascular mortality globally (GBD et al., 2018). The 2020 China Cardiovascular Health and Disease Report reveals that the prevalence of cardiovascular disease in China has surged to 330 million, with 11.39 million cases of coronary heart disease (CHD), and this trend is expected to continue over the next decade, accompanied by a rise in morbidity and mortality rates (Wen et al., 2022). The World Health Organization (WHO) highlights that coronary artery disease has emerged as the leading cause of global mortality. According to statistics, deaths from coronary heart disease have surged from 5.7 million to 9.14 million worldwide between 1990 and 2019, with China experiencing the highest number of fatalities. Furthermore, the death rate has escalated at a pace faster than over 95% of other countries (Wang et al., 2021). Restricted by economic and medical factors, developing countries have a higher incidence of patients compared to developed countries, ranking first among the leading causes of mortality (Virani et al., 2020).

The primary causes of death from coronary heart disease involve the rupture of atherosclerotic plaque, leading to thrombosis formation and complete occlusion of blood flow in the vessels, resulting in myocardial infarction and even sudden death within minutes (Li et al., 2015). Percutaneous coronary intervention (PCI) is a minimally invasive procedure that utilizes angiographic catheters, guide wires, balloons and stents to treat stenosis or occlusion of the coronary artery (Ge et al., 2021). Today, Percutaneous Coronary Intervention (PCI) has become a widely utilized clinical procedure in our country (Liu et al., 2020). PCI surgery exhibits characteristics of minimal invasiveness, relatively low cost, and ideal short-term

efficacy. However, it does not eliminate the risk factors associated with coronary heart disease nor alter its biological course (Liu et al., 2023) . In patients with coronary heart disease, this procedure cannot be solely relied upon to comprehensively enhance their health status or effectively improve their quality of life (Zhang et al., 2022). Following hospital discharge, patients may develop a complication known as restenosis, which refers to the narrowing of coronary arteries after interventional surgery and typically occurs within 3-6 months post-surgery (Yin & Zhang, 2022). Although the incidence of restenosis after PCI has decreased to a range of 5.79%-17.50%, the mortality rate remains high at 33.8% after 10 years due to stent thrombosis (Zeng et al., 2021). This is because the pathogenesis of coronary heart disease involves not only vascular remodeling and inflammatory response with cytokine release, but also postoperative changes in blood lipid levels, systolic blood pressure, body mass index, and smoking habits (Yue et al., 2023). Therefore, it is advisable to manage CHD risk factors in order to regulate the disease and mitigate symptom recurrence (Ahn et al., 2016). The guidelines for secondary prevention after PCI emphasize the importance of modifying unhealthy lifestyle factors, such as diet, exercise, and emotional well-being, in order to maintain patency of coronary arteries among postoperative patients (Gao, 2018).

The World Health Organization (2003) proposed that self-management is the most effective strategy for enhancing health outcomes among patients with chronic diseases (Lorig & Holman, 2003). According to research by the American Heart Association (AHA) and the Chinese report on cardiovascular disease, coronary heart disease is closely associated with modifiable risk factors such as smoking, alcohol consumption, dyslipidemia, physical inactivity, and unhealthy dietary habits (Hu et al., 2019; Huynh-Hohnbaum et al., 2015). By actively controlling risk factors, the rupture of coronary atherosclerotic plaque can be reduced or avoided, thereby preventing coronary artery accidents that may lead to acute myocardial infarction or even sudden death. The practice of self-management behavior in healthcare is a crucial component in improving patients' unhealthy lifestyles, with the potential to reduce the risk of coronary heart disease by 43% and serious coronary events by 58%. As such, it represents a key factor in enhancing patient health outcomes (Lv, 2017).

The European Society of Cardiology has released a report on the lifestyle, risk factors, and treatment management of patients with coronary heart disease across 24 countries. The findings indicate that 16.0% of patients were smokers, while 59.9% did not engage in regular physical exercise or engaged in it minimally, and 37.6% were classified as obese (Kotseva, Wood, Bacquer, Backer, ́n, Jennings, Gyberg, Amouye, et al., 2016). In response to the "Healthy China Action", there has been an increasing focus on the self-management behavior of patients with coronary heart disease in China. A study conducted in 20 hospitals of varying grades in Dalian City analyzed the self-management behavior of 618 patients with coronary heart disease, revealing that their overall level of self-management was moderate to low levels (Wang, 2022), and the same result also appeared in Tianjin, Xinjiang, Chongqing and other places (Jia, 2020; Ren et al., 2009a; Wang, 2011). Additionally, similar findings have been observed in studies targeting patients with coronary heart disease across various age groups and stages of the disease (Wang, 2020), indicating a less than optimistic situation regarding self-management behavior among Chinese patients with this condition. Therefore, understanding and improving self-management behavior is crucial for the prognosis of coronary heart disease as well as reducing recurrence and re-hospitalization rates (Zhao et al., 2019). This necessitates assisting patients in establishing effective self-management behaviors to mitigate the incidence of complications, such as cardiovascular events (Han et al., 2017).

As society progresses and develops, the pace of people's work and life accelerates, leading to an increase in unhealthy lifestyles and poor behaviors. These factors, including excessive work pressure, reduced physical activity, poor dietary habits, irregular sleep patterns, etc., are significant risk factors for coronary heart disease. Consequently, the number of individuals with abnormal blood pressure levels, blood lipids levels and blood glucose levels continues to rise (Yang et al., 2015). Improved self-management skills can assist patients in controlling disease risk factors and promoting overall health. Effective self-management abilities may also alleviate the burden of coronary heart disease and enhance quality of life (Bjorck et al., 2018; Marzolini et al., 2015). National survey and research on the self-management behaviors of patients with coronary heart disease indicate that currently, overall, patients with coronary artery disease exhibit a low capacity for self-

management (Ma et al., 2020). China Cardiovascular Health and Disease Report (2019) emphasized that patients under the age of 50 with coronary artery disease exhibited poor symptom recognition during crises, as only 31.7% selected emergency transportation to the hospital when experiencing a heart attack. Additionally, in patients under the age of 55 with acute myocardial infarction, recent excessive adverse lifestyle habits accounted for 20.8% of cases while heavy drinking contributed to 14.6% (Wang & Hu, 2020). Therefore, the level of self-management behaviors exhibited by patients following PCI remains suboptimal.

Self-management refers to an individual's capacity to recognize the effects of disease treatment on their physiology, psychology, and other aspects of their well-being, and subsequently modify their lifestyle in order to cope with the illness. This ability is demonstrated through the implementation of self-management behaviors. Therefore, self-management behavior can be regarded as a result measurement index of self-management (Lei & Zeng, 2023). Improved self-management can effectively facilitate patients in modifying their unhealthy lifestyles, thereby cultivating healthy behaviors (Aya et al., 2020; Ke et al., 2021). The concept of self-management was initially proposed by Professor Creer in the context of clinical illness management. He believed that self-management is a set of behaviors aimed at promoting health, preventing complications, and controlling risk factors. Subsequently, this concept has been extensively applied in health education and the management of various chronic diseases (Wardle & Jane, 1988). Self-management behavior refers to the actions taken by individuals during illness that promote disease rehabilitation, reduce complications, and alleviate negative physiological and psychological effects. It serves as a measurement index for self-management (Ryan & Sawin, 2009) ,it is a cost-effective, highly efficient, and operationally robust disease rehabilitation management model (Sun, 2018). According to definition of Lorig and Holman (2003), self-management behaviors refer to patients' management of lifestyle, physiology, psychology and other aspects in order to achieve the goal of maintaining and promoting health. This is done so as to mitigate the adverse effects of disease on their physical function, self-care ability, emotional state and social function (Lorig & Holman, 2003). Self-management behaviors can enhance patients' self-management

potential, facilitate the development of healthy living habits, and effectively manage their diseases, daily life, and emotional regulation (Yang & Gu, 2020).

The present study endeavors to explore the determinants of self-management behaviors among adult patients with coronary heart disease, drawing on a comprehensive review of pertinent literature. Prior research has identified several crucial factors that influence both self-management and self-efficacy, including age, gender, body mass index (BMI), marital status, educational attainment, occupation type, medical payment mode, residential setting, family per capita monthly income level as well as social support and other related variables (Huang et al., 2022; Wu, 2019a) . Self-efficacy and social support have been identified as the primary influential factors in self-management practices (Yi et al., 2022). However, given the advancements and enhancements in medical systems for chronic diseases and cardiac rehabilitation, as well as other influential factors such as humanistic and economic considerations, it is imperative to consider the correlation between patients' health literacy levels and their self-perceived burden following PCI. Factors influencing self-management behaviors in adult patients with coronary heart disease include sociodemographic and disease-related data, as well as social psychology; however, the results exhibit inconsistent findings. Currently, there is a lack of comprehensive and systematic research on the determinants of self-management behaviors in patients with coronary heart disease, which hinders the provision of nuanced guidance for clinical practice. Therefore, it is crucial to conduct a comprehensive and systematic investigation into the factors that influence self-management behavior in patients with coronary heart disease, guided by relevant theoretical frameworks.

The Individual and Family Self-Management Theory (IFSMT) is currently one of the theories utilized in the realm of self-management, having been developed by Ryan et al (2013) as a component of the Integrated Theory of Health Behavior Change. This theory comprises three dimensions: the contextual dimension, the procedural dimension, and the outcome dimension (Ryan & Sawin, 2009). Respectively delineating the risk and protective factors, process elements, outcome indicators, and individual or family-centered intervention measures targeting context or process dimensions of self-management" could be polished as follows. Based on this theory, researchers can identify the risk and protective factors of patients' self-

management and design tailored self-management programs. Health literacy and self-perceived burden are crucial contextual dimensions that influence self-management behaviors, whereas self-efficacy and social support are essential process dimensions that impact such behaviors. Context factors encompassed demographic variables such as age, gender, marital status, education level, personal income, medical insurance coverage and other general personal data. Additionally, risk behaviors including smoking and alcohol consumption as well as family history of coronary heart disease were considered. Furthermore, self-perceived burden both individual and family burden caused by complex circumstances such as the persistence of coronary heart disease symptoms after PCI were also taken into account. Health literacy was found to be associated with diseases. Process factors encompass personal and familial management of coronary heart disease post-PCI, belief in self-efficacy, recognition, and social facilitation through social support. The proximal outcome factor pertains to the self-management behavior exhibited by patients with coronary heart disease following PCI. IFSMT emphasizes that contextual factors play a crucial role in shaping the engagement of individuals and families in self-management, which ultimately impacts both short- and long-term outcomes. Furthermore, the process of self-management itself also exerts an influence on these outcomes.

Based on previous research findings, it can be inferred that health literacy plays a crucial role in determining self-management behaviors among patients diagnosed with coronary heart disease (CHD) (OR=24.404，95%CI:6.122~97.279) (Wang et al., 2022). Health literacy encompasses an individual's comprehension and application of health-related knowledge and behaviors, serving as a gauge for personal accountability in maintaining one's own well-being ($r=.36$, $p<.01$) (Li, 2019). According to the Healthy China Action (2019-2030), enhancing national health literacy represents a fundamental, cost-effective and impactful strategy for improving public health outcomes (Xinhua News Agency, 2019). Health literacy is a fundamental concern in global health promotion and has been adopted as a national strategy by the European Union, the United States, and other nations.

Studies indicate that patients with chronic illnesses exhibit a negative correlation between their health and self-management abilities, with the severity of sensory burden being directly proportional to poorer self-management performance

(Du et al., 2020; Qiu et al., 2019). A survey of 467 patients with chronic diseases was conducted, revealing a significant correlation between patients' self-perceived burden and their ability to manage their own health (r=-.416, p<.01) (Du, 2015). Specifically, those with low perceived burden demonstrated higher levels of health self-management. After undergoing PCI, patients are required to adhere to long-term or even lifelong medication regimens, participate in rehabilitation and exercise programs, and make significant changes to their daily habits. These adjustments can result in varying degrees of self-perceived burden (SPB) (Li et al., 2017; Tang et al., 2019). Zhang et al. (2017) conducted their study with 220 hypertension patients residing in Hengyang City, its results showed that the less self-perceived burden, the better self-management behaviors. The self-perceived burden did not only affect patients 'decision-making', 'decisions and treatment', but also causes patients' loss of dignity and cause them to have depression, leading to serious consequences such as decreased quality of life and even suicide (Peterson et al., 2014). Therefore, self-perceived burden would be one of the predictors that could predict self-management behaviors and will be examined in this study.

Apart from health literacy and self-perceived burden, self-efficacy is also another significant factor contributed to self-management behaviors among CHD patients(β =-.253， p＜.001) (Liu et al., 2019a; Yang et al., 2022). Self-efficacy is widely cited in the literature on health behaviors as a predictor of multiple health behaviors and showed positive effects on health behaviors. The level of self-efficacy is a strong predictor of self-management behavior (Ding et al., 2021; Joekes et al., 2007). The self-management level of CHD inpatients is positively correlated with their self-efficacy level. The higher the self-efficacy level, the better the self-management behaviors（r=.738,p＜.001) (Zhang & Fu, 2020).

Apart from self-management behaviors' influencing factors mentioned thus far, in the field of healthcare, social support not only predicts clinical outcomes in chronic diseases but also functions as a health promotion factor alongside self-management. Social support is positively associated with self-management behaviors and serves as a predictor of such behavior (r=.723,p＜.05) (Wang et al., 2020). Perceived social support refers to individuals' subjective perception and experience of

external support within society. It encompasses personal expectations and assessments of the availability of social support, as well as beliefs in its potential efficacy. Positive perceptions of social support can serve as a buffer against negative psychological outcomes, promoting emotional stability and well-being (Tian et al., 2018), in contrast to the actual social support, perceived social support reflects a more positive effect on patients.

Patients with coronary heart disease who have undergone percutaneous coronary intervention require long-term self-management following revascularization (Chen, 2018), while many patients may underestimate the severity of their illness due to short hospital stays and quick recovery times, this can negatively impact their ability to engage in effective self-management behaviors (Lafave et al., 2019; Lippold et al., 2017; Nguyen-Feng et al., 2019). Attention should also be given to the self-management of patients after PCI surgery, correcting any negative behaviors and implementing effective measures to encourage early and proper self-management. Patients should actively participate in care management and maintain their self-management practices (Lafave et al., 2019). Based on the literature reviews, several factors have been found to be associated with self-management behaviors among patients with CHD after undergoing PCI (Li & Qiu, 2020; Shi, 2020). In this study, social support, self-efficacy, health literacy, and self-perceived burden were selected as predictors of self-management behaviors and investigated as factors. Therefore, the focus of this present study is on how to enhance CHD patients' attention to self-management and improve their level of self-management in order to enhance their quality of life. The information obtained from this study would be beneficial for nursing practices.

Research objectives

The study aimed to

1. Describe the self-management behavior of adults with coronary heart disease after percutaneous coronary intervention

2. Examine predicting factors of self-management behaviors including health literacy, self-perceived burden self-efficacy, social support, and self-management

behaviors of adults with coronary heart disease after percutaneous coronary intervention.

Research hypotheses

Health literacy, self-perceived burden, self-efficacy, and social support can predict self-management behaviors of adults with coronary heart disease after percutaneous coronary intervention.

Scope of the study

The study was conducted in the outpatient unit at the Department of Cardiology at the Second Affiliated Hospital of Wenzhou Medical University, with a sample of 149 adult patients diagnosed with coronary heart disease who were followed up for a period which ranged from one to three months after undergoing percutaneous coronary intervention (PCI). Data collection conducted from September 10th to December 31st 2022.

Gap of knowledge

There are few studies on self-management behaviors among patients with coronary heart disease treated after PCI in Wenzhou China; There are no reports such on the relationship between health literacy, self-efficacy, self-perceived burden, social support, and self-management behaviors; Additionally, this study would fill the gap in identifying factors that have impact on self-management behaviors in adult patients with coronary heart disease and have undergone percutaneous coronary intervention (PCI) in Chinese context, and to establish a basis for development of clinical nursing interventions.

Conceptual framework

The conceptual framework of this study is grounded in the Individual and Family Self-Management Theory (IFSMT) proposed by Ryan (2009) and supported by relevant literature reviews. According to Ryan, self-management is a multifaceted and dynamic phenomenon that encompasses three interrelated dimensions: contextual factors, processes, and outcomes. This theory delineated the risk and protective

factors, constituent elements of self-management process, outcome indicators of self-management, as well as interventions that are centered on individuals and families. It can assist clinical self-management practitioners in identifying protective and risk factors, as well as developing a comprehensive self-management plan. The objective of promoting self-management behaviors is to facilitate patient health behavior modification, curtail healthcare expenses, and enhance patients' quality of life. Self-management behaviors are intricate phenomena with inherent dynamics (Ryan & Sawin, 2009). Based on the Individual and Family Self-Management Theory model and literature reviews, health literacy, self-perceived burden, self-efficacy, and social support are predictive factors for self-management behaviors in patients with coronary heart disease after percutaneous coronary intervention. Self-management behaviors are utilized for the management of chronic conditions and to engage in health promotion activities. Health literacy and self-perceived burden are contextual dimensions that influence self-management behavior, while self-efficacy and social support are process dimensions that impact it. The conceptual framework of this study is depicted in Figure 1

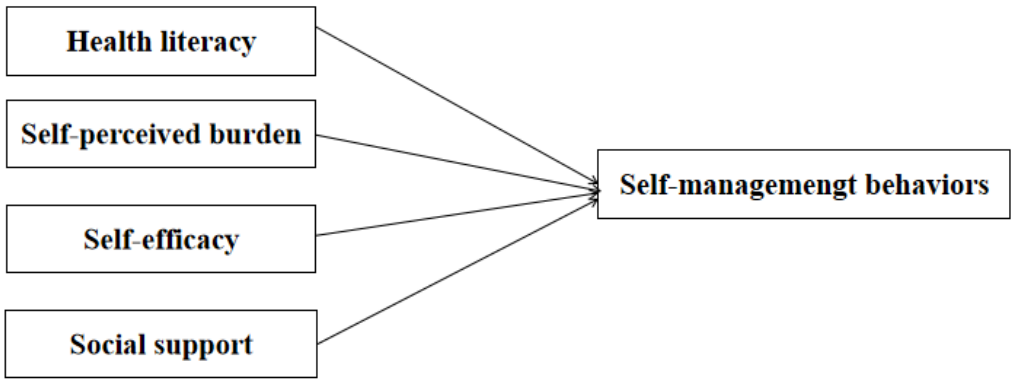

Figure 1 Conceptual framework

Definitions of terms

The definitions of variables in this study were as follows:

Self-management behaviors refer to any post-PCI activities undertaken by adult CHD patients for the purpose of maintaining and promoting their health, including management of diet, treatment, symptoms, and daily activities. The Coronary Heart Disease Self-Management Behavior Scale, developed by Lorig (2003) and translated by Wang et al. (2011), was utilized to assess the self-management behaviors of adult patients with CHD after PCI in this study.

