

RESEARCH ARTICLE

Relationship between Self-Management Behavior on the Severity of Artery Coronary Disease

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Abstract

Coronary artery disease (CAD) is a non-communicable disease that is the main cause of death and loss of disability-adjusted life years (DALYs) globally. Patients can experience various complications that affect the severity of the disease. Various factors, especially self-management behavior, can influence the severity of CAD patients. This study aimed to determine the relationship between self-management behavior and the severity of CAD in Dr. Zainoel Abidin Regional General Hospital Banda Aceh. This study used a cross-sectional design from March 28 to May 19, 2023. The sample consisted of 221 CHD patients who had undergone coronary angiography, were selected using purposive sampling, and met the inclusion and exclusion criteria. Data was collected through guided interviews using the self-management scale (CSMS) and syntax score. Data were analyzed descriptively and inferentially. Data analysis showed a significant relationship between self-management behavior and the severity of CAD. Daily life management ($p=0.000$, $OR=5.334$), disease management ($p=0.000$, $OR=2.633$), and emotional management ($p=0.000$, $OR=2.047$) were associated with the severity of CAD. Logistic regression indicated that daily life management was the most dominant factor associated with the severity of CAD ($OR=5.334$). Good daily life, disease, and emotional management can help reduce the risk of complications and improve the prognosis of CAD patients. Self-management behavior, particularly daily life management, is significantly related to the severity of CAD in Dr. Zainoel Abidin Regional General Hospital patients.

Keywords: Behavior, CAD, self-management

Introduction

Coronary artery disease (CAD) is the most common cardiovascular disease. CAD is the leading cause of death and loss of disability-adjusted life years (DALYs) globally. A large number of CAD problems occur in low- and middle-income countries, with nearly 7 million deaths and 129 million DALYs each year. In 2021, CAD accounted for 8.9 million deaths and 164.0 million DALYs.¹

Furthermore, data from the medical records of the Aceh Regional General Hospital show that in 2020, the number of cardiac catheterization patients was 667 patients, increasing in 2021, reaching 899 patients, and this number decreased in 2022 to 777 patients but those diagnosed with CAD and having coronary examinations angiography in 495 patients. Heart disease services at the hospital have been carried out using adequate facilities and health workers, and pharmacological and medical management has also been excellent. However, the number of

patients with CAD is still high, and many suffer co-morbidities such as diabetes, hypertension, and increased low-density lipoprotein (LDL). The behavior of CAD patients in independent self-management at home can influence this condition.

The severity of CAD can be reduced with good self-management by the sufferer. Self-management is a dynamic process in which sufferers actively manage chronic disease independently. Many people with chronic illnesses have poor self-management skills. It will lead to poor disease control and quality of life.²

Several studies related to self-management in chronic diseases, such as research on the effectiveness of self-management on the quality of life of patients with type 2 diabetes mellitus, show that self-management effectively improves the quality of life among diabetes patients.³ Other research on self-management and self-efficacy in chronic kidney failure patients undergoing hemodialysis. This research shows that good self-management behavior can increase self-efficacy

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for the better, too.⁴ Furthermore, research on self-management to improve the quality of life of people living with HIV also found that self-management programs improve the overall welfare of people living with HIV.⁵

Referring to several studies on self-management in chronic diseases that have been described above, the same thing applies to patients with CAD because they are also chronic diseases. Good self-management can reduce the risk of recurrent CAD attacks. There are many risk factors for CAD. Modifiable risk factors are high blood pressure, high blood cholesterol levels, smoking, diabetes, being overweight or obese, lack of physical activity, unhealthy diet, and stress. The non-modifiable factors are age, sex (men are generally more at risk for coronary artery disease), family history, and race.⁶

Self-management behavior in CAD patients is based on three main aspects: managing daily life, disease management, and emotional management, and combined with specific disease management skills that need to be mastered by CAD patients, such as first aid technology and management of angina symptoms. Daily life management includes managing habits, such as smoking, alcohol, and diet, and general life management, such as regular work and rest or activity. The disease management domain includes symptom management, first aid management, disease knowledge acquisition management, and medication adherence management—emotional management domains such as relaxation, self-direction methods, and others.⁷

Many studies on self-management in patients with chronic diseases have been carried out. However, there is very little research on self-management in patients with CAD. This study aims to determine the relationship between the components of self-management behavior and the severity of CAD.

