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The Relationship Between Self Care and Quality of Life Among Coronary Heart Disease Patient After Receiving Percutaneous Coronary Intervention: A Systematic Review

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Abstract

Coronary Heart Disease is a chronic disease with the highest morbidity and mortality rates in the world. Management is needed in the form of self-care management as a core element for CHD patients in order to improve the quality of life. Until now, there has been no comprehensive summary regarding self-care and quality of life for CHD patients with stents attached. This study aims to summarize research studies that link self-care and QOL in CHD patients after receiving Percutaneous coronary intervention. Systematic review using three databases (PubMed, ScienDirect, Google Scholar) for previous studies published in the last 10 years (2010–2020). The Joana Bright Institute format and PRISMA guidelines were used to assess the quality of studies and assist in the selection of articles. Data was extracted and summarized by the author using data extraction tools from JBI. Five articles from 2,729 studies were included. The results show inconsistency, namely three studies have a significant relationship and two studies have an insignificant relationship. All questionnaire domains used in the five articles state that the self-care domain of smoking cessation and exercise are correlated with the QOL domain of physical function, body pain, vitality, mental health, symptom domains and satisfaction. Only three articles reported the strength of the relationship (r = 0.117–0.64) and two articles didn't report the strength of the relationship. By knowing self-care and QOL of CHD patients after receiving PCI, it's hoped that the hospital can better understand and provide promotive/preventive education related to self-care management so that the patient's QOL increases significantly.

Keywords: Self-care, quality of life, Coronary Heart Disease, Percutaneous Coronary Intervention, Systematic Review

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1. Introduction

Cardiovascular disease is the leading cause of death worldwide [1]. According to data from the World Health Organization (2020), it's estimated that in 2017, 17.9 million people

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(31% of all deaths) died from cardiovascular disease. It remains the leading cause of death globally in the last 15 years [2]. The World Health Organization (2012) estimates that by 2030, nearly 23.6 million people will die from cardiovascular disease, mainly due to coronary heart disease and stroke[3]. More than 75% of deaths from cardiovascular disease occur in low to moderate income developing countries [4].

Mortality and morbidity in Indonesia due to cardiovascular disease is also a cause for concern [5]. The results of the 2018 Basic Health Research show that 1.5% or 15 out of 1000 Indonesians suffer from coronary heart disease [6]. The death rate due to CHD in Indonesia ranks second after stroke, with a mortality percentage of 12.9% of the causes of death in Indonesia [7]. West Java Province ranks 9th with the most CHD sufferers in Indonesia, around 1.6%, previously in position 14th [8]. The significant increase in cases of cardiovascular disease is estimated to add to the burden on society and the government, because handling is high cost and requires high technology [9]. This can be seen from data the Health Social Security Administration (*BPJS*) in 2017, as many as 10,801,787 million people or 5.7% of *JKN* participants received services for catastrophic diseases and spent health costs amounting to 14.6 trillion rupiah or 21.8% of all health care costs with the highest ranking composition came from heart disease at 50.9% or 7.4 trillion [9].

Coronary heart disease is a degenerative heart disease that is related to the lifestyle and socioeconomic conditions of society [10]. This disease occurs due to the abnormal accumulation of lipids or fatty materials and fibrous tissue in the walls of blood vessels resulting in changes in the structure and function of the arteries called atherosclerosis. Atherosclerosis can cause inadequate blood supply to the heart and the heart muscle cells lack a blood component [11]. This will cause ischemia in the heart muscles so that the patient will experience chest pain and in more severe ischemia conditions can be accompanied by irreversible heart cell damage [11, 12]. Improvement of ischemic areas and blood flow to the myocardium can be achieved by performing non-surgical dilatation of the coronary arteries, namely Percutaneous Coronary Intervention (PCI) [13].