Health literacy refers to the ability of adults with CHD after PCI to obtain, comprehend, and utilize health information and services in order to make informed decisions that promote their own health. The concept encompasses four dimensions: the capacity to acquire information, proficiency in communication and interaction, a disposition to enhance one's health, and a readiness to provide economic support. This study employed the health literacy scale for patients with chronic diseases developed by Jordan et al. (2013) and translated into Chinese version by Sun (2012) .

Self-perceived burden refers to the perception of burden experienced by adult patients with CHD after undergoing PCI, which arises from disease management and dependence on caregivers. The scale comprises three components, namely physical burden, emotional burden, and financial burden. The scale was developed by Cousineau et al. (2003) and was translated into Chinese by (Wu & Jiang, 2010).

Self-efficacy refers to the belief held by adults with CHD after PCI in their ability to attain specific behavioral objectives, encompassing an overall confidence in one's capacity to navigate diverse environments and confront novel situations that may impact an individual's behavior, cognition, and emotional responses. The present study employed the Chinese version of the General Self-Efficacy Scale developed by Schwarzer et al. (1995) to assess self-efficacy and translated into Chinese by Wang et al. (2001).

Social support refers to the perceived assistance or aid received by adult patients with CHD after undergoing PCI from their family, friends, and significant others. The multidimensional scale of Perceived Social Support (MPSS) was developed by Zimet et al. (1991) and translated into Chinese by Jiang (2001).

CHAPTER 2
LITERATURE REVIEW

The study investigated the factors predicting CHD self-management behavior (health literacy, self-perceived burden, self-efficacy, and social support). Therefore, this chapter describes the contents of the literature review as follows.

Coronary heart disease (CHD) and its treatment

Definition

Coronary heart disease(CHD) refers to heart disease caused by stenosis or obstruction of vascular lumen caused by atherosclerosis in coronary arteries, resulting in myocardial ischemia, lack of oxygen or necrosis(Tran & Tran, 2019) .These includes stable angina, unstable angina (UA), and non-ST-segment elevation myocardial infarction (NSTEMI) (Ge & Xu, 2018).

Classification of CHD

In recent years, clinical clinicians tend to divide this disease into acute coronary syndrome (ACS) and chronic coronary disease (CAD)(Bo et al., 2020). Acute coronary syndrome includes unstable angina pectoris (UA), non-ST elevated myocardial infarction (NSTEMI), ST elevated myocardial infarction (STEMI) and sudden coronary heart disease; chronic coronary disease includes stable angina pectoris, normal coronary angina pectoris, asymptomatic myocardial ischemia, and ischemic heart failure (ischemic cardiomyopathy) (Zhang & Li, 2023).

Diagnostic criteria

The diagnostic criteria that in line with the of coronary heart disease proposed by Chinese Society of Cardiovascular Diseases(Yang, 2022),included: stable angina, unstable angina pectoris (UA) and non-ST-segment elevation myocardial infarction (NSTEMI),details as follows:

Stable angina

A. Characteristics of typical angina pectoris symptoms, combined with the patient's existing risk factors, except chest pain caused by other reasons;

B. ECG ischemic ST-T dynamic changes or positive ECG exercise load test during the onset of chest pain;

C. If ECG examination during the attack can find ST segment descending, T wave flat or inverted in the lead dominated by R wave, and gradually recover after symptom relief, it is helpful for diagnosis;

D. ECG exercise load test can be performed for patients with no change in ECG, if the load test can induce angina symptoms or ECG myocardial ischemia changes can be confirmed.

Unstable angina pectoris (UA) and non-ST-segment elevation myocardial infarction (NSTEMI):

A. Typical clinical manifestations such as ischemic chest pain;

B. Typical ischemic ECG changes (new or transient ST segment downshift 0.1mV, or T wave inversion 0.2mV);

C. NSTEMI can be diagnosed if the levels of cardiac markers troponin T or CK-MB are elevated, and UA can be diagnosed if the levels of cardiac markers do not exceed the normal range.

Pathophysiology

The pathological basis of coronary heart disease is coronary atherosclerosis and the resulting pathological changes of myocardial ischemia and necrosis(Cao & Ma, 2023). The American Society of Cardiology divides them into type 6 based on the development of atherosclerotic lesions: type I, lipid point; type II, lipid stripe; type III, early plaques; type IV, atherosclerotic plaques; type V, fibrous atherosclerotic plaques; type VI, composite lesions. In recent years, clinical studies have shown that the progression of coronary heart disease does not evolve from type I to type VI lesions like the aforementioned pathological classification, but possibly with plaque rupture, bleeding, and (or) thrombosis at any stage of atherosclerotic disease, which is the pathophysiology of acute coronary syndrome (Chen et al., 2016).

Non-pharmacological management of coronary heart disease (PCI)

Percutaneous Coronary Intervention (PCI) is a method of catheterizing the coronary arteries to alleviate stenosis or occlusion, thereby enhancing myocardial perfusion. It encompasses percutaneous balloon angioplasty, coronary stent implantation, and atheromatous plaque ablation.(Zhao, 2018). Percutaneous coronary

intervention therapy, including percutaneous coronary angioplasty and stent implantation, recanalizes the stenotic or occluded coronary artery lumen via cardiac catheterization(Examination, 2014).Coronary intervention was first developed in Germany and gradually gained popularity worldwide. In China, percutaneous intracoronary angioplasty was pioneered by Xi'an Fourth Military Medical University and Professor Xiong of Suzhou Medical College from 1983 to 1984(Ge, 2014). With the advancement of clinical research in interventional therapy and the continuous development and refinement of interventional devices, both domestic and international cardiovascular disease treatment has rapidly progressed through interventional therapy, which is now considered as the primary method for treating coronary heart disease. (Higgins et al., 2005).

The world's first percutaneous transluminal coronary angioplasty (PTCA) was successfully performed in September 1977, marking the advent of a new era in interventional treatment for coronary heart disease(Tamai et al., 2002).Based on PTCA, the percutaneous coronary stent implantation procedure involves inserting a metal or plastic stent into the diseased coronary artery to provide structural support and maintain unobstructed blood flow within the lumen. Stents have developed from bare metal stents at the beginning to drug-coated stents. This procedure improves myocardial ischemia and hypoxia by achieving blood reperfusion (liu et al., 2021). PCI is the least invasive procedure for recanalizing occluded or narrowed coronary arteries, and its clinical application has surpassed CABG since the first interventional therapy was performed in China in 1984. It has opened up a new era in the treatment of coronary heart disease and become the primary means of treating this condition(Hu, 2012). Percutaneous Intracoronary Arterial Stenting (PICAS) involves the deployment of a metallic stent, typically composed of stainless steel or an alloy material, within a diseased coronary artery to provide structural support and luminal occlusion, thereby preserving unobstructed blood flow through the coronary lumen.

PCI can rapidly and effectively improve coronary blood supply, ushering in a new era of interventional treatment for coronary heart disease (Han, 2019). In the past two decades, there has been a significant reduction in hospitalization mortality rates for coronary heart disease (CHD), while the incidence of CHD and acute myocardial infarction (AMI) has shown a marked increase in recent years (In 1980,

the incidence rate was 54.74 per 10,000 person-years in VS2012, while in 1990 it decreased to 29.52 per 4,075 person-years) (Han, 2019). PCI can achieve revascularization in a short period of time, quickly perfusion the occluded blood vessels, save patients' lives to the greatest extent, reduce mortality, and relieve their angina symptoms, effectively treat most acute and critical patients, and improve the prognosis of the patient.

The above findings indicated that the underlying coronary heart disease (CHD) continues to progress post-percutaneous coronary intervention (PCI), emphasizing the importance of managing it as a chronic condition with long-term pharmacological treatment and risk factor modification to decelerate its progression (Wang & Liu, 2019). PCI can only improve myocardial ischemia and hypoxia, relieve angina symptoms, and maximize the dying myocardial treatment. It cannot prevent progressive coronary lesions or completely cure coronary heart disease. Most patients are still in a "disease survival" stated after treatment (Liang, 2012). Within one year post-surgery, there is a 20%-30% chance of restenosis of myocardial infarction, which imposes significant psychological burden on patients and their families (Benjamin et al., 2018; Parker et al., 2017). After percutaneous coronary intervention, patients require long-term administration of antiplatelet drugs such as clopidogrel and aspirin. Additionally, active prevention and control of cardiovascular risk factors including hypertension, hyperglycemia, and hyperlipidemia is necessary. A low-fat diet rich in unsaturated fatty acids and fish should be adhered to along with moderate regular exercise and maintenance of emotional stability (Hu, 2013).

Coronary heart disease has been recognized as a lifestyle disease. Its occurrence, development and outcome are closely related to lifestyle factors, according to studies conducted in 52 countries,90% of coronary heart disease is related to controllable risk factors such as smoking, diabetes, hypertension, abdominal obesity, low vegetable and fruit intake, low exercise, low alcohol intake and apolipoprotein Apo B/Apo A ratio (5:1) (Gyárfás et al., 2006). The Global Burden of Disease series shows that ameliorating these risk factors can reduce CHD incidence by 83% to 89% and CHD mortality by 78% to 85% (Ezzati et al., 2003). A prospective study of chronic diseases in China found that people who have a healthy lifestyle, such as not smoking or quitting early and drinking alcohol daily, 30 g

Participation in physical activity Adequate reduction in red meat intake of at least 4 healthy weight items was associated with a 58% and 43% reduction in the risk of serious coronary heart disease events, respectively.

Although PCI has numerous advantages in the diagnosis and treatment of coronary heart disease, it cannot reverse the pathological process of coronary atherosclerosis. Therefore, risk factors for cardiovascular events still exist, and patient self-management after PCI remains crucial to reduce recurrence (Ruan, 2017). Currently, clinical nursing practice has revealed that patients who have undergone PCI often exhibit a lack of disease self-management ability, which manifests as poor medication adherence, inadequate self-monitoring skills, and suboptimal coping strategies (Guo et al., 2022). These are crucial for the recuperation of patients following PCI. Therefore, the self-management behaviors of patients following PCI is of paramount importance in reducing disease recurrence and mortality rates, promoting postoperative rehabilitation, and should be highly valued by clinical practitioners.

Management for post PCI among adult patients with coronary heart disease

Based on the reviews, management for post PCI among adult patients with coronary heart disease should focus on the following aspects:

Diet

Patients who have undergone PCI should adhere to a low-sodium and light diet, as well as a balanced diet. The recommended daily intake of sodium is less than 5 grams, while the consumption of edible oil should not exceed 25 grams. It is also advisable to increase potassium intake with a recommended daily intake of at least 4.7 grams (Cheng et al., 2022).

Medication

Patients who have undergone PCI require long-term administration of various cardiovascular protective drugs based on their individual conditions. Studies indicate correlation between medication compliance and recurrent myocardial infarction following PCI in patients with acute myocardial infarction (Wang, 2018). After PCI, many patients initially exhibit good adherence to medication regimens, but over time their compliance tends to decline (Zhang et al., 2016). Therefore, based on medication

guidance, nursing staff should encourage family members to participate in medication management and enhance continuity of care (Fu et al., 2018) to promote patients' long-term adherence to medication.

Exercise

Exercise instruction is the fundamental component of cardiac rehabilitation following PCI. Prior to elective surgery, preoperative education should be conducted to enhance patients' surgical tolerance and foster their engagement in sports rehabilitation. Assist with patient assessment, education, and guidance based on risk stratification. Stage I rehabilitation patients were educated on daily activities and rehabilitation exercises in accordance with their individual risk stratification. Phase II rehabilitation patients are primarily recommended to engage in aerobic, resistance, and coordination exercises. It is important to instruct the patient to warm up and cool down for 5-10 minutes at the beginning and end of each exercise session. In Phase III, patients are encouraged to independently carry out their prescribed rehabilitation exercises (Wang & Wang, 2021).

Mood and sleep

Many individuals are concerned about the possibility of postoperative relapse following PCI, as well as the need for long-term medication which may lead to negative emotional experiences such as anxiety and depression. It is important to note that these negative moods can have a significant impact on patient prognosis. According to the patient and their family, health education related to coronary heart disease (CHD) and sports rehabilitation can effectively reduce negative emotions and improve sleep quality, thereby enhancing treatment adherence (Gai et al., 2018).

Unhealthy lifestyles modification

Evidence-based studies have demonstrated that more than half of Chinese patients with acute myocardial infarction had a smoking history, and male smokers who underwent PCI exhibited significantly higher all-cause mortality rates compared to non-smokers and former smokers (Goto et al., 2020). For smoking patients after PCI, the severity of tobacco dependence and smoking severity index were firstly evaluated, and 5R could be adopted according to the severity (Relevance, Risk, Rewards, Roadblocks, Repetition) and 5A (Ask, Advise, Assess, Assist, Arrange

(Wang & Xiao, 2016) And instruct patients to strictly control alcohol intake (Ding, 2022)and maintain the rule of life.

Career recovery

As the incidence of acute myocardial infarction in individuals under 45 years old continues to rise (Ma et al., 2018), vocational rehabilitation education for post-PCI patients is of paramount importance. Patients were promptly assisted in transitioning back to their social roles and resuming work during the early stages of recovery. Following PCI, patients should be advised to avoid engaging in strenuous physical activity and gradually adjust their work hours from short to long as they adapt. Furthermore, it is imperative that we educate our family members and colleagues on the significance of PCI and vocational rehabilitation, while providing them with increased social support to bolster their confidence in achieving vocational recovery.

Self-management behaviors in patients with CHD

According to the WHO's age standard for middle-aged and elderly individuals, the age group is defined as 18-44 years old for the former and 45-59 years old for the latter. Therefore, the combined age group ranges from 18 to 59 years old (Liu et al., 2017). Adults face greater work pressure and a faster pace of life, yet there is a lack of corresponding prevention methods for the risk factors associated with coronary heart disease. As a result, the increasing trend in its incidence has not been effectively suppressed. Furthermore, young patients often fail to recognize the importance of self-management despite their good physical condition (Li & Luo, 2011). Epidemiological studies have demonstrated (Fletcher et al., 2013) that regular exercise in conjunction with conventional treatment can ameliorate symptoms in patients following PCI. In the process of post-percutaneous coronary intervention (PCI) rehabilitation, it is imperative to adhere to medical advice regarding regular medication intake, moderate exercise, consistent dietary habits, modification of unhealthy lifestyle practices and management of various risk factors such as obesity, hypertension, hyperlipidemia, hyperglycemia and smoking. All these measures necessitate patients' adoption of effective self-management behaviors in order to prevent long-term complications. Studies conducted by Luhr et al. (2021) have

demonstrated that the implementation of patients' self-management mode has a direct impact on improving health behaviors, ultimately leading to an improvement in patients' overall health status. In recent years, scholars have increasingly focused on the self-management status of elderly patients following PCI. However, research on self-management among adult patients after PCI remains limited in scope and depth, with no widely applied specific intervention mode.

China coronary interventional treatment guidelines (Ma, 2018) in its content clearly stated that maximize the role of interventional technology in the treatment of coronary heart disease, consolidate its treatment effect, and improve the prognosis and reduce the occurrence of adverse events, depends on patients after revascularization drug maintenance, regular follow-up, and long-term lifestyle and risk factors control. At the present stage, the comprehensive management system of cardiovascular disease prevention, treatment and rehabilitation and follow-up in China is still imperfect (Hu & Guo, 2011), so the long-term and effective scientific management of the disease still needs to be strengthened. Studies have shown that lifestyle improvement can reduce blood pressure and blood lipids in CHD patients, and thus reduce the risk factors for CHD (Zhang et al., 2014). Therefore, developing targeted interventions to enhance the self-management behaviors of adult patients following PCI remains a pressing clinical challenge that requires resolution.

The term self-management was first put forward by Thomas Creer and others in the mid-1970s. It means that the patient is an active participant in the treatment process (Shi et al., 2011). Barlow et al. (2002) introduced the concept of self-management as the ability of the individual to modify psychophysiological symptoms and lifestyle patterns that have been established during the management of chronic illnesses. Good self-management ability can promote one's own health and avoid adverse effects of diseases on others and the society (Xue et al., 2017; Yan et al., 2017). Lorig et al. (2003) defined self-management as the process by which patients engage in behaviors that promote and maintain their health, monitor and manage symptoms and signs of illness, reduce the impact of illness on physiological, psychological, social, and interpersonal functioning, and consistently adhere to treatment regimens. European General Practice (Mola et al., 2019) and Miller et al. (2014) defined patient self-management as a patient-centered process in which

individuals actively deal with chronic diseases in daily life. All the aforementioned definitions of self-management center around patients, highlighting that self-management is not only related to behavioral pattern but also a skill. Self-management is an action taken by patients to cope with diseases, reduce the occurrence of disease complications and alleviate the negative effects of diseases (Gao et al., 2019), it is a new approach for secondary prevention of chronic diseases and a highly effective and operable disease rehabilitation management mode.