Methods

This study used a cross-sectional study design. The samples are CAD patients who have undergone coronary angiography at Aceh Regional General Hospital. The sample size is determined based on the proportion formula, and a total of 221 people is obtained. The sample selection technique used a purposive sampling method, which was then determined based on

the inclusion criteria were CHD patients who had undergone coronary angiography, patients in a stable and compos mentis condition, patients who agreed to be studied, and were cooperative, able to read and write and had good hearing. Meanwhile, the exclusion criteria were patients who experienced shortness of breath, chest pain, and impaired mobility.

The data collection instrument used was the coronary artery disease self-management scale (CSMS), which was carried out using guided interviews and syntax scores to measure the severity of CHD as seen from the patient medical record. CSMS was adapted from Zhu et al.,⁷ and the score syntax was adapted from Askin and Tanriverdi.⁸

This research was carried out at the Catheterization Laboratory and Cardiac Clinic at Dr. Zainoel Abidin Regional General Hospital Banda Aceh. Data was collected from March 28 to May 19, 2023. The data collection results were analyzed using descriptive statistics followed by inferential statistics and the chi-square test to determine the partial relationship between one independent and dependent variable. Another inferential statistic is the binary logistic regression with the stepwise method, which is to know the simultaneous relationship of all independent variables with the dependent variable and to find out the most dominant independent variable related to the dependent variable.

This research was carried out after obtaining a certificate of passing the ethical test from the Ethics Committee of Dr. Zainoel Abidin Regional General Hospital Banda Aceh on March 2, 2023, with research code 23-02-038.

Results

Characteristics of CAD patients treated at Dr. Zainoel Abidin Regional General Hospital Banda Aceh can be seen in Table 1.

Table 1 shows that of the 221 CAD patients who did coronary angiography, as many as 159 people (71.9%) aged 41–65 years (mid-adult), 175 people (79.2%) were men, 104 people (47.1%) had secondary education, 73 people (33, 0%) work as entrepreneurs, 156 people (70.6%) earn <Rp3,280,000, 180 people (81.4%) are married, 175 people (79.2%) had CAD >5 years, 94 people (42.5%) had >2 rings installed, 129 people (58.4%) had diabetes mellitus as a co-morbidity, 78 people (35.3%) had high total cholesterol

Table 1 Sociodemographic Characteristics of CAD Patients

Characteristics	n=221 (%)
Age (years)	
Young adults: 19–40	12 (5.5)
Mid-adult: >40–65	159 (71.9)
Elderly: > 65	50 (22.6)
Gender	
Male	175 (79.2)
Female	46 (20.8)
Last education	
High	92 (41.6)
Intermediate	104 (47.1)
Basic	25 (11.3)
Occupation	
Civil servant	30 (13.6)
Contract employee	1 (0.5)
BUMN employee	1 (0.5)
Retired	34 (15.4)
Self-employe	73 (33.0)
Farmer	45 (20.4)
Housewife	37 (16.7)
Income (rupiah)	
≥3.280.000	65 (29.4)
<3.280.000	156 (70.6)
Marital status	
Married	180 (81.4)
Divorced alive	4 (1.8)
Divorced dead	37 (16.7)
Long suffered from CAD (years)	
≤5	46 (20.8)
>5	175 (79.2)
Number of rings	
≤2	127 (57.2)
>2	94 (42.5)
Associated disease	
Diabetes	129 (58.4)
Hypertension	42 (19.0)
Diabetes and hypertension	38 (17.2)
Other	12 (5.4)
Total cholesterol	
Normal	74 (33.5)
Close to normal	69 (31.2)
High	78 (35.3)
Body mass index	
Underweight	1 (0.5)
Normal weight	35 (15.8)
Overweight	123 (55.7)
Obesity	62 (28.1)

values, 123 people (55.7%) were overweight and 191 people (86.4%).