PCI or cardiac catheterization is an invasive procedure in which one or more catheters are inserted into the heart and certain blood vessels [14]. According to the American Heart Association, heart disease and stroke statistics 2017 reports that 954,000 patients in the United States have undergone PCI procedures [15]. In Indonesia, the number of stents installed is estimated to increase from year to year, reaching 15,000 units a year, although for now there is no official map document for stent use [16, 17]. The action of placing a heart stent if it's not balanced with maintaining a healthy lifestyle will have an impact which can result in re-blockage of the coronary arteries and will stop blood

flow except for the blood flow from the collateral vessels which is very small [18]. This condition is called in-stent re-stenosis and carries the risk of repeated PCI procedures and may have another heart attack [19]. The risk of re-stenosis is greatest during the first 6 months after PCI [19]. Of course, re-stenting will also have an impact in terms of insertion and post-insertion costs as well as physiological, psychological and physical impacts [20-25]. The various impacts described above can be avoided if patients after PCI are able to adapt to their conditions and situations and are expected to be able to implement optimal self-care management in activities, stress, medication, and diet [19].

Self-care, based on the middle-range theory of self-care of chronic illness, is defined as a naturalistic decision-making process to maintain health through practices to improve health and manage disease [26]. Self-care includes self-maintenance, self-monitoring, and self-management [26]. Self-care is an important component in the clinical management of patients with CHD [27]. Several studies in Indonesia reported that patients with heart disease haven't carried out self-care appropriately as taught, for example adhering to the given medication, a low salt diet, regular physical activity, fluid restriction, daily weight monitoring, and early recognition of signs and symptoms. [28]. This study is in line with a Scottish study which concluded that self-management of CHD in patients over 65 years of age who had undergone elective PTCA for the management of symptoms of stable angina was less than optimal [29]. Self-care can improve the client's QOL to effectively manage the symptoms of the disease, besides that self-care management is also a factor that can affect the quality of life among patients after PCI [28, 30].

The QOL in patients with CHD tends to be poor or it can be said that the QOL for CHD sufferers is low [31]. A study on QOL in CHD was also conducted by Morys et al In their study, patients with CHD had a low or poor QOL. In addition, this study also states that anxiety in CHD is quite high [32]. Based on other research, the QOL of CHD patients can be improved, one of which is through cardiac revascularization measures such as placing a stent [33]. In line with this study, other studies stated that CHD patients who have had a stent installed will have a good QOL (25%) with their usual health status [34]. Summary Research on self-care and QOL has been conducted in patients with heart disease, but not in the heart disease population with PCI.

The phenomenon of PCI as an alternative medical treatment in cardiovascular system diseases caused by atherosclerosis is an interesting topic to be reviewed. There have been many systematic reviews of the quality of life in patients with CHD, but there haven't been many systematic reviews linking self-care with quality of life in CHD patients who have receiving PCI. This is what underlies researchers to conduct systematic reviews.

2. Methods

2.1. Study Design

The type of research used is a systematic review of existing research journals to determine the results of previous studies regarding the relationship between self-care and quality of life among coronary heart disease patient after receiving percutaneous coronary intervention. Systematic reviews have criteria where the review of articles is carried out in a structured and planned manner.

2.2. Search Strategy

The search strategy aims to find articles that have been published and are relevant to the study being conducted. Literature search was carried out through an analysis of the keywords contained in the following database: Google Scholar, PubMed and ScienceDirect. The three databases were selected with the consideration that they are the largest databases in the field of health and medicine. Searching for articles in the database uses the boolen operator "AND" and "OR" which are used to expand or specify a search, making it easier to determine which article or journal to use. The boolean operator is combined with the keywords used, namely a combination of "(self-care OR self-management), AND (quality of life OR HRQOL) AND (coronary heart disease OR coronary artery disease) AND (percutaneous coronary intervention OR coronary angioplasty)."

2.3. Inclusion/Exclusion Criteria

The strategy for determining inclusion and exclusion criteria used to search for articles using the PICOT framework. The inclusion criteria in this systematic review include: Population in patients with CHD or Post PCI, Respondent age ≥18 years, the article studies the relationship of self-care with QOL in patients with CHD / Post PCI, quantitative design, published articles in the last 10 years (January 2010 to April 30, 2020), Articles in Indonesian / English and full text. While the exclusion criteria included Coronary artery bypass grafting (CABG) patients, systematic review articles or literature review, randomized controlled trial research design.