The method of chronic disease self-management has been applied in western developed countries for more than 20 years, and many domestic communities have corresponding chronic disease self-management guidance services (Ryan & Sawin, 2009). Self-management is the evaluation of patients' ability to manage their own diseases and their own state. As a specific strategy for secondary prevention, it can promote patients to master self-regulation skills and health care skills based on disease knowledge and health beliefs, so as to achieve the purpose of self-detection and control of diseases. Patients after PCI still need to conduct long-term self-management after revascularization, while many patients tend to underestimate the severity of their condition due to short operation and hospitalization time and quick recovery, which affects the improvement of self-management behaviors (Lin & Huang, 2018a; Yaraghchi et al., 2012). This suggests that we should pay attention to the self-management of patients after PCI, correct bad behaviors, and take effective measures to urge patients to carry out early management, actively participate in management, and actively maintain management.

Studies have indicated that the likelihood of myocardial infarction, cardiac fatality and other adverse events post-PCI remains as high as 20% or more. Patient self-management following PCI can effectively mitigate the incidence of cardiac events and re-hospitalization while enhancing quality of life(Sun, 2017). The study(Byrne et al., 2015; Rezende et al., 2013) revealed a mortality risk exceeding

30% within ten years after PCI, with 32.3% of patients experiencing cardiac colic attacks within one year and an intrastent restenosis rate of only 1%. Additionally, patients face high risks of recurrent events and significant economic burdens(Zhou et al., 2017) , underscoring the importance of controlling CHD risk factors to reduce symptom recurrence(Ahn et al., 2016). The primary interventions

include behavior modification and medication, necessitating patients to undertake a long-term self-management regimen encompassing dietary control, healthy exercise habits, medication adherence, and risk factor monitoring. As such, post-PCI patient self-management assumes paramount importance.

The self-management behaviors of patients with CHD exerts significant impacts on their disease progression, physical and mental well-being, as well as quality of life. The findings indicated that, three months post-intervention, the dietary intake did not exceed 10%, physical activity amounted to at least 3.5 hours per week, and engagement in stress management activities exceeded 5.5 hours per week; these self-reported lifestyle modifications were corroborated by improved risk factors: weight loss, improved blood pressure management, reduced low-density lipoprotein cholesterol levels, and increased physical activity were observed (Mao & Lu, 2022). Furthermore, patients reported enhanced subjective well-being, decreased depression and hostility symptoms, and improved quality of life.

According to relevant scholars both domestically and internationally, as demonstrated by Lahtinen et al. (2017) and other studies on coronary heart disease patients within two years of diagnosis, changes in leisure physical activity have a significant impact on heart disease mortality. The results indicate that inactive or previously active but now inactive coronary heart disease patients face at least 4.49 times higher risk of irregular heart disease mortality compared to those who engage in regular leisure physical activity (Yanan et al., 2017). A meta-analysis examining the relationship between medication adherence and clinical outcomes in patients with stable angina found that higher levels of medication compliance were associated with reduced all-cause mortality, cardiovascular disease mortality, hospitalization due to cardiovascular disease, and incidence of myocardial infarction conducted a systematic review of studies on medication adherence, disease cost, and disease outcomes in patients with better health, spending $294-868 per year for disease, equivalent to 10.1% -17.8% compared to patients with lower compliance (Bitton et al., 2013); De (2014) examined the correlation between quality of life and lifestyle modifications, found that patients with coronary heart disease who quit smoking, increased physical activity, and adopted healthier eating habits - such as reducing fat and salt intake while increasing consumption of fish, vegetables, and fruits - experienced a higher

quality of life than those who did not adopt these healthy lifestyles. The study conducted by Kong et al. (2013) demonstrated a significant correlation between the self-management behavior of community patients with CHD and their quality of life.

However, research has indicated that while self-management knowledge following PCI is generally adequate, the overall level of self-management behavior remains low. There is still room for improvement in daily life management behaviors, as well as patients' disease medical and emotional cognitive management behaviors (Hu et al., 2012; Hu et al., 2011). The low management score among CHD patients in association with insufficient awareness and knowledge of the condition (Zhang, 2017b), less than 50% of 60.92% patients after PCI (Yan & Lin, 2014). Even 42% of patients mistakenly think they were cured and no longer pay attention to the correction of the original bad behavior, leading to the recurrence of the disease (Zhou et al., 2019).

The European Society of Cardiology has published a report on lifestyle, risk factors, and treatment management across 24 European countries. Of these, 16% were active smokers with 48.6% continuing to smoke during acute cardiac events; 59.9% had low or no physical activity; obesity was present in 37.6% (BMI ≥30 kg/m2), with concentric obesity observed in 58.2%; hypertension was detected in 42.7%, high LDL cholesterol levels in 80.5%, and diabetes mellitus in 26.8%. Additionally, the use of cardioprotective drugs among patients was highly prevalent (Kotseva, Wood, Bacquer, Backer, ́n, Jennings, Gyberg, Amouyel, et al., 2016).Ren (2009) found the self-management of coronary heart disease primarily centers on rational dietary and exercise habits, as well as effective regulation of negative affect, and self-management behaviors can significantly enhance self-efficacy and improve health outcomes among CHD patients. Wang et al. (2011) found that the factors affecting self-management behavior in patients with coronary heart disease also include self-efficacy and social support. Therefore, the significance of self-management behavior in CHD patients is evident, necessitating medical professionals to enhance their understanding and implementation of such practices.

Individual and Family Self-Management Theory (IFSMT)

Chronic diseases have replaced acute illnesses as a significant threat to public health, imposing substantial burdens on individuals, families, and the socioeconomic fabric (Zhao et al., 2022). Within the current medical system, hospital stays are abbreviated, but discharge criteria remain linked to surgical outcomes or patient conditions rather than their capacity for self-management or receiving care from family members (Xie & Yu, 2015). The majority of healthcare activities for patients with chronic diseases should be conducted in non-hospital settings. Self-management is a novel approach to addressing the chronic disease management model. It is a behavioral technique developed by Douglas et al. (2023) based on the principles and methods of behavioral science, and it is more commonly utilized in behavioral medicine Effective self-management can optimize health outcomes, reduce healthcare costs, and enhance quality of life (Schad et al., 2021), making it particularly crucial for healthcare providers to assist individuals and families in improving their self-management skills.

The Individual and Family Self-Management Theory (IFSMT) is another self-management theory proposed by Ryan et al., (2009), based on the integrated theory of health behavior change and the ecological model of condition and adaptation (Sawin et al., 2012; Sawin et al., 2003). Its aim is to promote patients' health behavior change, reduce medical costs, and enhance patients' quality of life or happiness. According to IFSMT, self-management is a complex and dynamic phenomenon that encompasses three dimensions: context, process, and outcome. These dimensions respectively delineate the risk and protective factors of self-management, the procedural elements of self-management, as well as the outcome indicators of self-management. Additionally, individual/family-centered intervention measures can assist clinical practitioners in identifying patient self-management's protective and risk factors while devising corresponding programs (Ryan & Sawin, 2009). In IFSMT, "self-management" is defined as the process through which individuals and families utilize their knowledge and beliefs, self-regulation skills and abilities, as well as social facilitation to attain health-related outcomes within the context of contextual factors (Bonis & Sawin, 2016).

Contextual dimension

The content of this dimension provides a comprehensive summary of the risk and protective factors that influence individual and family engagement in self-management. Drawing on relevant literature, this dimension is informed by the work of researchers who have identified key barriers and facilitators to effective self-management (Ryan & Sawin, 2009; Sawin et al., 2003; Schilling et al., 2010). This dimension primarily encompasses disease-specific factors, physical and social environmental determinants, as well as individual and familial influences. Disease-specific factors refer to the physiological structure and functional characteristics of the disease, as well as the number and type of interventions required for treatment or prevention, and key behaviors necessary for managing the disease during transitional periods. This includes individual/family perceptions regarding disease complexity and treatment, disease progression trajectory, stability, and transition. Physical and socio-environmental factors primarily encompass physical or social determinants, such as healthcare accessibility, provider switching, environmental conditions, transportation options, community dynamics, educational institutions, occupational settings, cultural influences and social capital. Individual and family factors encompass personal and familial attributes that either bolster or undermine self-management, including individual cognitive status, perspectives, information processing abilities, developmental stages as well as personal and familial aptitudes, cohesion, literacy levels and resourcefulness.

Process Dimension

The process dimension encompasses cognitive and affective factors, metacognitive skills, and social facilitation (Kennedy et al., 2022). Knowledge and belief in knowledge aim to furnish patients with personalized health-related information. Belief encompasses a patient's perspective on a particular health condition or behavior(Huang & Liu, 2023), which comprises four components: accurate information, self-efficacy, outcome expectation, and goal consistency. Self-efficacy is a behavior-specific construct that pertains to individuals' confidence in their ability to effectively execute a particular behavior under normal and stressful circumstances (Meuwissen et al., 2022). Outcome expectation refers to the belief that engaging in a specific behavior will lead to desired outcomes. Goal alignment denotes

an individual's capacity to resolve confusion and anxiety arising from seemingly conflicting demands related to health goals. Self-regulation refers to the process in which an individual establishes clear and attainable objectives, employs effective strategies to accomplish them, and evaluates their success(Chen & Shi, 2022). This primarily encompasses: Goal-setting, self-monitoring, and reflective thinking; Decision-making, planning, and action-taking; Self-evaluation; And emotional regulation. The promotion of society generally occurs in interpersonal relationships, which can enhance the ability of individual behavioral change. It mainly includes social influence, social support and negotiation cooperation. According to Cohen and Wills' (2016) classification of social support, the theory posits that social support primarily encompasses emotional, instrumental, or informational assistance aimed at facilitating individuals and families' active engagement in health behaviors.

Outcome Dimension

According to IFSMT by Ryan (2009), self-management outcomes can be categorized into proximal and remote outcomes. Proximal outcomes pertain to the expenses incurred by individuals and families in their self-management behaviors, such as participation in activities/treatment programs, symptom, management, or adherence to prescribed medication and healthcare services. Remote outcomes encompassed health status, which was measured by disease prevention, decline, stability and worsening to indicate the trajectory of disease progression; quality of life, which was assessed based on the perception of happiness; as well as costs including both direct and indirect expenses.

The interplay of risk and protective factors within the contextual framework. Prevalence is influenced by various factors, including gender, race, socioeconomic status and education level. Moreover, individuals with chronic diseases in low socioeconomic status exhibit lower awareness of their condition, reduced compliance with treatment regimens, increased risk factors (such as overweight or obesity, sedentary lifestyle habits, smoking and alcohol consumption), and lower levels of health literacy compared to those in socially advantaged groups. These challenges make self-management more difficult for them and contribute to higher rates of mortality, morbidity and disability(Bartlett, 2020; Kennedy et al., 2022). The

contextual factors exert an influence on the participation ability of individuals and families in the process dimension, which may directly affect the outcomes.

Enhanced self-management processes facilitate dynamic interactions based on: knowledge and beliefs regarding the disease, acquisition and utilization of self-regulation skills and competencies, as well as social support and consultation are all crucial factors to consider. Knowledge itself does not lead to behavior change, but the augmentation of knowledge and specific health beliefs can facilitate patients' active engagement in self-regulation. Self-regulatory behaviors supported by ample knowledge and sufficient resources are likely to yield positive outcomes in terms of self-management or other proximal measures. By participating in such behaviors, individuals may also enhance their sense of self-efficacy and become more actively involved in managing their own health. The outcome dimension is influenced by the context and process dimensions, and the aim of self-management is to attain at least a portion of the proximal outcome. Although proximal outcomes have a direct impact on distal outcomes, engaging in health behaviors does not necessarily translate into reduced medical service costs.

The IFSMT theory is commonly applied to analyze situational or process factors that impact the self-management of a study population. Cross-sectional studies utilizing this theory can better comprehend and interpret the relevant influencing factors of self-management, providing a foundation for developing intervention measures. Sawin utilized the IFSMT approach to develop a self-management program for parents of hospitalized children post-discharge, employed the IFSMT framework to facilitate data extraction and analysis, with the aim of synthesizing qualitative research evidence pertaining to female heart pain and self-management of associated symptoms.

The IFSMT presents a novel approach to self-management of chronic diseases in China. When discussing individual self-management, IFSMT should take into account not only the influences of personal and familial, social, and physical environments but also focus on the process of self-management and the development of skills necessary to achieve it. The outcome dimension encompasses not only indicators such as patients' quality of life and happiness but also economic benefits like medical costs. IFSMT can play an active role in addressing the issue of chronic

disease self-management research in China. By utilizing IFSMT to identify factors that influence self-management, developing individual and family-centered intervention measures, and selecting appropriate evaluation indicators for intervention programs, IFSMT serves as a simple, efficient, and practical tool for self-management research.

In this study, social psychological variables were selected based on the theoretical model of personal and family self-management as well as the research objectives. Health literacy, self-perceived burden, self-efficacy, social support, and recent outcomes (self-management behaviors) were consistent with the conceptual framework of the theory. The following is a breakdown: Health literacy and self-perceived burden are influenced by individual and family factors. Health literacy is context-specific, meaning that different environments can impact health literacy levels and lead to changes (Wittenberg et al., 2020). Self-perceived burden refers to the psychological response of patients who require care and support from others during treatment, and are concerned about becoming a burden on their caregivers. This concept is consistent with personal and familial factors in the Integrated Family Systems Model of Treatment (IFSMT) (Xu et al., 2019a). Self-efficacy pertains to belief: It denotes an individual's subjective evaluation of their capabilities and self-assurance, which can influence their behavioral choices and attitudes when faced with challenges. Belief is a distinctive psychological state of human consciousness that aligns with the principles of IFSMT (Zhang et al., 2021). Social support is a key driver of social mobility, it plays a crucial role in facilitating individual advancement and aligns with the principles of social promotion espoused by IFSMT (Li et al., 2019). Self-management behaviors are indicative of immediate outcomes, these behaviors pertain to actions that promote disease recovery, mitigate complications and alleviate physiological and psychological distress associated with illness. They serve as a measure of self-management (Zhou et al., 2023a), details as shown in Figure 2.

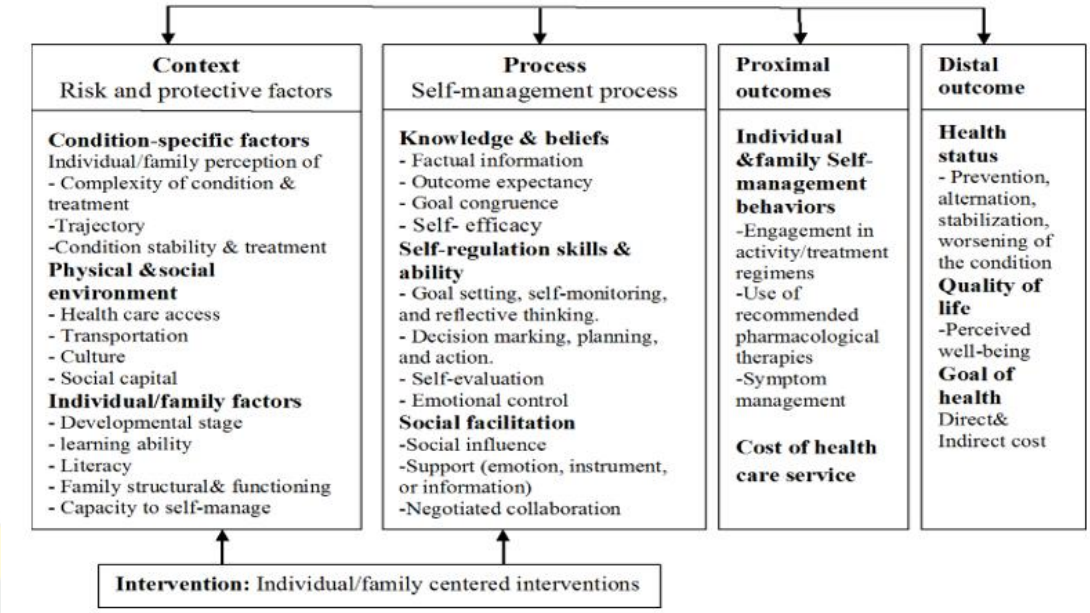

Figure 2 Individual and Family self-management theory *(Ryan, 2009)*

Factors related to self-management behaviors

Demographic and social factors

The study included 9 sociodemographic variables, age, gender, body Mass Index (BMI), marital status, educational level, occupation type, medical payment method, per capita monthly household income and residential type.

Several studies have examined the association between age and self-management behavior in patients with coronary heart disease, yet findings remain inconsistent. While some studies suggest that self-management behavior improves with advancing age and is an independent predictor(Cui et al., 2022; Drouin-Chartier et al., 2020), Tong et al. (2018) indicate that being ⩾60 years old poses a risk for suboptimal self-management behavior among this population. Studies have indicated that gender is a significant risk factor for self-management behavior among patients with coronary heart disease(Li & Chen, 2016) . Notably, female patients with coronary heart disease exhibit higher total scores of self-management behavior than their male counterparts (Gao et al., 2019), which may be attributed to women's heightened attention to daily life management. People with higher BMI was less likely to exercise and control over their dietary habits. Huang et al. (2021) have

demonstrated a negative correlation between BMI and the overall score of self-management behaviors in CHD patients, with BMI even serving as an independent predictor of such scores. Marital status is an independent factor that influences self-management behavior. Married individuals exhibit higher levels of self-management behavior compared to unmarried or widowed individuals (Lin & Huang, 2018b). This may be attributed to the fact that CHD patients are more likely to gain confidence and courage in coping with their condition through the companionship and support of their partners and family members. Education level is positively associated with self-management behavior (Lin & Huang, 2018c), while education level of junior high school or below poses a risk for self-management behavior. The higher the educational attainment, the greater the patient's acceptance of knowledge pathways related to self-management behaviors and their receptiveness to effectively manage their own health. Several studies have demonstrated that occupation has a statistically significant impact on the overall score of self-management behavior among CHD patients (Zheng et al., 2023; Zhou et al., 2023b). Notably, farmers exhibit lower levels of self-management behavior compared to other professionals (Ma, 2020; Wu, 2019b), which may be attributed to their generally low educational attainment and unfavorable economic circumstances.