Table 2 shows that the majority of components of self-management behavior daily

Table 2 Distribution of Self-Management Behavior Components in CAD Patients

Components Self-Management Behavior	n=221 (%)
Daily life management	
Very good	140 (63.3)
Good	41 (18.6)
Enough	32 (14.5)
Bad	8 (3.6)
Disease management	
Very good	116 (52.5)
Good	68 (30.8)
Enough	31 (14.0)
Bad	6 (2.7)
Emotional management	
Very good	72 (32.6)
Good	94 (42.5)
Enough	49 (22.2)
Bad	6 (2.7)

life management are very good with 140 people (63.3%), disease management with 116 people (52.5%), and emotional management with 94 people (42.5%).

Table 3 shows that most coronary artery disease severity is low, with 191 people (86.4%) and moderate 30 people (13.6%). Table 4 shows the relationship between daily life management, disease management, and emotional management with the severity of CAD.

Table 3 Distribution of Coronary Arterial Disease Severity in CAD Patients

Coronary Arterial Disease Severity	n=221 (%)
Low	191 (86.4)
Moderate	30 (13.6)

Table 4 Relationship between Self-Management Behavior Components and CAD Severity in CAD Patients

Components Self-Management Behavior	CAD Severity
Daily life management	0.000
Disease management	0.000
Emotional management	0.000

Table 5 Results of CAD Severity Predictor Analysis

Factors	B	OR	p	95% CI	
				Lower	Upper
Daily life management	1.674	5.334	0.001	2.003	14.201
Disease management	0.968	2.633	0.050	0.999	6.939
Emotional management	0.717	2.047	0.048	1.007	4.163
Constant	5.758	0.003	0.000		

Table 4 shows that daily life management ($p=0.000$), disease management ($p=0.000$), and emotional management ($p=0.000$) are associated with CAD severity. Table 5 shows an analysis to determine the simultaneous relationship between daily life management, disease management, and emotional management with the severity of CAD using binary logistic regression with the stepwise method.

The results of the analysis in Table 5 show that daily life management ($p=0.000$, $OR=5.334$), disease management ($p=0.000$, $OR=2.633$), and emotional management ($p=0.000$, $OR=2.047$) were simultaneously associated with CAD severity. Daily life management is the most dominant factor associated with CAD severity with $OR=5.334$, or daily life management is associated with CAD severity of 5 times.

Discussion

CAD severity is influenced by various sociodemographic factors, namely age, gender, and education. Old age is an independent risk factor for cardiovascular disease in adults, but this risk is accompanied by additional factors, including frailty, obesity, and diabetes.⁹⁻¹¹ In addition, socioeconomic factors such as income, occupation, and education level contribute to the general population's risk of adverse cardiovascular events.¹² Low educational background is an independent predictor in CAD patients undergoing angiography.¹³ In addition, many risk factors influence CAD severity,⁶ especially diabetes mellitus, which increases the risk of CAD.¹⁴ Habits or daily lifestyles significantly affect the health of individuals. Lifestyle has been shown to influence the risk of CAD severity in patients with irreversible CAD risk factors.¹⁵ This study found that, for the most part, CAD patients have carried out daily life management very well. Furthermore, it is also known that CAD patients who carry out daily life management well experience low CAD severity.

Based on these results, it can be concluded that there is a significant relationship between daily life management and the severity of CAD.

Other research has suggested a relationship between self-management behavior and the incidence of CAD. Most CAD patients have low self-management scores. Daily life management has the highest average score compared to disease and emotional management.¹⁶ Aspects of daily life management most often not adhered to by CAD patients are physical activity, maintaining a healthy diet, and weight loss.¹⁷

A healthy lifestyle, modifying risk factors, and medication adherence are critical to preventing death and recurrence in individuals with CAD. Previous studies have revealed the preventive effects of lifestyle modifications, including smoking cessation, exercise, healthy diet, and exercise, on mortality among patients with CAD. Another systematic review also reported that smoking cessation can reduce the risk of death and myocardial infarction in CAD patients by 30%.¹⁸

Healthy lifestyle behavior can reduce the risk of CAD severity, which has been proven through various studies. Risk reduction through behavior in CAD patients is essential in mediating health conditions after coronary angioplasty. By maintaining healthy physical activity, CAD patients who engage in physical activity can significantly reduce mortality and other cardiovascular risks.¹⁹

Based on the results of this study and the discussion that has been described, good daily life management will affect the severity of CAD. In contrast, increased non-compliance in carrying out good day-to-day life management will increase the severity of CAD.