2.4. Data Extraction

The data was extracted by the researcher and summarized using the JBI data extraction tool. The data that the researcher extracted included the name and year of the study, the focus of the study, the research method, the characteristics of the respondents (age and gender), the place of origin of the study, samples, instruments, and the results of the research.

2.5. Assessment of Methodological Quality

The assessment of the quality of each article was carried out using the standard format of the JBI (The Joana Brigs institute critical appraisal tools) and the PRISMA guidelines. We used the PRISMA guidelines for protocol review and study selection. The PRISMA Guidelines are evidence based instrument items for reporting in a Systematic Review. The criteria used at JBI to evaluate whether each study is of good quality and minimal risk of bias. In total there were 8 checklist items which included an explanation of the inclusion and exclusion criteria, the subject and place of the study, valid instruments, specific standard instruments, confounding factors, the measured outcomes were valid and reliable, the use of correct statistics. There are four answer choices in the JBI, namely "yes", "no", "unclear", "not applicable". The conclusion is based on the results of the review and directly from the results of the review, the more yes answers in the JBI critical appraisal column, the better and more valid the journal will be.

2.6. Summary of Study Assessment Results

In assessing the quality of the articles, 5 articles were declared of good quality, where all articles had a JBI score of more than 60%. the average yield of the five journals was 87.5%. Some articles have weaknesses in points 1, 3, 4, 6, and 7.

3. Result

The process of selecting and eliminating articles is illustrated in the form of a PRISMA flowchart which are shown in Figure 1. A literature search resulted in 2729 studies through a database search identified by keywords. From the number above, we excluded 2575 articles that were screened by title, leaving 154 articles. Of the total 154 articles, 143 of them were excluded based on abstracts and not in accordance with the
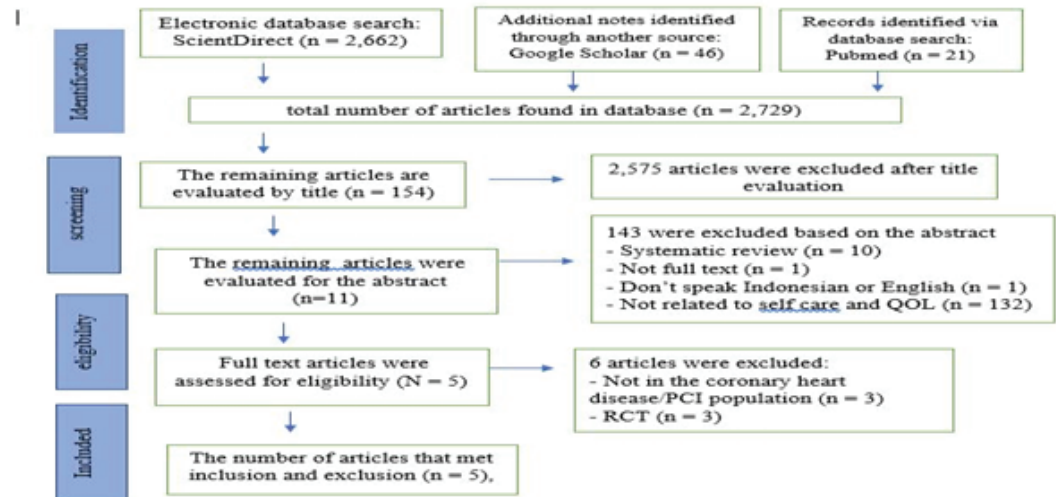
Figure 1: PRISMA flow diagram that describes the process of the articles reviewed and selected.

inclusion criteria, namely systematic review (10), not full text (1), not speaking English / Indonesian (1), not related to self-care and QOL (132) thus leaving 11 articles according to the abstract. Of the 11 articles, 6 of which were excluded because they were not in the CHD/PCI population (3), a randomized controlled trial design (3). Finally, we decided on five studies that met all inclusion criteria and were included in the analysis.