Patients who utilize medical insurance to cover their medical expenses exhibit a higher level of self-management ability compared to those who pay out-of-pocket (Zhang, 2017a). This may be attributed to the economic security provided by insurance which allows patients to approach negative experiences associated with their illness with a more positive attitude, ultimately leading to an improvement in their self-management behavior. However, patients who pay for treatment themselves must consider the high costs and subsequent rehabilitation. Zhang &Wang (2019) posited that a family's economic status is positively correlated with the level of self-management exhibited by patients. Wu's (2019) research findings indicate that individuals from households with per capita incomes ranging between 2000 to 3000 yuan exhibit higher levels of self-management compared to those earning less than 2000 yuan or more than 3000 yuan. Patients with coronary heart disease who have access to stable financial resources are more likely to proactively seek professional assistance and take initiative in acquiring knowledge. Studies indicate that individuals

living alone exhibit lower levels of self-management behavior, which can be attributed to the absence of familial support and assistance(Liao et al., 2021b).

Factors related to self-management behaviors among adult patients with coronary heart disease

The report encompassed the historical background of coronary heart disease, disease progression, comorbidities, frequency of visits related to coronary heart disease, and instances of stent implantation.

Whether patients have a history of coronary heart disease has an impact on their level of self-management behavior, with those who have such a history exhibiting higher levels(Guo, 2017). The study conducted by Wu et al. (2011) demonstrated a positive correlation between the duration of CHD and patients' self-management behavior, with longer disease courses associated with higher levels of self-management behavior. These findings are consistent with those reported by Cui Ying (2020) and may be attributed to increased disease-related knowledge and skills among patients as their illness progresses. Sun et al. (2020) demonstrated that patients with hypertension or diabetes had higher scores in self-management behavior compared to those without complications, while Xiao et al. (2017) found no statistically significant difference in the impact of having or not having complications on patients' self-management behavior scores. The greater the number of stents implanted, the higher the number of lesion sites and severity of vascular blockage indicated, thereby increasing patients' likelihood to consciously improve their self-management behavior (Chen & Hua, 2019).

Health literacy

Health literacy serves as a crucial gauge for evaluating an individual's health-related knowledge and competencies. Health literacy is defined as the individual ability to acquire, understand and process basic health information or services and make correct health-related decisions (Sheldon & King, 2001). WHO defines health literacy as the ability of individuals to actively acquire, comprehend and utilize health information and services in order to promote their own health, make informed decisions, and participate effectively in society (Cai et al., 2019). The Canadian Public Health Association defines health literacy as the capacity of individuals to obtain, understand, evaluate and communicate information for

promoting, maintaining and improving their health throughout different stages of life (Simonds, 1974). In 2005, China introduced the concept of health literacy for the first time (Guo & Wang, 2005), emphasizing that Chinese citizens should enhance their understanding of scientific health concepts, comprehend the social impact of health, and acquire basic knowledge to comprehensively improve their health literacy from these three aspects. Health literacy has become a crucial issue in global health promotion, with many countries or political coalitions taking it into account when developing policies. Health literacy is a process in which people acquire, understand, adopt health information and services, and use such information and services to make correct judgments and decisions to promote their own health (Zhang et al., 2014).

The improvement of self- management in patients with CHD is more meaningful for disease conversion and quality of survival (Zhao, 2013) ,while the level of self- management largely depends on the level of individual health literacy (Sperber et al., 2013).Individual health status is inseparable from health literacy, which has a significant impact on the progression of chronic diseases (Lu et al., 2020) . Research indicates that health literacy serves as a predictor for self-management proficiency(β=1.05, 95% CI:0.50,1.63) (Schrauben et al., 2020). The utilization of healthcare services, including hospitalizations, emergency visits, participation in physical examinations and self-medication practices are all associated with health literacy. Poor understanding of health information and irrational use of healthcare services due to inadequate health literacy can lead to adverse health outcomes (Liao et al., 2021a). The study showed a significant positive impact relationship between health literacy and self-management ability (β=.523,95%CI:1.615,2.190; r=.996, $p < .001$) (Zhang & Shen, 2023).

Individuals with low health literacy face challenges in accurately comprehending disease-related information, have limited capacity to access and evaluate health resources, and thus encounter difficulties in effectively managing their own health (Yehle & Plake, 2010). Heinrich's (2012) study demonstrated a significant correlation between health literacy and cultural background, ethnicity, and identified health literacy as the sixth vital sign following pain. The health literacy of patients with CHD is a significant predictor of the health status within the coronary heart disease population. Its level directly impacts the acquisition, comprehension, and

utilization of disease knowledge, information, and services; thus influencing the awareness level towards the disease, healthy lifestyle adoption, and overall health behavior performance among CHD patients (Ren et al., 2009b). Health literacy in patients with coronary heart disease is an important influencing factor in the self-management level (Li & Zhang, 2019). Meng and Li (2016) conducted a study on 242 middle-aged and elderly patients with chronic illnesses, revealing inadequate health literacy levels and suboptimal health statuses.

Therefore, the formulation of reasonable and effective health literacy intervention is an effective way to improve the self-management ability of patients with coronary heart disease, which suggests that we should take various methods and measures to improve the health level of patients' quality, so as to truly alleviate the adverse effects of adverse health behaviors on patients with coronary heart disease.

Self-perceived burden

Self-perceived burden (SPB) is a multi-dimensional concept, and Cousineau (2003) et al first studied hemodialysis patients with burden perceived in 2003, and first proposed the concept of SPB, believing that SPB is the sense of caregiver frustration, concerns, and guilt they felt about relying on their caregivers. SPB is a condition of empathetic concern caused by an individual's illness and care needs that affect others, resulting in feelings of guilt, depression, pain, burden, and reduced self-esteem. Physical, social, economic and emotional factors contribute to SPB(Chen et al., 2022). The presence of SPB may potentially complicate the dynamic between patients and their caregivers, eliciting a range of affective responses including but not limited to depression, anxiety, guilt, pain and self-blame (Chiagauthier, 2005; McPhersona et al., 2007), and even trigger patients' contemplation of "hastening death" or "euthanasia", which significantly impairs their quality of life.

The self-perceived burden significantly influences patients' autonomous decision-making (Libert et al., 2017a). Studies indicate that the primary factor influencing elderly patients' decision to discontinue treatment is their desire to avoid imposing a burden on others (Lee et al., 2015). The self-perceived burden not only impacts patients' decision-making and treatment, but also undermines their dignity and triggers depression, leading to a decline in their quality of life and even suicide or other severe consequences. Studies have confirmed that approximately 47% of

patients experience accelerated mortality due to their perception of being a burden on their families. A number of studies have shown that self-perceived burden is widespread in patients with chronic diseases such as stroke, cancer and diabetes (Chen & Li, 2023; Liu et al., 2015). Among elderly patients with common chronic diseases, 75.7% have self-perceived burden, among which 53.3% have mild self-perceived burden, 19.5% have moderate self-perceived burden, and 2.8% have severe self-perceived burden (Xu, 2020).

Self-perceived burden is a major contributor to the self-management behavior (Akazawa et al., 2010; Oeki et al., 2012). Self-perceived burden is negatively correlated with the self-management behaviors, and the worse the self-management behavior, the heavier the self-perception burden of the patients($r=-.411, p<.01$) (Li & Sun, 2016). Effective self-management behaviors can enhance patients' ability to care for themselves, reduce their reliance on others, promote independence, alleviate emotional burden, and facilitate physical balance or even optimal health status (Xu et al., 2019b).See that the self-management behavior is closely related to the self-perception burden. SPB is one of the important social stressors caused by patients feeling guilty to their family due to the disease, which affects the rehabilitation treatment and quality of life in the later stage of the disease. Li (2017) examined the outcomes of self-perceived burden among adult and elderly patients following PCI surgery, revealing a moderate level of self-reported sensory burden. PCI surgery may impose significant pressure on both the patient's family and society, leading to a sense of guilt in patients and exacerbating their emotional burden.

Zhang et al. (2017) found that the response style is a key factor affecting self-perception burden in 383 patients after PCI surgery, and active response styles should be encouraged to avoid negative effects of passive response styles. However, patients with stronger social support receive care and assistance from more family members, friends, and other relevant individuals, leading to a lighter self-perception burden. Feng and Yang (2015) conducted a self-perceived burden survey on 96 elderly patients after PCI surgery, which revealed that the patients' ability to comprehend the chronicity of their condition, long-term medication requirements, and susceptibility to recurrent coronary heart disease directly contributed to an exacerbation of their self-perceived burden. Patients with the lower the ability to take

care of themselves actually need the help of their caregivers to affect the emotional burden in order to take care of their own needs. The more serious the patient's condition, the longer the care needs will take, resulting in the reduced self-efficacy of the caregivers, which aggravates the self-perception burden.

The research results of Xu et al. (2019) suggest that patients with chronic diseases control their diseases through strict self-management behavior, which also has a positive impact on improving patients' anxiety, and thus reduce their self-perceived burden. Ren et al. (2020) pointed out that there is a positive correlation between reducing self-perceived burden and improving self-management behavior. Targeted intervention can be developed according to the characteristics and correlation of patients' self-perceived burden to improve patients' self-management behavior. The self-management behavior after PCI was negatively correlated with the perceived burden of coronary heart disease ($r=-.586$, $p<.001$), and was an important influencing factor of the perceived burden($\beta=.-197$,95%CI: -0.908,-0.408) (Wang et al., 2023). When formulating nursing intervention measures, nursing staff should improve patients' self-management behavior from diet management, daily life management, treatment-related management and social psychological management, so as to reduce patients' self-perceived burden.

Self-efficacy

Self-efficacy refers to individuals' beliefs in their ability to execute the necessary actions for achieving specific goals within an organization, a preliminary theoretical framework was formulated, ultimately defining it as (Bandura, 1977), the belief in one's capability to effectively execute an action in a given situation to achieve a desired outcome. It posits that self-efficacy determines the level of effort and persistence individuals exhibit when faced with obstacles or adverse experiences. Joekes et al. (2007) concluded that a higher level of self-efficacy is positively correlated with improved self-management behavior, suggesting the potential utility of self-efficacy as a predictor. The enhancement of self-efficacy is beneficial for ameliorating fatigue and depression in patients with coronary heart disease, as well as fostering confidence in early lifestyle modification (Ludman et al., 2013). When dealing with the pressure brought by the disease, CHD patients with a high level of self-efficacy often have a correct and objective understanding of themselves and

respond positively and optimally to the physical adverse reactions and psychological negative emotions brought by the disease, thus adopting more positive and healthy behaviors to deal with the disease (Liang, 2018a; Mifsud et al., 2020). Self-efficacy has been widely cited in the literature on health behaviors as a prediction of multiple health behaviors and with positive effects on health behaviors.

Liu et al. (2014) indicated that there exists a positive correlation between the self-management level of hospitalized patients with coronary heart disease and their self-efficacy level ($r=0.491$, $p<.01$). Moreover, the higher the level of self-efficacy, the better their self-management behavior (Xie & Xu, 2011). Higher self-efficacy was associated with improved self-care behavioral control (Tharek et al., 2018). Fu's (2003) showed that self-efficacy theory plays an important role in promoting the management of patient behavior and improving the health of patients' health function. Du studied the self-efficacy of patients with coronary heart disease, and found that their self-efficacy was lower than the national normal model (Du, 2017). Liang believes that the self-efficacy of patients with acute myocardial infarction still needs to be improved, and it needs to further analyze the influence path of self-efficacy on psychological factors (Liang, 2018b).Studies have shown that self-efficacy is the most important independent influencing factor for the self-management behavior of patients with coronary heart disease ($\beta=.288$,$p<.001$; $\beta=-.253$,$p<.001$) (Cai et al., 2023; Li et al., 2022). In conclusion, self-efficacy exerts a significant impact on the level of self-management among patients with coronary heart disease, and it may serve as an intermediary factor for enhancing nursing support and promoting self-management.

Various factors impact patients' self-management behaviors, with disease knowledge and self-efficacy being the two primary influencing factors(Prince et al., 2016). Self-efficacy plays a crucial role in determining individual behavioral decision-making, particularly for patients with coronary heart disease, as it can significantly impact the implementation of certain behaviors(Fan, 2011). The level of self-efficacy is a robust predictor for the implementation and modification of behavior, as well as patients' health-related behaviors(Sheng, 2019), which significantly affects implementation behaviors and behavioral changes. Once the attitudes and emotions towards health behaviors are impacted, it will affect human

determinism. The relationship between individual self-behavior level and self-efficacy is characterized by dynamic development and mutual promotion. As the level of self-efficacy increases, patients' subjective initiative to seek solutions to problems becomes stronger(Hong, 2018), and they can elicit positive behavioral outcomes and mitigate the onset of depression and anxiety(Fan & Bi, 2019). Self-efficacy exerts a significant impact on individuals' behavioral choices, persistence levels, and exertion intensity while simultaneously shaping their cognitive processes and situational responses that facilitate the acquisition and execution of novel behaviors(Du et al., 2018).

After coronary intervention, the self-efficacy level of patients was found to be low (Xu & Wang, 2020). In addition to these studies, many studies have also found in related research that self-efficacy is the most robust predictor of behavioral changes regarding risk factors for coronary heart disease(Li & Lu, 2021; Wang & Wang, 2020). Zhang et al. (2018) found that 54% of young and middle-aged patients with coronary heart disease exhibited a moderate level of self-efficacy, while Cao et al. (2019) reported that 65.74% of patients demonstrated low levels of self-efficacy following PCI. Aronov et al. (2019) conducted a study on 508 patients diagnosed with coronary heart disease and discovered that those who exhibited higher levels of self-management efficacy also demonstrated greater ejection fraction. Fu et al. (2018) discovered a significant correlation between the self-management efficacy of patients with coronary heart disease and their overall health status. Through the aforementioned analysis, it is apparent that further research and intervention are necessary to address the self-efficacy of coronary patients both domestically and internationally.

Social support

Social support is a proper noun first proposed by Caplan in the 1970s (Caplan, 1974). He posits that social support is an ongoing social network that provides opportunities for individuals to understand themselves, face challenges and difficulties with spiritual and material assistance and support, thereby mitigating the impact of stress on physical and psychological health while increasing individual adaptability. This concept was initially introduced domestically. In China, it is more understood as the spiritual and material social support of the family members, friends

and other individuals or organizations (Cohen & Hoberman, 1983). Social support, as defined by Weber et al. (2010), refers to the act of individuals reaching out to others or groups through formal or informal channels in order to obtain information, reassurance, and assurance. Initially categorized into four types - informational support, instrumental support, evaluative support, and emotional support - social support serves a crucial role in promoting well-being. And now social support refers to the tangible and intangible assistance that individuals receive from significant others in their social network, including family members, relatives, neighbors, colleagues, etc. High-quality and ample support can help alleviate stress, reduce psychological burden, facilitate behavior modification and enhance patients' self-management capabilities (Upton et al., 2015).

A systematic review has demonstrated that social support from peers can enhance patients' self-efficacy in managing coronary heart disease, thereby improving their self-management abilities (Parry & Watt-Watson, 2010). Numerous domestic and international studies have demonstrated a positive correlation between social support and self-management behavior among patients with CHD, highlighting its crucial role in facilitating the practice of self-management behavior ($r=.791$, $p<.01$; $\beta=.325$, $p<.001$) (Bai & Zheng, 2021; Zhao, 2020). The influence of social support on the management of maladaptive behaviors is particularly significant and emotional management in the self-management behavior of patients with CHD ($\beta=.50$, $p<.01$) (Teleki et al., 2018).A foreign study suggest that social support can serve as a crucial factor in ensuring long-term health self-management and disease outcomes by providing both relational and resource-based guarantees (David et al., 2014). The degree of social support is positively associated with patients' adoption of behavioral changes and self-management practices (Lauck et al., 2009). In a number of studies on chronic diseases such as diabetes ($\beta=0.367$, $p<.05$) (Zhong et al., 2019), stroke($\beta=0.498$, $p<.001$) (Zhang et al., 2019) and coronary heart disease ($\beta=.108$, $p<.05$) (Chang et al., 2016). It has been found that patients' social support is positively correlated with self-management behavior and can be used as a predictor of self-management behavior.

Unlike other chronic diseases, patients with coronary heart disease not only experience sudden and life-threatening acute episodes but also endure the burden of long-term medication, restricted daily activities, and psychological distress with limited prospects for recovery (Li, 2018). Therefore, the social support for patients with coronary heart disease has gradually gained attention. The majority of studies indicate that social support plays a significant role in shaping behavioral habits and self-management among individuals with coronary heart disease (Mosleh & Darawad, 2015). A favorable family environment and a harmonious social atmosphere can play a significant role in facilitating patients to modify their behavior and cultivate healthy living habits, thereby enhancing their well-being and quality of life, reducing hospitalization duration, as well as increasing the compliance rate with regards to blood pressure, blood lipids, blood glucose levels and body mass index (Wang et al., 2016). Therefore, the significance of social support should not be overlooked, and healthcare professionals ought to collaborate with family members to fully harness and leverage patients' social support potential in enhancing their self-management behaviors.

In this paper, the health-related variables (social support, Self-perceived burden (SPB), health literacy and self-management) of CHD patients were reviewed, and we found that the four variables were more studied unilaterally, but the perceptual control was less studied in China, and the relevant studies among the four were lacking. It is suggested that when medical care and researchers do their clinical work to study the health-related factors in CHD patients, they can try to combine the above four patients and explore the possible intermediary role in a deeper step. Through the combination of internal and external factors of social support and perceptual control, we can work together on patients to improve patient confidence, form correct disease cognition and attitude, improve health literacy, make patients take the initiative to take healthy behaviors such as self-management, and improve the quality of life.