Disease management is the concept of reducing health care costs and improving the quality of life of individuals with chronic conditions by preventing or minimizing the effects of disease through integrated care.²⁰ The results of this study show how CAD patients carry out

disease management very well. Furthermore, it is known that CAD patients who carry out disease management well experience low CAD severity. Based on these results, it can be concluded that there is a significant relationship between disease management and CAD severity.

Related research suggests a relationship between disease management, namely adherence to taking medication and controlling risk factors for cardiovascular disease.²¹ A high level of adherence to antihypertensive therapy and controlled blood pressure is a form of disease management to prevent the severity of CAD.²² Cardiovascular medications are essential for the secondary prevention of CAD. However, the cardiovascular effects of drugs may depend on optimal patient adherence. Compliance with taking medication is defined as the extent to which a patient takes medication as prescribed by a health care provider. In clinical practice, medication nonadherence is one of the main factors reducing the effectiveness of drug therapy in CAD patients.²³

The main factors for preventing CAD recurrence are health behavior practices in disease management in CAD patients, such as regular and continuous drug therapy, low-fat, low-sodium, and low-cholesterol diets, regular exercise, smoking cessation, follow-up examinations, and adherence to treatment plans.²⁴ Based on the results of this study and the discussion described, it can be concluded that disease management is related to the severity of CAD patients through the level of adherence of CAD patients to treatment and medical examinations.

The management of problematic emotions (including anger and anxiety) plays a significant role in physical ailments such as cardiovascular disease. Many studies have examined the relationship between personality influences and heart disease.²⁵ The results of this study show CAD patients carry out emotional management well. Furthermore, it is known that CAD patients who carry out emotional management well experience low CAD severity. There is a relationship between emotional management and the severity of CAD.

The conclusion of this study is in line with studies that say one of the factors that influence the severity in patients with heart disease is negative emotions such as anger, which can exacerbate the disease.²⁵ Intense emotions, significantly negative emotions such as hostility, anger, depression, and anxiety, can trigger

CAD.²⁶ Stress is also one of the most common predisposing factors experienced by people with CAD. The relationship between anxiety and CAD has been the subject of several studies, most of which show that stressful events are associated with CAD. Sudden and profound emotional stress can precipitate acute heart failure in individuals with CAD.²⁷

Furthermore, emotional management in CAD patients is also influenced by co-morbidities such as diabetes. The results of the study said that patients with type 2 diabetes mellitus had a higher risk of depression and suffered from high levels of emotional stress.²⁸ Anxiety and fear are the most common emotional disturbances in diabetes patients, which the results of many studies have confirmed. Studies also show that depression in diabetes patients has been associated with an increased risk of vascular complications, poor glycemic control, and nonadherence to medication and self-management behaviors.²⁹

Behavioral risk reduction in CAD is essential in mediating health conditions after coronary angioplasty. However, many patients with CAD need more critical knowledge about the role of behavioral management (e.g., physical activity) in the secondary prevention of CAD severity.¹⁹

CAD patients who engage in physical activity can achieve a significant reduction in the risk of death from cardiovascular disease. This statement shows that of the three constructs of self-management behavior, daily life management is the most important thing to prevent the severity of CAD.¹⁶

Daily life management in CAD patients is related to maintaining daily living habits, including physical activity. However, the vast majority of patients with CAD do little of this. CAD patients often do not engage in sustained physical activity or other health behaviors consistently over time and have high levels of poor adherence to health maintenance.³⁰

Nearly two-thirds of patients with CAD do not engage in physical activity. Studies show that among people hospitalized for CAD, physical activity levels increase initially after discharge and decrease around 2–4 months after discharge. CAD patients participating in exercise-based cardiac rehabilitation programs in all age groups experienced a decreasing trend in exercise over time—only 22% of people adhered to the guidelines after 12 months.³¹

Conclusions

The results of this study conclude that daily life management is most related to severity in CAD patients undergoing coronary angiography. Good daily life management will reduce the severity of CAD patients. CAD patients need to make lifestyle modifications to be healthier by not smoking, eating a healthy diet, and exercising while adhering to the treatment program.

Conflict of Interest

There is no conflict of interest among all the authors in this study.

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