3.1. The Characteristic of Included Studies

The characteristics of the included studies included population and geographic area in Table 1. Estimated number of respondents obtained from five articles published from 2010 to 2020, with a sample size of 1005 respondents. The ages of the five articles ranged from 37 to 80 years. The proportion of gender in the four studies studied had more respondents who were male while in one study there were more female respondents. Of the five studies, four were cross sectional (80%) and one study was prospective (20%). Two studies were conducted in South Korea (40%), one was conducted in New York (20%), one was conducted in Japan (20%), and the other was conducted in China (20%). Two studies discussed the focus of the study on CHD patients (40%) and three studies discussed the focus of the study on post-PCI patients (60%). The use of instruments in the five studies used different instruments, only 2 studies used the same instrument to measure self-care and QOL. The results showed that three studies had a significant relationship and two studies had an insignificant relationship. The domain in the questionnaire used in the five articles states that the domain of self-care to stop smoking and exercise is correlated with the QOL domain, namely physical function, body pain, vitality, mental health, symptom domain and satisfaction domain.

This indicates that quitting smoking and frequent physical activity will have an impact on the patient's quality of life. The strength of the relationship was only 3 articles that reported the strength of the relationship from strong, low / very weak to even none (r = 0.117–0.64), and the other 2 articles didn't report the strength of the relationship explicitly.

TABLE 1: Characteristics of Included Studies (N = 5).

author, year and place	Methods	Results	JBI score
Sukhee Ahn, RN, PhD *et al* (2016)., *South* Korea [35]	**Desain**: Cross Sectional **Sampel**: 130 CHD (men 73. Women 57) **Age**: 37-48 years **Instrument**: The CHB scale and SF Korean version2.0	Self-care behavior is significant on quality of life, (r = 0.64)	87,5%
Yanan Zhang et al.(2020). China [36]	**Desain**: Cross Sectional **Sampel**: 220 Post PCI (men 139, Women 81) **Age**: 42-80 years **Instrument** : CSMS dan SF-36 *Chinese version*	Self-management and HrQoL are not significant (r = 0.117 - 0.328)	87,5%
Victoria Vaughan Dickson, PhD, *et al.*(2012). New York [37]	**Desain**: Cross Sectional **Sampel:** 129 CHD **Age**: 45-61 years **Instrument** : *MOSAS* dan *MacNew Heart Disease questionnaire*	Self-care compliance is not a significant determinant of HRQOL (value r = 0.275)	100%
Yu-Mi Lee *et al.*(2018). South Korea [38]	**Desain**: Cross Sectional **Sampel**: 417 CHD (men 348, women 69) **Age**: >50 years **Instrument** : *MOSAS* and *CROQ*	Lifestyle modification was significantly associated with symptom domain and satisfaction with CROQ.	100%
Kenzo Shibayama.(2012). Japan [39]	**Desain**: Cross Sectional **Sampel:** 118 Post PCI (men 101, women 17) **Age**: >45 years **Instrument** : Data collection for self-care activities (diet, smoking cessation, exercise) was carried out by post while HRQOL used the SF-36	exercise, as a post-discharge self-care activity, for patients treated with PCI was significantly associated with the PF domain QoL (p = 0.05) at 6 months after discharge	62,5%

CHD = Coronary heart disease; The CHB Scale = the cardiac health behaviours scale; SF = Short form; PCI = Percutaneous coronary intervention; CSMS = Coronary Artery Disease Self-Management Scale; HrQoL = health related quality of life; MOSAS = Medical Outcomes study; CROQ = Coronary Revascularization Outcome Questionnaire; PF = Physical Function

4. Discussion

4.1. Respondent Characteristics

The characteristics of respondents and the proportion of gender in the five studies were the majority aged 37-80 years. According to the Ministry of Health of the Republic of Indonesia the age range of respondents from 37 to 80 years is the final adult phase to the elderly. In this elderly group, the aging process occurs, which is a process characterized by failure to maintain balance against physiological stress conditions. Failures that are often obtained include decreased ability to live and increased individual sensitivity [40]. In the elderly there is a decline in cells due to the aging process which can cause various diseases including chronic diseases, one of which is coronary heart disease. Other research show that age has a significant relationship in increasing the risk of coronary heart disease where respondents aged $\geq$ 40 years have 2.72 times the risk compared to <40 years for coronary heart disease. The older the age, the greater the appearance of plaque that sticks to the wall and causes disruption of blood flow through it [41].