Summary

The influencing factors of self-management behavior in CHD patients encompass multiple dimensions, including sociodemographic data, disease-related data, and social psychology. However, the results of different studies are not entirely

consistent. Furthermore, some influencing factors may act as independent determinants of self-management behavior while also interacting with other factors.

This study is informed by the Individual and Family Self-Management Theory (IFSMT) to concentrate on patient and family practices in health and disease self-management, while also considering the role of family, friends, and community in maintaining a patient-centered focus. The IFSMT holds significant guiding implications for practical application. Since its inception, it has been extensively employed in research design (Shang et al., 2020), intervention, and the development of measurement tools(Fowler et al., 2020) pertaining to disease self-management behavior studies. The IFSMT is derived from the complex and dynamic phenomenon of my management behavior, which encompasses context, process, and outcomes. IFSMT argues that contextual factors, such as health literacy and perceived self-burden, exert an influence on the participation of individuals and families in the process of self-management. Moreover, factors within this process itself, including self-efficacy and social support, have a direct impact on both short-term (self-management behaviors) and long-term (quality of life) health outcomes for these groups.

Therefore, given the current state of self-management implementation, it is imperative to actively investigate the relevant factors that influence self-management behavior. Domestic research on the psychosocial factors related to disease self-management is limited, and there is no evidence of a relationship between health literacy, self-perceived burden, and self-efficacy. In this study, the five relationships were initially discussed to enhance medical workers' comprehension of the influencing factors on self-management behaviors in patients treated with PCI and provide a theoretical foundation for implementing effective interventions that promote self-management practices among patients.

CHAPTER 3
RESEARCH METHODOLOGY

This chapter elucidated the research context, target population and sample, measurement tools, ethical considerations, data collection procedures, and statistical analysis.

Research Design

A cross-sectional design was employed in this predictive study to establish the strength and direction of relationships between self-management behaviors and influencing factors. A cross-sectional study is an appropriate method for describing the status of phenomena or relationships among phenomena at a specific point in time. (Spector, 2019).

Research Setting

The study was conducted at the Second Affiliated Hospital of Wenzhou Medical University. This is a general hospital with approximately 2,667 beds and over 130 clinical departments, boasting 12 provincial key medical disciplines and 18 university-level research institutes. Our medical center conducts more than 2,500 percutaneous coronary intervention surgeries annually for patients with coronary heart disease. A cohort of 149 postoperative outpatients who underwent PCI were selected for follow-up.

Population and participants

The study participants were recruited from the Rehabilitation Clinic of the Second Affiliated Hospital of Wenzhou Medical University, located in Wenzhou, China. Data collection was performed from September 10th to December 31st, 2022. The study enrolled patients with coronary heart disease who underwent PCI and were followed up for 1 to 3 months at the Department of Cardiology. Sample size was calculated using G*Power 3.1 software, assuming a power of 90%, alpha level of .05, and a moderate effect size of 0.13 based on four independent variables (Eva et al.,

2015). A total of 124 subjects were recruited for this study, and after excluding 20% of invalid questionnaires, the final sample size was determined to be 149.

The following criteria were used for inclusion:

1. Patients who met the diagnostic criteria for coronary heart disease as proposed by the Guidelines of the Chinese Society of Cardiology underwent successful emergency or elective first stent implantation.
2. The patient was classified as NYHA class I
3. The age range of the participants was between 18 and 59 years old.
4. Able to fluently communicate in Chinese through listening, speaking, and writing.

Exclusion criteria

1. Damage to vital organ function or co-occurrence with other serious chronic conditions, such as malignant tumors, severe liver and kidney dysfunction, etc.
2. Severe audio-visual impairment, unable to cooperate with this study.
3. Had serious systemic diseases or mental disorders as diagnosed by the physician/ psychiatrist.
4. Unclear answers or incomplete filling in the questionnaire.

Sampling technique

With the hospital's approval, the researcher identified eligible patients who expressed willingness to participate in this study from the clinic. The researcher allocated a unique identifier to each patient on a small piece of paper and randomized them in a container. The researcher randomly picked up about half eligible patients depending on number of patients on the day. For example, if there were ten eligible patients receiving treatment on that day, the researcher would randomly select five patients, etc.

In this study, we selected outpatient follow-up patients who were diagnosed with coronary heart disease and underwent successful percutaneous coronary intervention (PCI) at the Second Affiliated Hospital of Wenzhou Medical University and returned for follow-up within 1-3 months.

1. The Second Affiliated Hospital of Wenzhou Medical University annually admits over 2,500 patients for percutaneous coronary intervention (PCI) surgery to treat coronary heart disease, and a cohort of 140 outpatient follow-up patients who underwent PCI were selected.

2. The outpatient department of the Department of Cardiology at the Second Affiliated Hospital of Wenzhou Medical University is designed to accommodate over 150 patients daily, operating from 7:30 a.m. to 12:00 p.m. and from 1:00 p.m. to 5:00 p.m.

3. The research proposal has been submitted to the Institutional Review Board (IRB) of BUU and The Second Affiliated Hospital of WMU for ethical review.

4. After obtaining ethical approval, a letter was obtained from the Dean of the Graduate School at BUU to request permission from the President of the Second Affiliated Hospital of WMU for data collection.

5. Reaching out to the Chief of Cardiology and Head Nurse of the Outpatient Department, in order to request permission for data collection through submission of a formal letter.

6. The researcher employed a simple random sampling technique to select study participants, initiating the process on working days in the morning when post-PCI patients with CHD arrived at the department for treatment follow-up.

7. The researcher provided a comprehensive explanation to the participants regarding the research objectives, data collection methods, human subject protection measures, and solicited their participation. Subsequently, the participants were requested to provide their consent by signing a form in accordance with their willingness.

8. The self-report was conducted through face-to-face communication during participants' free time. The instruments used included the General Data Questionnaire, Health Literacy Scale, Perceived Social Support Scale, Self-Perceived Burden Scale, CHD Self-Efficacy Scale and Coronary Heart Disease Self-Management Behavior Scale (CSMS).

9. Verify if all questionnaires have been fully completed.

10. Ensure that all data has been gathered and verified.

Research instruments

A total of six research instruments were utilized, namely: a demographic background questionnaire, a health literacy scale, a perceived social support scale, a self-perceived burden scale, the CHD Self-efficacy Scale and the Coronary Heart Disease Self-Management Behavioral Behavior Scale (CSMS).

Part I: Demographic data

The researcher developed the demographic background questionnaire (DBQ) to gather patients' demographic and background information, which was obtained through self-reports and medical records. The demographic information collected in the DBQ includes age, gender, BMI (height, weight), living status, marital status, residence, number of children, education level, occupation, insurance, smoking drinking, diseases diagnosis time(year), number of stents implanted and family history for coronary heart disease is noted alongside the year in which PCI was performed.

Part II: Self-Management Behaviors

The Coronary Heart Disease Self-Management Behaviors Scale, as developed by Lorig (2003), and translated by Wang (2011), was utilized to examine self-management behaviors that encompass 21 items and four dimensions: diet management, treatment adherence, symptoms management, and daily activities management. A rating of Level 5 on the Likert scale was implemented, where each item is assigned a score of 1 to 5 and the total score ranges from 21 to 105 points. The greater the score, the more effective the individual's self-management behavior. The score index was utilized as a metric for analysis, calculated by dividing the actual score of the scale by its maximum possible value and multiplying by 100%. The score index for self-management behaviors have been categorized into three levels: a low level at 60%, a moderate level ranging from 60% to 80%, and a high level above 80%.The Cronbach's of the questionnaire was 0.94, indicating good reliability and validity (Wu et al., 2011).

Part III Health Literacy

The health literacy assessment employs the health literacy scale for patients with chronic conditions developed by Jordan and revised by Sun (2013). The scale comprises 24 items, encompassing four dimensions: information acquisition (9 items),

interaction (9 items), willingness to improve health (4 items), and willingness to provide economic support (2 items). The Likert scale with a 5-point scoring system was employed. The total score was calculated as the aggregate of individual item scores, which ranged from 24 to 120.The higher scores indicated that the higher level of the patients' health literacy. The Cronbach's of each dimension was .947, .857, .933, .891, and the cumulative variation interpretation amount of 4 dimensions was 66.24%, with good structural validity, Cronbach's α is 0.901 (Sun et al., 2013). In our country, health literacy is assessed by a score of 96 or higher (80% correct) on the evaluation questionnaire(Sun et al., 2022).

Part IV Self- perceived burden

Self-Perceived Burden Scale (SPBS) was compiled by Cousineau (2003) and introduced in Sinicization by Wu (2010). The scale consists of three aspects, namely, physical burden, emotional burden, and financial burden. There are 10 entries, three dimensions, respectively physical, emotional, and economic. Body dimension includes items 1, 2, 5, 7, 8, where item 8 is scored in reverse; emotional dimension includes items 4, 6, 9, 10; and economic dimension is item 3. The total score ranges from 10 to 50 points, and the sum of the scores for each entry is the overall score of the self-sensory burden. The higher the overall score, the greater the patient's self-perception burden. The specific evaluation indicators are the score of self-sensory burden is <20, the mild level of self-sensory burden is 20-29, the moderate level of self-sensory burden is 30~39, and the severe level of self-sensory burden is 40. The 10 entries of SPBS have a Cronbach's coefficient of .85(Cousineau et al., 2003), indicating good reliability validity.

Part V Self-efficacy

The General Self-efficacy scale which developed by Schwarzer et al. (1995) and translated into Chinese by Wang et al. (2001) was used. The Chinese version of general Self-efficacy Scale consists of 10 items, and each item is given four grades: completely incorrect, somewhat correct, most correct, completely correct. The total score is 40 points. The scale is in the Chinese population Cronbach'α=0.87(Wang et al., 2001).

Part VI: Social support

The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1991) developed by Zimet in1987 and translated into Chinese as well as revised by Jiang (2001) was used in this study. The C-MSPSS can assess the overall level of social support that individuals perceive. This scale has 12 items with three dimensions of "support from family," "support from friend's support" and "support from significant other". Each of these groups consisted of four items. Items 3, 4, 8, 11 assess subscale of support from family. Items 6, 7, 9, 12 assess subscale of support from friends. Items 1, 2, 5, 10 assess subscale of support from significant other. Items is rated on a 7-point Likert scale that includes "1= Strongly disagree, 2= Very disagree, 3= Slightly disagree, 4= neutral, 5= Slightly agree, 6=Very agree, 7= Strongly agree". The higher the score, the higher the degree of individual social support. According to the range of the score, 12-36 points, 37-60 points and 61-84 points represents low social support, moderate social support, high social support respectively (Jiang, 2001). The Cronbach's is .921, family support, friends and .882, .886 and .793 (Blumenthal et al., 1987) for other support dimensions, respectively.

Validity

All research instruments utilized in this study have not undergone validity testing. They all are standardized instruments and have been widely used in previous research studies across countries including China.

Reliability

The reliability of all research instruments were assessed through Cronbach in this study. In the outpatient department of the Second Affiliated Hospital of Wenzhou Medical University, a preliminary study was conducted to assess the reliability of 30 patients who shared similar characteristics with those in the study sample. The Cronbach alpha coefficient analysis is considered acceptable if it yields a value of at least .70 (Taber, 2018). During the pilot study, the reliability of each questionnaire was assessed through a Cronbach's alpha coefficient test, yielding the following results: General self-efficacy (.921), Health literacy (.918), Social support (.926) Self- perceived burden (.880). Self-management behavior (.906).

Ethical Consideration

The research proposal was submitted to get approval from the Burapha University Ethics Committee on Human Research (Approval Number: G-HS051/2565) and the Institution Review Board (2022-K-77-02) of WMU and its second affiliated hospital for ethical approval. During the process of data collection, patients who have undergone PCI for CHD were received both oral and written information regarding the study's confidential and voluntary nature. Participants were granted the right to withdraw from the study at any point in time, and they were assured that their decision not to participate would not impact the services they receive. The participants provided their consent by signing the form prior to data collection. All collected data was securely stored, and study results were presented in an aggregated format without any individual identification. The data was solely utilized for research purposes and subsequently destroyed upon publication of study results.

Data collection procedures

The researcher conducted the data collection procedures in this study as follows:

1. The data collection was carried out following the approval of BUU EC and IRB from all relevant institutions. A letter from the Faculty of Nursing at BUU was sent to the Director of the Second Affiliated Hospital of WMU in Wenzhou, China.

2. A permission letter issued by the Dean of Graduate Affairs at Burapha University has been presented to the Director of the Second Affiliated Hospital of Wenzhou Medical University in order to obtain authorization for data collection.

3. Permission was obtained from hospital and cardiology clinic leaders prior to administering the questionnaire, while investigators were required to undergo daily nucleic acid testing and submit valid 2019-nCoV test reports.

4. A roster of participants scheduled for daily follow-up visits was obtained from the cardiology clinic one day prior. Patients who met the inclusion criteria on

that day were selected through simple random sampling, and a questionnaire was administered upon obtaining consent.

5. Prior to commencing the survey, researchers must evaluate the participants' condition and surroundings. Upon completion of their outpatient follow-up, participants were seated in a suitable location to initiate the questionnaire survey. Before commencing the survey, it is imperative to provide a comprehensive explanation of its purpose, significance and content. Following informed consent, participants were provided with a paper questionnaire in a secure and confidential environment. The completion of the questionnaire took approximately 30 minutes.

6. The self-report was conducted face-to-face during participants' free time, utilizing the General Data Questionnaire, Health Literacy Scale, Perceived Social Support Scale, Self-Sensory Burden Scale, CHD Self-Efficacy Scale and Coronary Heart Disease Self-Management Behavioral Behavior Scale (CSMS).

7. Upon completion of the questionnaire, participants were instructed to deposit both the paper and pen into a designated receptacle before departing. The researcher refrained from reviewing or marking any questionnaires in front of participants, with unfilled questionnaires being deemed invalid and excluded from data analysis.

Data analysis

The data was subjected to statistical analysis using SPSS software. Descriptive statistics, frequency distribution, percentage, mean and standard deviation were utilized to depict the demographic and other variables. The Enter method of multiple regression analysis was employed to investigate the impact of health literacy, self-perceived burden, self-efficacy, and social support on self-management behaviors among patients with coronary heart disease who underwent PCI in the outpatient department of the Department of Cardiology at the Second Affiliated Hospital of Wenzhou Medical University in China. The assumption testing of multiple regression was performed and a statistical significance level set at $p < .05$.

CHAPTER 4
RESULTS

This study aimed to investigate self-management behaviors and its influencing factors in adults with coronary heart disease after PCI. These factors include four elements: health literacy, self-perceived burden, self-efficacy and social support. Data were collected from 149 adult patients with coronary heart disease after PCI who were followed up in the outpatient department of the Department of Cardiology, the Second Affiliated Hospital of Wenzhou Medical University, in Wenzhou, China. The research results were presented in five parts as follows:

Part I: Demographic characteristics of adults with coronary heart disease after PCI

Part II: Descriptive information of Self- management behaviors

Part III: Factors related to self-management behaviors

Part IV: Correlation of the studied variables

Part V: Factors influencing self-management behaviors

Part I: Demographic characteristics of adults with coronary heart disease after PCI

Table 1 The findings indicated that 77.9% of the participants were male, with 55.7% falling within the age range of 40-49 years old, and 47% exhibiting overweight status; furthermore, a significant majority (80.5%) resided in urban areas. 62.4% of the participants cohabit with a spouse, and 47% received education at the secondary level. 84.6% of patients are married, and 51% have two offspring; while 51% of patients' monthly income falls within the range of 2001-4000¥. The mean monthly salary of Chinese citizens in 2022 is 4,810.58¥. Among the patients, 33.6% are professional technicians and 55.7% have medical insurance for urban residents. Additionally, 64.4% do not smoke and 74.5% do not drink alcohol. Furthermore, 48.3% of the patients were diagnosed with their disease within the past one to five years and a total of 79.2% suffer from at least one chronic illness. 51.2% of the patients underwent implantation of two stents, while 91.2% had no familial history of coronary

heart disease (CHD). The demographic characteristics of the study participants are presented in Table 1.

Table 1 Characteristics of participants (n = 149)

Variables	Frequency (149)	Percentage (%)
Gender		
Male	116	77.9
Female	33	22.1
Age (years old) Min = 23, Max = 59, *Mean*= 45.12, *SD*= 7.16		
Less than 29	5	3.4
30-39	24	16.1
40-49	83	55.7
50-59	37	24.8
BMI Min = 17.78, Max = 34.96, *Mean*= 24.69, *SD*= 3.17		
< 18.49	6	4.0
18.5-23.9	54	36.2
24-27.9	70	47.0
≥28	19	12.8
Residence		
City	120	80.5
Village	29	19.5
Living Status		
Spouse	93	62.4
Children/parents/grandchildren	43	28.9
Alone/others	13	8.7
Educational level		
Illiterate	3	2
Primary school	7	4.7
Secondary school	70	47.0
Vocational Certificate/High Vocational Certificate	53	35.6
Bachelor's degree	16	10.7
Marital Status		
Have spouse	126	84.6
Have no spouse	23	15.4
Number of children		
One	34	22.8
Two	76	51.0
Three	28	18.8
Four or more children	11	7.4

Table 1 (Continued)

Variables	Frequency (149)	Percentage (%)
Average monthly household income		
The average salary of Chinese people in 2022 is 4,810.58¥ per month		
< 2000 ¥	16	10.7
2001-4000 ¥	76	51.0
4001-5000 ¥	47	31.5
> 5000 ¥	10	6.7
Occupation		
Civil servant	15	10.1
Professional technicians	50	33.6
Workers or staff	37	24.8
Farmer/other	47	31.5
Insurance		
Medical insurance for employees	54	36.2
Medical insurance for urban residents	83	55.7
Self -paying /others	12	8.1
Smoking		
No	96	64.4
Yes	53	35.6
Alcohol drinking		
No	111	74.5
Yes	38	25.5
Duration since first diagnosis (years)		
< 1 year	30	20.1
1-5years	72	48.3
> 5years	47	31.5
Others comorbidity		
No	31	20.8
At least one chronic disease	118	79.2
Number of stents implanted		
One	50	33.6
Two	77	51.7
≥Three	22	14.8
Family history of CHD		
Yes	13	8.7
No	136	91.3

Part II: Descriptive information of Self -management behaviors

In this study, the highest and lowest scores for overall self-management among coronary heart disease patients were 84 and 21 points, respectively, with an average score of (64.53 ± 8.69) points. The self-management behavior score ranged from 21 to 105, with a mean score of 44-84. The scores for each dimension of self-management behaviors were as follows: treatment adherence management behavior (13.54 ± 3.33, 67.7%), diet management behavior (15.75 ± 3.95, 63%), daily activities management behavior (18.72 ± 3.56, 62.4%), and symptoms management behavior (16.52 ± 3.66, 55.1%).As shown in Table 2.

Table 2 Mean and Standard Deviation Self- management behaviors of and its dimensions (n =149)

Variables	Possible range	Actual range	Mean	*S.D.*	*Level*
Diet management	5-25	6-25	15.75	3.95	Moderate
Treatment adherence	4-20	6-20	13.54	3.33	Moderate
Symptoms management	6-30	9-26	16.52	3.66	Low
Daily activities management	6-30	9-29	18.72	3.56	Moderate
Self-management behaviors (Total)	21-105	44-84	64.53	8.69	Moderate

The greater the score, the more effective the individual's self-management behaviors. The score index was utilized as a metric for analysis, calculated by dividing the actual score of the scale by its maximum possible value and multiplying by 100%. According to the research findings in China, this survey categorizes the level of self-management behaviors into high, moderate, and low based on scoring indicators. Specifically, a score of ⩾ 80% indicates a high level, while scores ranging from 60%-80% indicate a moderate level and scores ⩽ 60% indicate a low level. In this study population, 72.5% of the patients exhibited a moderate level of self-management behaviors. As shown in Table 3.

Table 3 The level of Self- management behavior (n = 149)

Self-management behaviors	Score range	Number (n)	Percentage (%)
Poor level	≤63	40	26.8%
Moderate level	64－83	108	72.5%
High-level	≥84	1	0.7%

Part III: Factors related to self-management behaviors

This study investigated four factors associated with self-management behaviors, self-efficacy, health literacy, social support, and self- perceived burden. The findings indicated that the mean score for self-efficacy was 27.56 (SD=4.26), while the mean score for health literacy was 63.65 (SD=7.49). Additionally, social support received a mean score of 65.17 (SD=6.50) and self-perceived burden had a mean score of 31.45 (SD=4.04). As shown in Table 4.

Table 4 Mean and Standard Deviation (SD) of the factors related to Self -management behavior (n =149)

Variables	Possible range	Actual range	Mean	*S.D.*
Health literacy	24-120	49-79	63.65	7.49
Self -perceived burden	10-50	23-41	31.45	4.04
Self-efficacy	10-40	16-38	27.56	4.26
Social support	12-84	49-80	65.17	6.50

Part IV: Correlation results of all studied variables

The Pearson correlation test was employed to investigate the associations among self-efficacy, health literacy, social support, self-perceived burden and self-management behaviors.

From the perspective of the correlation matrix, self-efficacy, health literacy, and social support exhibited significant positive correlations with self-management behaviors (r=. 564, p<. 01; r=. 514, p<. 01; r=. 511, p<. 01). Conversely, self-

perceived burden was found to be significantly negatively correlated with self-management behaviors (r=-.436, p<.01), as shown in Table 5.

Table 5 Correlation between predictors and self-management behavior (n=149)

Variables	1	2	3	4	5
1. Health literacy	1				
2.Self-perceived burden	-.507**	1			
3.Self-efficacy	.471**	-.370**	1		
4. Social support	.390**	-.378**	.376**	1	
5. Self- management behaviors	.514**	-.436**	.564**	.511**	1

**P < .01

Part V: Factors influencing self-management behaviors

Prior to analysis, the assumptions of the multiple regression tests were tested. Self-management behaviors were the dependent variable, and health literacy, self-perceived burden, self-efficacy and social support were the four independent variables. Variance inflation factor (VIF) was used to test the collinearity between independent variables. The VIF value ranged from 1.299 to 1.583 in this study, indicating that the data met the assumptions of multiple linear analysis. A VIF value below 5 indicates a well-constructed model with linear independent variables and log odds. The normal distribution of data was demonstrated through regression residuals, Q-Q plots, and scatter plots. All variables were found to have a correlation coefficient smaller than 5, with no evidence of severe multicollinearity or outliers. Additionally, the homoscedasticity test yielded significant results ($p < .001$).

The coefficient of correlation (R) is a crucial indicator for assessing the linearity between variables and also reflects the degree of regression fitting. Typically, R values range from 0 to 1, with larger values indicating stronger linear relationships. In this study, the correlation coefficient R was found to be .69, indicating a significant positive relationship between medium and higher levels of the

variables under investigation. Additionally, R2 represents the proportion of variance in the dependent variable that can be explained by changes in the independent variable.

Regression analysis showed that self-efficacy, health literacy， self-perceived burden and social support significantly explained 47.3% of the differences in self-management behaviors, it can significantly positively affect patients' self-management behavior (R^2=0.473). Significant regression equation (F (4,144) =32.26, p<. 001), at least one of the four independent variables can significantly affect self-management behavior. The best predictor is self-efficacy (β= .328, p<. 001), followed by social support (β=. 268, p<. 001), followed by health literacy (β=. 197, p＜0.05), it can significantly positively affect patients' self-management behavior. Contrary to expectations, self-perceived burden (β= -. 113, p>. 05) is not a significant predictor of self-management behavior. The analysis results are shown in Table 6.

Table 6 The influence of factors predicting Self- management behaviors (n=149)

Predicting factors	B	SE	β	t	p-value
Health literacy	0.228	0.088	0.197	2.589	0.011
Self-perceived burden	-0.243	0.156	-0.113	-1.555	0.122
Self-efficacy	0.671	0.145	0.328	4.616	0.000
Social support	0.358	0.092	0.268	3.883	0.000
Constant=15.81, p<.05, R=.69, R^2= .47, R^2adjust= .46, F (4,144) =32.26, p<.001					

CHAPTER 5
CONCLUSION AND DISCUSSION

This chapter presents a comprehensive overview of the research evidence, an in-depth discussion of the research results, a critical analysis of the limitations of the study, and practical recommendations for clinical nursing practice, administrative management, health education and future research.

Summary of the research

The objective of this cross-sectional study is to delineate the self-management behaviors exhibited by adult patients with coronary heart disease who have undergone PCI in Wenzhou, and to examine how their self-perceived burden, health literacy, self-efficacy, and social support influence these behaviors. This study focuses on a sample of 149 adult patients who underwent percutaneous coronary intervention (PCI) for coronary artery disease at the Second Affiliated Hospital of Wenzhou Medical University and were subsequently followed up in an outpatient clinic in Wenzhou from September to December 2022.

The findings indicated that the majority of respondents were male (77.9%), with a significant proportion falling within the age range of 40 to 59 years old (55.7%). The mean age was calculated as 45.13 years old, with a standard deviation of 7.16. The prevalence of overweight individuals is 47%, with an average BMI of 24.69 (SD=3.17) and a range of BMIs from 17.78 to 34.96. The majority of patients reside in urban areas (80.5%), are married (62.4%), and cohabitate with their spouse (84.6%). Additionally, over half of the respondents reported having two children (51%) while nearly half had completed junior high school education (47%).51% of families with a monthly income between 2001-4000 ¥ possess medical insurance for urban residents, while 33.6% are professional technicians. Additionally, 79.2% of patients have at least one chronic disease and 51.7% of patients have two stents.

The mean score for self-management behavior was 64.53 (SD=8.69), indicating that the majority of participants exhibited moderate levels of self-management behaviors, accounting for 57.7%. The mean scores for factors

influencing self-management behaviors, including self-efficacy, health literacy, social support and perceived burden were 27.56 (SD=4.26), 63.65 (SD=7.49), 65.17 (SD=6.50) and 31.45 (SD=4.04), respectively.

Before conducting the analysis, the assumptions of multiple regression tests were assessed to ensure their validity. The dependent variable is self-management behavior, while the four independent variables are health literacy, self-perceived burden, self-efficacy, and social support. The findings indicate that self-efficacy, health literacy, self-perceived burden and social support collectively explain 47.3% of the variance in self-management behaviors ($F(4, 144) = 32.26$, $p < .001$). Among these factors, self-efficacy emerges as the strongest predictor ($\beta = .328$, $p < .001$), followed by social support ($\beta = .268$, $p < .001$) and then health literacy ($\beta = .197$, $p < .05$). Contrary to expectations, self-perceived burden did not exert a significant effect on self-management behaviors ($\beta = -.113$, $p > .05$).

Discussion

The self-management behavior refers to the autonomous actions taken by patients in order to mitigate the negative impact of their illness through monitoring and managing their own condition, ultimately leading to improved treatment outcomes and sustained disease management. This study aims to examine the current status of self-management behaviors among patients who have undergone PCI in Wenzhou, Zhejiang Province, and identify potential influencing factors. The ultimate goal is to explore effective strategies for enhancing patients' self-management behaviors.

Self-management behaviors of adult patients with coronary heart disease after PCI

Potential influencing factors encompass general demographic characteristics, disease features, health literacy, self-perceived burden, self-efficacy and social support. General demographic characteristics primarily comprise gender, age and income of the patient while disease features include past medical history, family history and complications that may have physical or psychological implications. According to relevant research both in China and abroad, the scoring

indicators can be classified into three levels: below 60% is considered a low level, between 60% and 80% is regarded as moderate, while above 80% is categorized as high. The findings indicated that the self-management behaviors score among the study population was (64.53 ± 8.69), with a corresponding index of 61.46%, indicating a moderate level of self-management. In this study, the patients' total score for self-management ability was found to be poor, which is consistent with Li (2016) research findings. The low educational background of the patients resulted in a lack of understanding regarding the importance of self-management behaviors. This study indicated that 72.5% of patients exhibit moderate levels of self-management behaviors, while 26.8% demonstrate low levels. The scores for each of the four dimensions are as follows: treatment adherence management behavior (13.54 ± 3.33), diet management behavior (15.75 ± 3.95), daily activities management behavior (18.72 ± 3.56), and symptoms management behavior (16.52 ± 3.66).

These findings are consistent with those reported both domestically and internationally (Muzeyyen et al., 2022). In this study, patients with low educational attainment, of whom 53.7% had completed junior high school or below, may exhibit inadequate awareness regarding the significance of self-management ability and lack relevant guidance and education. Therefore, their conceptualization and behavioral management necessitate improvement. In addition, 79.8% of the patients enrolled in this study have been afflicted with the disease for over a year, indicating that it is not their first encounter with cardiovascular illness and they may have experienced symptoms such as angina pectoris and arrhythmia prior to admission. 79.2% of the patients presented with at least one chronic condition, such as hypertension, diabetes, or hyperlipidemia. The persistent physical discomfort experienced by these individuals has led to a decrease in their vigilance and attention towards their illness, resulting in a lack of disease-related knowledge. This indirectly highlights the pressing need for enhancing self-management behaviors.

The results obtained from this study is consistent with Ye's (2017) findings on the baseline level of overall coronary heart disease patients, indicating that adult patients with coronary heart disease exhibit inferior self-management ability compared to other individuals. In the Wu (2019) study, patients with coronary heart

disease aged under 60 exhibited a lower baseline level of self-management compared to their older counterparts. Furthermore, post-PCI patients with coronary heart disease demonstrated relatively inferior levels of self-management ability when contrasted against adult patients without PCI. This may be associated with adult patients who believe that percutaneous coronary intervention (PCI) can rapidly restore blood flow and achieve vascular reconstruction, while neglecting the importance of secondary prevention in preventing recurrent vascular stenosis. It may also be linked to adult patients who tend to overlook self-management due to high stress levels from work, family, or education. Similar to the findings of Hu (2022), the results suggest that there is still a considerable gap from achieving optimal levels, indicating a need for improvement in self-management abilities among adult patients with coronary heart disease after PCI. Wang (2017) conducted a study on 359 patients who underwent PCI and discovered that the self-management behavior of patients after coronary artery stent implantation was rated at a lower middle level, which is far from reaching the ideal state. This finding is consistent with the research results of scholars such as Ding Biao et al. (2020).

Factors predicting self-management behavior

The second objective of this study is to examine the predictive factors that influence self-management behaviors. The standard multiple linear regression method was employed, with all factors entered simultaneously. The results of the multiple regression analysis indicated that self-efficacy, health literacy, self-perceived burden and social support significantly accounted for 47.3% of the variance in self-management behavior, which had a significant positive impact on patients' self-management behavior (R^2 =0.473). The regression equation was statistically significant (F (4,144) =32.26, p<.001). The findings of the present study indicate that self-efficacy (β =. 328, p<. 001), social support (β =. 268, p<. 001) and health literacy (β =. 197, p＜0.05) are significant predictors of self-management behavior among adult individuals following PCI. Despite initial expectations, the perceived burden on oneself (β = -.113, p > .05) did not prove to be a significant predictor of self-management behavior. Overall, the regression model accounted for 47.3% of the

variance in self-management behaviors. The most significant predictor is self-efficacy, followed by social support and health literacy.

The findings of this study provide empirical support for the research hypothesis that self-efficacy exerts a significant positive influence on self-management behaviors (β = .328, $p < .001$), and serves as one of the predictors of such behaviors. The predicted value indicates that a one-unit increase in self-efficacy standard deviation (SD=4.26) is associated with a 0.328 standard deviation increase in self-management behavior score (SD=8.69). The self-efficacy of the population in this study is moderately low, which falls short of the optimal level and is inferior to the findings reported by Zhang et al. (2018). The correlation may be directly linked to whether adult patients undergo percutaneous coronary intervention (PCI) surgery, which is an invasive cardiac intervention procedure. PCI surgery is an invasive cardiac intervention procedure. Postoperatively, adult patients with coronary heart disease generally exhibit low self-efficacy and lack knowledge of managing medication and daily life, which may compromise their postoperative efficacy. This is consistent with Liu's findings, which suggest that patients with a strong sense of self-efficacy exhibit better self-management behaviors; moreover, the level of self-management behavior increases in proportion to the degree of perceived self-efficacy(Liu & Sun, 2017). This implies that during the process of disease treatment and education, medical personnel should focus on enhancing patients' confidence in managing their illness, instructing them on how to effectively cope with health issues arising from the disease, and promoting adult patients' self-efficacy after PCI to facilitate their reintegration into society.

Social support emerged as a significant predictor of self-management behaviors (β=. 268, p<. 001). The findings of the present study revealed that patients with coronary heart disease had a mean score of 65.17 (±6.50) on their ability to comprehend social support, with family support being the highest dimension at 22.07 (±2.99), followed by other forms of support such as relatives and colleagues at 21.64 (±3.25), and friend support at 21.47 (±3.85). Therefore, the CHD patients in this study demonstrate a moderate level of social support comprehension, surpassing that of the CHD patient group studied by Shang et al. (2010) (60.11 ± 13.97), yet falling

short of the breast cancer patient group studied by Pan (2016) (91.97 ± 13.82). The findings indicate that patients with coronary heart disease may exhibit a greater propensity to seek financial and spiritual support from their spouses and parents during times of illness. This outcome is consistent with Dao's research, which demonstrated that increased social support can enhance patients' self-management capabilities(Dao et al., 2015). Therefore, it is imperative to acknowledge the pivotal role of social support in self-management behaviors post-PCI. Furthermore, health education programs for patients should emphasize the significance of social support and encourage patients and their families to seek out such resources, thereby facilitating a speedy return to society.

Among the current set of predictive variables, the prediction of health literacy on self-management behavior is also statistically significant (β =.197, p ＜.05). The findings indicated that patients with coronary heart disease had a mean total health literacy score of (63.65 ± 7.49) points, with the following dimensions: communication and interaction skills (26.79 ± 3.52) points, information acquisition abilities (17.32 ± 3.68) points, willingness to receive financial support (4.84 ± 1.41) points, and willingness to improve health (14.72 ± 2.27) points. The health literacy score of patients with coronary heart disease in this study is suboptimal, and inferior to that of hypertensive patients. Specifically, their ability to access information and willingness to provide financial support are relatively deficient(Sang et al., 2017). Research indicates that health literacy is a reliable predictor of self-management proficiency. According to Luke's (2017) findings, there exists a significant and positive correlation between health literacy and the ability to manage one's own health. Health literacy not only impacts individual health status, but also has a significant impact on public health. A longitudinal study conducted abroad demonstrated that higher levels of health literacy can significantly reduce the incidence of adverse outcomes related to heart disease and decrease mortality rates associated with heart failure (2019). In addition, Liu (2017) has noted that the relationship between health literacy and disease outcome is not a straightforward linear correlation. In conclusion, social support is one of the psychological factors that exert an impact on self-management behaviors.

In recent years, scholars in the field have come to believe that enhancing patients' health literacy is conducive to improving their ability to manage their own health and has significant value for enhancing disease prognosis and quality of life(Liu et al., 2019b). Xie et al. (2020) discovered that inadequate health literacy resulted in low levels of self- management behaviors due to difficulties in acquiring and comprehending disease and health knowledge, which increased the risk of chronic diseases such as coronary heart disease or had a negative impact on the illness.

The self-perceived burden factor did not demonstrate a significant impact on self-management behaviors in this study (β = -. 113, p>. 05). Despite the significant correlation between this factor and self-management behaviors indicated by Pearson correlation statistics (r=-.436, p<.01), there was a noteworthy negative association between self-perceived burden and self-management behavior; however, it did not exert a significant impact on self-management behaviors (β =. 14, p＞. 05). In this study, the self-perceived burden (SPB) score of adult patients who underwent coronary heart disease stent implantation was 31.45 ± 4.04, indicating a moderate level of burden.