In today's millennial era, coronary heart disease is not only found in the elderly but at a young age it begins to occur. Currently, young people also have the same risk of coronary heart disease as the elderly. This is evidenced by the age in the five articles reviewed that there are still ages <45 years which are still considered productive ages. It's estimated that 2% to 6% of all infarcts are clinical manifestations of coronary artery narrowing, involving individuals <45 years. Other research result concluded that the risk factors for young coronary heart disease are men, smoking, and dyslipidemia [42]. In the future, research is needed on what factors affect the incidence of coronary heart disease that attacks productive age, considering that many teenagers now smoke and have a bad lifestyle such as lack of exercise due to watching television or playing cellphones at home, eating unhealthy foods and contain lots of cholesterol.

The majority of these five articles, as many as four articles stated that more men affected by CHD than women. Men are very susceptible to CHD, this is influenced by the men's lifestyle that tends to be less good. According to Kusumawaty (2016) states that men tend to be at risk of cardiovascular disease associated with unhealthy lifestyles such as smoking and alcohol consumption than women [43]. Smoking is a major risk factor for heart disease, including heart attacks and strokes and also has a strong relationship to the occurrence of CHD so that smoking cessation will reduce the risk of heart attack [44]. Smoking one or more packs per day for several years can increase

the risk of death from CHD by up to 200% [44]. Other research result argues that of several factors that cause coronary heart disease, one of them is gender, especially in men whose smoking habits cause damage (necrosis) in tissues and blood vessels due to the presence of plaques that can suppress the heart's working system also in men can't control stress because men work a lot outside the home, besides that this study also concluded that there is a relationship between gender and the incidence of coronary heart disease (P-value = 0.002) [45].

Apart from the four articles above which explain that more men are affected by CHD, there is one article that was reviewed which concluded that more women are affected by CHD than men. The incidence of CHD in women is related to menopause conditions. The increase in the incidence of CHD in women occurs after menopause and mortality is 2-3 times greater than that of women before menopause due to having the hormone estrogen [46]. Women who have not yet experienced menopause are protected by the hormone estrogen which has a protective effect in increasing the levels of High Density Lipoprotein (HDL). High HDL cholesterol levels are a protective factor in preventing the atherosclerosis process. The protective effect of estrogen is thought to explain the presence of immunity in premenopausal women [47].

4.2. The Instrument Used

The use of self-care instruments in the five articles can be divided into generic and specific questionnaires. Researchers argue that a generic questionnaire is a questionnaire that measures the general population of heart disease while the specific questionnaire is a questionnaire that measures a specific heart disease population. Generic questionnaires include: The Cardiac Health Behavior Scale, the specific adherence survey from the medical outcomes study, the medical outcomes study (MOS) measures of patient adherence. Specific questionnaires include the coronary artery self-management scale. What is interesting is the use of the coronary heart disease self-management scale instrument, which is an instrument that directly measures self-management in patients with coronary heart disease. The domains in each questionnaire reflect 10 general behaviors recommended to maintain stability for people with CHD, namely maintaining medication adherence, taking aspirin or other blood thinners, checking blood pressure, exercising, taking medication, eating low-fat foods, using a medication reminder system such as alarm, eating fruits and vegetables, avoiding cigarettes and smokers, and weight control. These items were taken from the Simple Heart Seven of the American Heart Association and clinical guidelines for CHD [26].

Some of the domains in the quality of life questionnaire in these articles include four aspects of the quality of life according to WHOQOL-BREF (1996), which include physical health, psychological well-being, social relationships, relationships with the environment [48]. Based on the explanation above, the researcher recommends the self-care and QOL questionnaires to be used by future researchers if they want to conduct research including: generic self-care questionnaires, researchers recommend the use of the cardiac health behavior scale while the specific questionnaire, researchers recommend the coronary artery disease self-management scale. In addition, there are specific self-care questionnaires for CHD patients such as the self-care coronary heart disease inventory and the self-care chronic illness inventory, which can be used as a consideration for measuring CHD self-care in the present and future. The generic QOL questionnaire, researchers recommend MacNew Heart disease for use in future studies, while for the specific questionnaire, researchers recommend a coronary revascularization outcome questionnaire. In addition to the questionnaire mentioned above, there are several recommended questionnaires that can be used by further researchers, namely: the Seattle questionnaire, APQLQ, and EQ-5D. The SF-36 questionnaire can also be an alternative choice for generic questionnaires in measuring QOL in CHD patients. The few questionnaires that measure the quality of life in direct post-PCI patients indicate that there are not many types of specific questionnaires, only CROQ is the specific QOL questionnaire in post-PCI patients. So it's hoped that in the future, researchers in the cardiovascular field can make a specific questionnaire for post-PCI patients, which of course contains a domain that reflects the quality of life for post-PCI patients.