The research findings indicate that a considerable proportion of patients (67.8%) experienced moderate to severe symptom burden. A significant negative correlation was observed between self-management behavior and self-perceived burden, suggesting that lower levels of self-management behavior were associated with higher levels of perceived burden among patients. These results are consistent with those reported by Li et al. (2016). This may be associated with the patient's ability to engage in effective self-management behaviors. Effective self-management can enhance patients' self-care abilities, reduce their reliance on others, promote independence, and facilitate the achievement of physical balance and optimal health outcomes. (Du, 2018). Foreign countries conduct more comprehensive research on psychological factors related to self-feeling burden, including suicidal tendencies, loss of dignity, and depression. Additionally, they explore the relationship between perfectionism, self-management, and coping styles. In China, self-perceived burden is primarily influenced by general demographic and disease-related factors, with relatively limited research on psychological factors. (Libert et al., 2017b).

Implications for Nursing

As the standard of living improves, more patients with coronary heart disease after PCI are paying more attention to their disease management and improving quality of life. With this regard, nurses should not only assess the effect of treatment but also pay more attention to the factors that influence self-management behaviors. This study found that health literacy, social support and self-efficacy significantly positively predict self-care behaviors. Therefore, nurses could use these results to design effective interventions. One of the possible ways for nurses to provide more robust interventions and promote patients' quality of life is through an in-depth understanding of the misunderstandings of patients with coronary heart disease following could provide beneficial interventions such as adjusting patients' unhealthy lifestyles and behaviors, helping them to gain more and better social support, along with building their confidence to overcome such the disease.

Limitations in this study

This study had some certain limitations. One of the limitations of this study was the use of a cross-sectional design, because self-management behavior of patients with coronary heart disease after PCI changes over time, so data collected from multiple or longitudinal patients is better suited to fully describe the nature of the variables. Another limitation is the settings for data collection. The study was conducted at only one hospital. Although the hospital is a general Grade 3, Grade A provincial hospital in Wenzhou, it may limit the generalization of the findings. And the research on longitudinal and qualitative aspects needs to be further developed.

Conclusion

This study focused on the factors affecting self-management behavior of adults with coronary heart disease after PCI, and found that health literacy, social support, and self-efficacy had a significant impact on patients' self-management behavior. This study would be helpful for nursing staff to apply the research results to improve self-management behaviors of adults with coronary heart disease after PCI.

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Zimet, G. D., Dahlem, N. W., & Walker, R. R. (1991). The Multidimensional Scale of Perceived Social Support: a confirmation study. *J Clin Psychol, 52*(6), 756-761. https://doi.org/10.1002/1097-4679(199111)47:63.0.CO;2-L

APPENDIX

APPENDIX A

Demographic Questionnaire

Instructions: Please mark (√) in the appropriate box or write down your answers into the blank (……)

1. Age …… years

2. Gender: ☐ Male ☐ Female

3. Height ……cm

4. Weight……Kg

5. Residence 口 City 口 Village

6. Living with people

口 spouse 口 Children/parents/grandchildren 口 Alone/Other

7. Educational level

☐Illiteracy ☐Primary school ☐Secondary school

☐Vocational Certificate/High Vocational Certificate ☐Bachelor's degree

8. Marital status

口 Have spouse 口 Have no spouse

9. Number of children

口 one 口 two 口 three 口 Four or more

10. Average monthly household income

口＜2000￥ 口 2001-4000￥

口 4001-5000￥ 口＞5000￥

11. Occupation :(If you have retired, please fill in your pre-retirement career)

口 Civil servant □Professional technicians

口 Workers or staff 口 Farmer/Other

12. Insurance

口 Medical insurance for employees

口 Medical insurance for urban residents

☐ Self -paying /others

13. Smoking（Smoking at least one cigarette a day lasts for a year）

□No

□Yes

14. Alcohol drinking（Drink more than one amount a day for more than a year）

□No

□Yes

15. Duration since first diagnosis (years)

□＜1 year □1-5year □＞5year

16. Others comorbidity

□ No

□ Yes（□ Hypertension □ Diabetes □ Hyperlipemia (At least one chronic disease))

17. Number of stents implanted

□ 1 □ 2 □≥3

18. Family history of CHD

□ Yes

□ No

Perceived social support scale (PSSS)

Please select the best option on the right and type it "√"

	Extremely Disagree	Very Disagree	Slightly Disagree	Neutral	Slightly agree	Very agree	Extremely agree
1.There is a special person who is around when I am in need.	1	2	3	4	5	6	7
……							
……							
……							
……							
……							
……							
……							
……							
……							
……							
12. I can talk about my problems with my	1	2	3	4	5	6	7

elf-perceived burden

There are 10 questions about the self-perceived burden here. Please answer according to your actual situation, answer, please do not have any concerns, carefully answer your own opinion to each question.

	Never consider	Occasionally consider	Sometimes consider	frequent consider	Always consider
1.I fear that the caregivers will affect their health because they take care of me	1	2	3	4	5
……					
……					
……					
……					
……					
……					
……					
……					
10.I am concerned that the physical health of my caregivers will not meet the needs to care for me	1	2	3	4	5

Health Literacy Scale

Do you have the ability to do the following? (Please check"√" which option you agree with.)

Item	completely unable	very difficult	Some difficulty	little difficulty	No difficulty
1） Read a hospital or clinic health	1	2	3	4	5
……					
……					
……					
……					
……					
……					
……					
……					
……					
……					
……					
……					
16） Do you often discuss your health with anyone other than your doctor?	1	2	3	4	5

Item	never thought	Thought no action	seldom	Occasionally	Often
17） To what extent did you consider practicing the health information you get in your daily life?	1	2	3	4	5
……					
……					
20） To what extent have you consider having family or friends to accompany you to a doctor?	1	2	3	4	5

Item	Very reluctant	unwillingness	No difference	Willingness	with pleasure
21） Are you willing to invest time in your health?	1	2	3	4	5
……					
……					
24） Are you willing to make lifestyle changes to improve your health?	1	2	3	4	5

BURAPHA UNIVERSITY

CHD Self-Management Behavioral Scale

1- Not at all, 2-rarely, 3-somewhat, 4-often, 5- completely

	Self-management behaviors	1	2	3	4	5
diet management	Be able to avoid overeating and drinking, and adhere to a light and low-salt diet (sodium salt <5g per day)					
	……					
	……					
	……					
	……					
	Stop smoking and limit alcohol (limit liquor/alcohol)					
treatment adherence	Blood pressure is measured regularly (blood sugar is measured for diabetes)					
	……					
	……					
	……					
	……					
	……					
	……					
	Be able to understand the common adverse reactions of the drugs you are taking					
symptoms management	Stick to regular life					
	……					
	……					
daily activities management	Participate in community activities or other recreational activities in your spare time					
	……					
	……					
	……					

General self-efficacy Scale（GSES）

For your usual general opinion of yourself, please type "√" on the appropriate □ on the right according to your actual situation (actual feelings). There is no right or wrong answer, and there is no need to think more about each sentence.

	Items	Not true at all 1	A little bit right 2	Mostly true 3	absolutely right 4
1	I can always solve problems if I try my best				
2	……				
3	……				
4	……				
5	……				
6	……				
7	……				
8	……				
9	……				
10	Whatever happens to me, I can handle it, you know				

APPENDIX B

Institutional Review Board Approval

IRB of Burapha University

สำเนา

ที่ IRB3-065/2565

เอกสารรับรองผลการพิจารณาจริยธรรมการวิจัยในมนุษย์
มหาวิทยาลัยบูรพา

คณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ มหาวิทยาลัยบูรพา ได้พิจารณาโครงการวิจัย

รหัสโครงการวิจัย : G-HS051/2565
โครงการวิจัยเรื่อง : Factors influencing self-management behaviors among adults with coronary heart disease after percutaneous coronary intervention
หัวหน้าโครงการวิจัย : MRS.WENQIN LIU
หน่วยงานที่สังกัด : คณะพยาบาลศาสตร์

BUU Ethics Committee for Human Research has considered the following research protocol according to the ethical principles of human research in which the researchers respect human's right and honor, do not violate right and safety, and do no harms to the research participants.

Therefore, the research protocol is approved (See attached)

1. Form of Human Research Protocol Submission Version 2 : 5 August 2022
2. Research Protocol Version 1 : 16 June 2022
3. Participant Information Sheet Version 2 : 5 August 2022
4. Informed Consent Form Version 2 : 5 August 2022
5. Research Instruments Version 1 : 16 June 2022
6. Others (if any) Version - : -

วันที่รับรอง : วันที่ 9 เดือน สิงหาคม พ.ศ. 2565
วันที่หมดอายุ : วันที่ 9 เดือน สิงหาคม พ.ศ. 2566

ลงนาม *Assistant. Professor Ramorn Yampratoom*
(*Assistant. Professor Ramorn Yampratoom*)
Chair of The Burapha University Institutional Review Board
Panel 3 (Clinic / Health Science / Science and Technology)

IRB of the Second Affiliated Hospital of Wenzhou Medical University

温州医科大学附属第二医院 温州医科大学附属育英儿童医院

伦理委员会审查批件

批件号：伦审（2022-K-77-02）

科室：DSA 中心	主要研究者：刘文芹		职称：主管护师
项目名称	影响冠心病 PCI 术后自我管理行为的相关因素		
项目来源	自选课题		
审查类别	复审	审查方式	简易审查
审查日期	2022 年 7 月 24 日	审查地点	/
审查委员	王爱霞		
审查材料	1. 临床课题研究复审申请 2. 试验方案（版本号：V2.0；版本日期：2022.5.30）		
审查意见	经过我院医学伦理委员会审查，审查结果为：同意		
年度/定期跟踪审查	审查频率为该研究批准之日起每 12 月一次，首次请于 2023 年 7 月 23 日前 1 个月递交"定期/年度研究进展报告"。 本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。		
批件有效期	2022 年 7 月 24 日——2023 年 7 月 23 日（逾期未实施，自行废止）		
主任委员签字： 日　期：2022 年 7 月 24 日 温州医科大学附属第二医院 温州医科大学附属育英儿童医院 医学伦理委员会（盖章）			

声明：

本伦理委员会的职责、人员组成和工作程序均遵循 ICH-GCP、NMPA-GCP、中国相关法律和法规。

注意事项：

1）修改试验方案、知情同意书、招募广告及其他提供给受试者的相关材料，请及时提交"修正案审查申请"。

地址：浙江省温州市龙湾区温州大道东段 1111 号　　电话：0577-85676879　　邮编：325000

2）本中心发生的医疗器械严重不良事件或药物可疑且非预期严重不良反应及研发期间安全性更新报告须按照 NMPA/GCP 最新要求及时递交我院伦理委员会，国内外其他中心发生的严重不良事件或药物可疑且非预期严重不良反应需定期汇总后递交伦理委员会，伦理委员会有权对其评估做出新的决定。

3）研究纳入了不符合纳入标准或符合排除标准的受试者，符合中止试验规定而未让受试者退出研究，给予错误治疗剂量，给予方案禁止的合并用药等没有遵从方案的情况；或可能对受试者的权益\健康以及研究的科学造成不良影响等偏离 GCP 原则的情况，请发现者及时提交“不依从或违背方案报告”。

4）自批件签发之日起，请研究者在规定的跟踪审查截止日期前 1 个月提交“定期/年度研究进展报告”，本伦理委员会有根据实际进展情况改变跟踪审查频率的权利。

5）暂停或提前终止临床研究，请及时提交书面申请。

6）完成试验请及时提交“结题报告”。

7）凡涉及中国人类遗传资源采集标本、收集数据等研究项目，必须获得中国人类遗传资源管理办公室批准后方可在本中心开展研究。

8）凡经我院伦理委员会批准的研究项目在实施前，申请人应按相关规定在国家卫健委、药审中心等的临床试验登记备案信息系统平台登记研究项目相关信息。

地址：浙江省温州市龙湾区温州大道东段 1111 号　电话：0577-85676879　邮编：325000

APPENDIX C

Permission of using questionnaires

Permission of using self-management behaviors

RE: Scale Permission ☆

发件人：**lorig** <lorig@stanford.edu>
时　间：2022年4月27日（星期三）上午10：22
收件人：墨菲堡 <403693346@qq.com>

纯文本 |

邮件可翻译为中文　立即翻译

Yes, you have my permission to use the scale. Good luck with your thesis

From: 墨菲堡 <403693346@qq.com>
Sent: Tuesday, April 26, 2022 6:31 PM
To: Kate R Lorig <lorig@stanford.edu>
Subject: Scale Permission

Dear Professor, I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your self-management behavior scale for my master's thesis? Thank you very much for your support.

快捷回复给：Kate R Lorig

回复：量表使用许可（Scale Permission） ☆

发件人：**zzy1968chn** <zzy1968chn@163.com>
时　间：2022年4月29日（星期五）上午6：15
收件人：墨菲堡 <403693346@qq.com>

纯文本 |

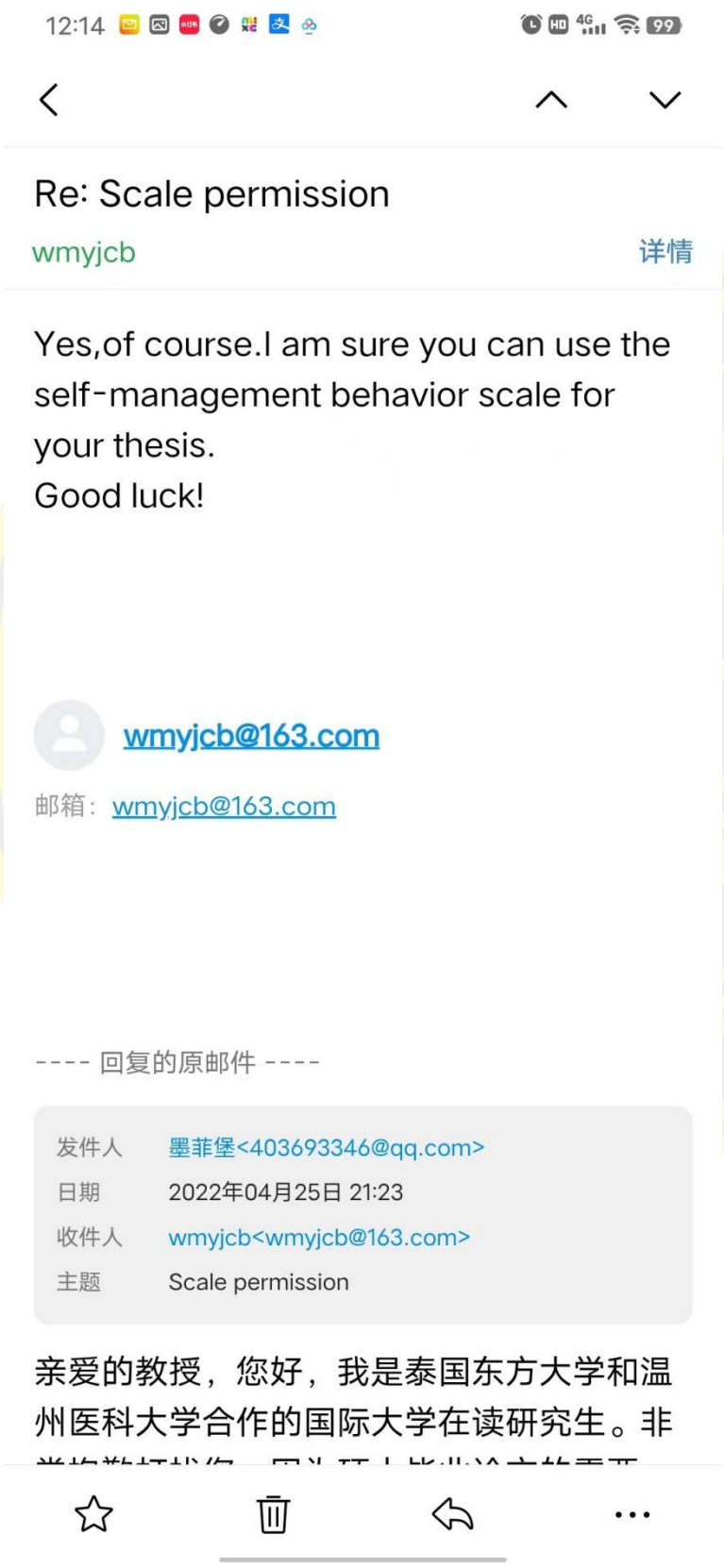
邮件处理：已于 2022年4月29日(星期五) 上午7:19 回复了此邮件

武燕燕老师同意您使用该量表

发自我的手机

-------- 原始邮件 --------
发件人： 墨菲堡 <403693346@qq.com>
日期： 2022年4月24日周日 23:02
收件人： zzy1968chn <zzy1968chn@163.com>
主 题： 量表使用许可（Scale Permission）

> 亲爱的教授，您好，我想找武燕燕老师，我实在找不到她的邮箱，我尝试了几个是错的，麻烦您转告她，想得到她的量表使用许可。非常感谢。
> 我是泰国东方大学和温州医科大学合作的国际大学在读研究生。非常抱歉打扰您。因为硕士毕业论文的需要，我可以使用您的自我感受负担量表吗？非常感谢您的支持。
> Dear professor, HELLO, I want to find Teacher Wu Yanyan, but I really can't find her email address. I tried several but made a mistake. Please tell her that I want to get her permission to use the scale. Thank you very much.
> I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your Self-perceived burden scale for my master's thesis? Thank you very much for your support.



12:14

Re: Scale permission

wmyjcb 详情

Yes,of course.I am sure you can use the self-management behavior scale for your thesis.
Good luck!

wmyjcb@163.com

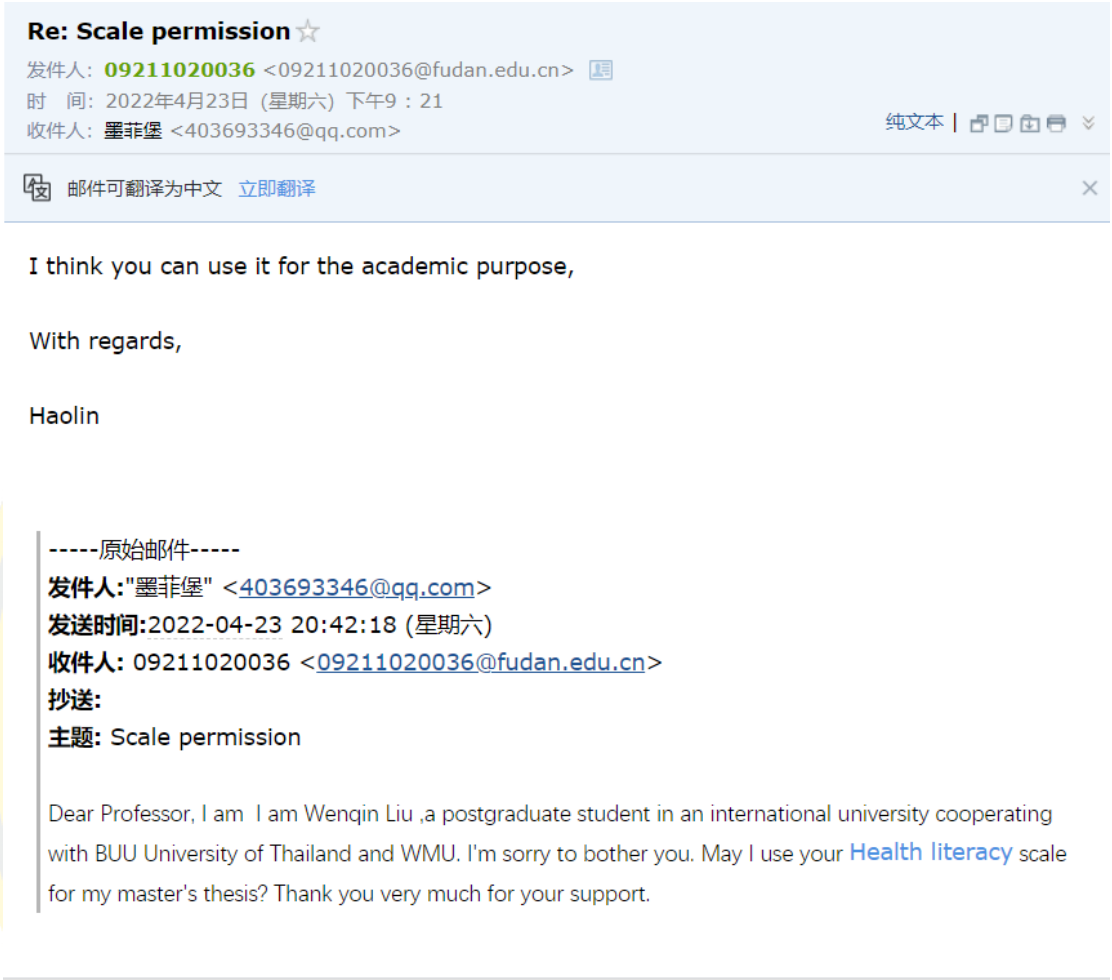
邮箱：wmyjcb@163.com

---- 回复的原邮件 ----

发件人	墨菲堡<403693346@qq.com>
日期	2022年04月25日 21:23
收件人	wmyjcb<wmyjcb@163.com>
主题	Scale permission

亲爱的教授，您好，我是泰国东方大学和温州医科大学合作的国际大学在读研究生。非

Permission of using Health Literacy



Re: Scale permission ☆

发件人：**09211020036** <09211020036@fudan.edu.cn>
时　间：2022年4月23日（星期六）下午9：21
收件人：墨菲堡 <403693346@qq.com>

纯文本 |

邮件可翻译为中文　立即翻译

I think you can use it for the academic purpose,

With regards,

Haolin

-----原始邮件-----
发件人:"墨菲堡" <403693346@qq.com>
发送时间:2022-04-23 20:42:18 (星期六)
收件人: 09211020036 <09211020036@fudan.edu.cn>
抄送:
主题: Scale permission

Dear Professor, I am I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your Health literacy scale for my master's thesis? Thank you very much for your support.

Permission of using Self-perceived burden

Re: Scale permission ☆

发件人：**mcdowell** <mcdowell@uottawa.ca>
时　间：2022年4月24日（星期日）上午6：53
收件人：墨菲堡 <403693346@qq.com>

纯文本 |

邮件处理：已于 2022年4月24日(星期天) 上午6:54 回复了此邮件

邮件可翻译为中文　立即翻译

Yes, certainly you may use the Caregiver Burden Scale in your research.
Yours sincerely,
Ian McDowell

From: 墨菲堡 <403693346@qq.com>
Sent: April 23, 2022 9:04 AM
To: Ian McDowell <mcdowell@uottawa.ca>
Subject: Scale permission

Attention : courriel externe | external email

亲爱的教授，您好，我是泰国东方大学和温州医科大学合作的国际大学在读研究生。非常抱歉打扰您。因为硕士毕业论文的需要，我可以使用您的自我感受负担吗？非常感谢您的支持。

Dear Professor, I am I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your Self-perceived burden scale for my master's thesis? Thank you very much for your support.

Permission of using PSSS

RE: [External] Scale Permission ☆

发件人：**Zimet, Gregory D** <gzimet@iu.edu>
时　间：2022年4月24日（星期日）下午10：05
收件人：墨菲堡 <403693346@qq.com>
附　件：3 个 (0732 Zimet - MSPSS - Chapter 1998.pdf...)　　纯文本 |

邮件处理：已于 2022年4月24日(星期天) 晚上10:14 回复了此邮件

Dear Wenqin Liu,

You have my permission to use the Multidimensional Scale of Perceived Social Support (MSPSS) in your research. I have attached the original English language version of the scale (with scoring information on the 2nd page), a document listing several of the articles that have reported on the reliability and validity of the MSPSS, and a chapter that I wrote about the scale.

I hope your research goes well.

Best regards,
Greg Zimet

Gregory D. Zimet, PhD, FSAHM
Professor of Pediatrics & Clinical Psychology
Co-Director, IUPUI Center for HPV Research
Division of Adolescent Medicine | Department of Pediatrics

410 W. 10th Street | HS 1001
Indianapolis, IN 46202
+1.317.274.8812 tel
+1.317.274.0133 fax
gzimet@iu.edu
Hear my name

INDIANA UNIVERSITY
SCHOOL OF MEDICINE
PREPARING **HEALERS.** TRANSFORMING **HEALTH.**

Web Pages:
https://medicine.iu.edu/faculty/2816/zimet-gregory
https://medicine.iu.edu/pediatrics/specialties/adolescent-medicine/research/hpv

From: 墨菲堡 <403693346@qq.com>
Sent: Sunday, April 24, 2022 9:40 AM
To: gzimet <gzimet@iupui.edu>
Subject: [External] Scale Permission

You don't often get email from 403693346@qq.com. Learn why this is important
This message was sent from a non-IU address. Please exercise caution when clicking links or opening attachments from external sources.

Dear Professor, I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your Psss scale for my master's thesis? Thank you very much for your support.

附件(3 个)

普通附件 (已通过电脑管家云查杀引擎扫描) 全部下载 全部收藏

0732 Zimet - MSPSS - Chapter 1998.pdf (538.52K)
预览 下载 收藏 翻译

MSPSS References.pdf (158.50K)
预览 下载 收藏 翻译

MSPSS.pdf (20.10K)
预览 下载 收藏 翻译

Re: 量表使用许可（Scale Permission） ☆

发件人：**jqj** <jqj@zj.com>
时　间：2022年4月26日（星期二）上午9：07
收件人：墨菲堡 <403693346@qq.com>

纯文本 |

同意

姜乾金

-----原始邮件-----
发件人:"墨菲堡" <403693346@qq.com>
发送时间:2022-04-24 21:00:17 (星期日)
收件人: jqj <jqj@zj.com>
抄送:
主题: 量表使用许可（Scale Permission）

亲爱的教授，您好，我是泰国东方大学和温州医科大学合作的国际大学在读研究生。非常抱歉打扰您。因为硕士毕业论文的需要，我可以使用您的领悟社会支持量表吗？非常感谢您的支持。

Dear Professor, I am I am Wenqin Liu ,a postgraduate student in an international university cooperating with BUU University of Thailand and WMU. I'm sorry to bother you. May I use your Perceived Social Support scale for my master's thesis? Thank you very much for your support.

————————————————————
姜乾金 浙江大学 教授 主任医师
邮箱 jqj@zj.com 手机 13018972720
网站 www.medline.com.cn 免费下载:
《医学心理学-理论、方法与临床》等新书
————————————————————
医学心理学老专家联谊会网址:
http://www.medline.com.cn/index(1).htm

Permission of using general self-efficacy scale

Everything you wanted to know about the
General Self-Efficacy Scale
but were afraid to ask
by Ralf Schwarzer, May 30, 2014

There is no other manual of the GSE. This is the only documentation. Don't send eMails asking for more!

There are currently scale versions adapted to 33 languages. See:
http://userpage.fu-berlin.de/~health/selfscal.htm

The purpose of this FAQ is to assist the users of the scales published at the author's web pages http://www.ralfschwarzer.de/ Here you find lots of other resources.

Before attending to the questions below you might want to study our web pages. You might not have any questions after reading the web pages.

Do I need permission to use the general perceived self-efficacy (GSE) scale?

For a permission letter, see page 9.You do not need our explicit permission to utilize the scale in your research studies. We hereby grant you permission to use and reproduce the General Self-Efficacy Scale for your study, given that appropriate recognition of the source of the scale is made in the write-up of your study.

The main source is attached to this FAQ:
Schwarzer, R., & Jerusalem, M. **(1995)**. Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, England: NFER-NELSON.

An additional source for the German version is:
Schwarzer, R., & Jerusalem, M. (Eds.). (1999). *Skalen zur Erfassung von Lehrer- und Schülermerkmalen: Dokumentation der psychometrischen Verfahren im Rahmen der Wissenschaftlichen Begleitung des Modellversuchs Selbstwirksame Schulen*. Berlin: Freie Universität Berlin.

APPENDIX D

Permission for data collection

MHESI 8137/1240

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

August 31th, 2022

To The president of the Second Affiliated Hospital of Wenzhou Medical University,

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments (Try out)

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Wenqin Liu to collect data for testing the reliability of the research instruments.

Mrs. Wenqin Liu, ID 63910126, a graduate student of the Master of Nursing Science program (International Program) in Adult Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her dissertation proposal entitled: "Factors influencing self-management behaviors among adults with coronary heart disease after percutaneous coronary intervention" under supervision of Assoc. Prof. Dr. Pornpat Hengudomsub as the principle advisor. She proposes to collect data from 30 adult patients with coronary heart disease after percutaneous coronary intervention who came for follow-up at Out-patient department of the Second Affiliated Hospital of Wenzhou Medical University.

The data collection will be carried out from August 29 to September 5, 2022. In this regard, you can contact Mrs. Wenqin Liu via mobile phone +86-1599-0757-096 or E-mail: 403693346@qq.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

(Assoc. Prof. Dr. Nujjaree Chaimongkol)
Dean of Graduate School, Burapha University

Carbon Copy: Xueqin Yan
Director of Out-patient Department

Graduate School Office
Tel: +66 3810 2700 ext. 701, 705, 707
E-mail: grd.buu@go.buu.ac.th
http://grd.buu.ac.th

เอกสารนี้ลงนามด้วยลายเซ็นอิเล็กทรอนิกส์ ตรวจสอบได้ที่ (https://e-sign.buu.ac.th/verify)

MHESI 8137/1241

Graduate School, Burapha University
169 Longhaad Bangsaen Rd.
Saensuk, Muang, Chonburi
Thailand, 20131

August 31th, 2022

To The president of the Second Affiliated Hospital of Wenzhou Medical University,

Enclosure: 1. Certificate ethics document of Burapha University
2. Research Instruments

On behalf of the Graduate School, Burapha University, I would like to request permission for Mrs. Wenqin Liu to collect data for conducting research.

Mrs. Wenqin Liu, ID 63910126, a graduate student of the Master of Nursing Science program (International Program) in Adult Nursing Pathway, Faculty of Nursing, Burapha University, Thailand, was approved her dissertation proposal entitled: "Factors influencing self-management behaviors among adults with coronary heart disease after percutaneous coronary intervention" under supervision of Assoc. Prof. Dr. Pornpat Hengudomsub as the principle advisor. She proposes to collect data from 149 adult patients with coronary heart disease after percutaneous coronary intervention who came for follow-up at Out-patient department of the Second Affiliated Hospital of Wenzhou Medical University.

The data collection will be carried out from September 6 to December 6, 2022. In this regard, you can contact Mrs. Wenqin Liu via mobile phone +86-1599-0757-096 or E-mail: 403693346@qq.com

Please do not hesitate to contact me if you need further relevant queries.

Sincerely yours,

(Assoc. Prof. Dr. Nujjaree Chaimongkol)
Dean of Graduate School, Burapha University

Carbon Copy: Xueqin Yan
Director of Out-patient Department

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เอกสารนี้ลงนามด้วยลายเซ็นอิเล็กทรอนิกส์ ตรวจสอบได้ที่ (https://e-sign.buu.ac.th/verify)

Please type or write with readable hand writing

GRD-109 (Eng)
(Try Out)

Graduate School Burapha University

Request form for issuing a requesting letter for data collection (Try Out)

To Dean of Graduate School

I am (Mr./Mrs./Ms.) Wenqin Liu Student ID #.....63910126.....

❑ Doctoral degree √ Master degree - plan ⊘ A1 ○ B Study type ⊘ Full-time · Part-time

Program Master of Nursing Science Major/Pathway..... Adult Nursing

Faculty Faculty of Nursing Telephone +8615990757096 E-mail 403693346@qq.com

Doctoral dissertation/ Master thesis/ IS **Title**: **Factors influencing self-management behaviors among adults with coronary heart disease after percutaneous coronary intervention**

Principal advisor' name..... Dr. Pornpat Hengudomsub.....

I would like to request for issuing **a requesting letter for data collection (Try Out)**:

By issuing to (name of the director of Institute/ University/ Organization)

.....Xueqin Yan， the director of Outpatient Department of the Second Affiliated Hospital of Wenzhou Medical University

To collect data from (details of participants and sample size) .....

Adults patients with coronary heart disease after percutaneous coronary intervention who came for follow-up at Out-patient Department of the Second Affiliated Hospital of Wenzhou Medical University for 30 cases.

Duration of data collection: from date…August 29 – September 5 , 2022.....

My contact information: # cellphone and E-mail .....+8615990757096 .....E-mail:403693346@qq.com.

With this request, I have enclosed documents 2 copies

1) A copy of proof of ethical approval from Burapha university, and
2) Research instruments

Please be informed accordingly,

Student's name .....*Wenqin Liu*.....

(.....Mrs.Wenqin Liu .....)

Date…10… Month…August……Year…2022..

Principal advisor acknowledged	Dean of Faculty/College acknowledged	Dean of Graduate School approved
Approved (Signed)..... Date…10 August, 2022	(Signed)..... Date..... 22 AUG 2022	(Signed)..... (Assoc.Prof.Dr.Nujjaree Chaimongkol) Dean of Graduate School Date..... 31 August 2022

Please type or write with readable hand writing

GRD-109 (Eng)
(Main Study)

Graduate School Burapha University

Request form for issuing a requesting letter for data collection (Main Study)

To Dean of Graduate School

I am (Mr./Mrs./Ms.) Wenqin Liu Student ID #.....63910126.....

❑ Doctoral degree √ Master degree - plan Ø A1 ○ B Study type Ø Full-time Part-time

Program Master of Nursing Science Major/Pathway..... Adult Nursing

Faculty Faculty of Nursing Telephone +86-15990757096 E-mail 403693346@qq.com

Doctoral dissertation/ Master thesis/ IS **Title:** Factors influencing self-management behaviors among adults with coronary heart disease after percutaneous coronary intervention

Principal advisor' name Assoc. Prof. Dr. Pornpat Hengudomsub.....

I would like to request for issuing **a requesting letter for data collection (Main Study)**:

By issuing to (name of the director of Institute/ University/ Organization)

Xueqin Yan， the director of Outpatient Department of the Second Affiliated Hospital of Wenzhou Medical University

To collect data with adult patients with coronary heart disease after percutaneous coronary intervention at the Out-patient Department of the Second Affiliated Hospital of Wenzhou Medical University for 149 cases.

Duration of data collection: from date…September, 6, 2022…….to……December 6, 2022

My contact information: # cellphone and E-mail .....+8615990757096 ....E-mail：403693346@qq.com..

With this request, I have enclosed documents 1 copies

1) A copy of proof of ethical approval from Burapha university, and A copy of proof of ethical approval from The Second Affiliated Hospital of Wenzhou Medical University
2) Research instruments

Please be informed accordingly,

Student's name ……*Wenqin Liu*……

(……Mrs.Wenqin Liu ……)

Date…10… Month…August……Year…2022..

Principal advisor acknowledged	Dean of Faculty/College acknowledged	Dean of Graduate School approved
Approved Pornpat Hengudomsub (Signed)..... Date…10 August, 2022	(Signed) Pornpat Date 22 AUG 2022	(Signed)..... (Assoc.Prof.Dr.Nujjaree Chaimongkol) Dean of Graduate School Date 31 August 2022

BIOGRAPHY

NAME	Wenqin Liu
DATE OF BIRTH	07 June 1984
PLACE OF BIRTH	China
PRESENT ADDRESS	Room 13-1901, No.9 Garden, Daodexin Country Garden, Wutian Street, Ouhai District, Wenzhou, Zhejiang.
POSITION HELD	Student
EDUCATION	Undergraduate course