4.3. Research Result

The results of this study indicate that the relationship between self-care and quality of life in patients with coronary heart disease after receiving PCI is inconsistent. We found three studies had a significant relationship, but the other two studies had no significant relationship. Previous literature reviews have been conducted but not in the CHD population after receiving PCI, which is in other chronic disease populations such as the Chronic obstructive pulmonary disease (COPD) population. three articles in systematic review support previous systematic review that self-management is an important factor in reducing recurrence of chronic disease sufferers [49]. Self-care is a key element in improving self-efficacy and reducing the consequences of chronic illness. Patients who are more active in maintaining and improving their abilities have a better quality of life and can receive and develop support from health workers [49].

Based on the meta-analysis of Cannon et al (2016) the collected effects revealed that self-management interventions significantly improved all aspects of patients' health regarding quality of life, in addition to some aspects of their self-efficacy; especially, reduction of feelings of helplessness, shortness of breath after physical exertion, as well as improved nutrition and breathing techniques [50]. The ability to self-care that is gained through the experience of suffering from chronic diseases will have an impact on lifestyle changes and can directly affect the patient's quality of life [11]. Many studies have shown that self-care improves quality of life by reducing pain, anxiety, and fatigue, increasing patient satisfaction, and decreasing the use of health care facilities by reducing the number of visits to doctors, home visits, medicine use and length of stay in the hospital [51]. Self-care has a heavy effect on a person's quality of life, if someone has good self-care, it's certain that the quality of life will be good too [52]. Self-care in coronary heart disease refers to the theory of self-care Barbara Riegel (2012), where self-care maintenance, self-care monitoring and self-care management play an important role as the core elements of self-care [26].

Unlike the other two studies that we found, the factor that influenced the insignificant relationship in that study was the lack of daily life self-management behavior. This is consistent with previous studies showing that it's difficult to change an unhealthy lifestyle [29]. The researcher argues that, this may be due to the lack of knowledge education about proper self-care management in the community so that self-management behavior cannot be fulfilled properly. In addition, there are factors in the form of job characteristics to meet job demands that interfere with the ability to engage in self-care. Job control and workplace support also play a role. increased job demands and low job control may be reasons for reduced adherence to routine recommended self-care behaviors. So it takes a health program in the workplace environment so that workers have good self-care. As job characteristics can interfere with self-care and potentially affect quality of life, nurses should assess job demands and include stress reduction as part of patient counseling for workers with heart disease during routine office work [53].

5. Conclusion and Suggestions

In conclusion, this systematic found that CHD doesn't only attack the elderly but also of productive age can be affected by CHD if they don't maintain a healthy lifestyle. In addition, there are still results that self-care is not related to quality of life. This can be influenced by job characteristics that cause a person to be disobedient to self-care and

the less than optimal application of self-care in everyday life. Interestingly, it turns out that CHD can also be experienced by women. In the past, due to cultural influences and the viewpoint of awareness of the importance of heart health among women, people often thought that the health of their husbands or men was more important. There are still many medical personnel who think that cardiovascular disease is a disease of men, so that cardiovascular disease in women, whose symptoms are a typical, are often overlooked. It's recommended to always improve the ability of self-care as a core element in the management of chronic diseases, one of which is coronary heart disease, considering that the number of mortality and morbidity of coronary heart disease is very high in the world, even in Indonesia. Good self-care management will certainly have an impact on improving the quality of life significantly.

Acknowledgement

Funding

Conflict of Interest

The authors have no conflict of interest to declare

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