

## ORIGINAL ARTICLE

# A Qualitative Study Exploring the Perceived Barriers Among Patients After Percutaneous Coronary Intervention

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## ABSTRACT

**Introduction:** Cardiovascular diseases, particularly coronary heart disease (CHD), are the third biggest cause of mortality worldwide, and percutaneous coronary intervention (PCI) is one of the available treatments. The patient's self-efficacy in performing self-care decreases as a result of several post-PCI hurdles, which has an effect on their quality of life. The purpose of this investigation was to explore the barriers that patients experience following PCI. **Methods:** The study design used was descriptive qualitative in 15 patients after PCI. Purposive sampling was used to conduct the participant recruitment process. Between June 2021 and January 2022, data were collected using a semi-structured interviewing method. The data were analysed through the use of thematic content analysis. **Results:** The thematic content analysis found four themes: 1) Perceived physical barriers; 2) Perceived psychological barriers; 3) Low adherence; 4) The adverse side effects of medications. **Conclusion:** The results of this study highlight the value of empowering patients to take care of themselves at home following PCI and assisting in the creation of holistic and continuity nurse intervention models.

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## INTRODUCTION

One-third of deaths globally are due to cardiovascular disease, with coronary heart disease (CHD) ranking as the most severe type of the illness. CHD causes nine million deaths globally out of 126 million (1). CHD related deaths occur in all country income groups, but the CHD mortality rate is higher in low and middle-income countries (2). The countries with the highest number of cardiovascular disease deaths are China, India, Russia, America, and Indonesia (3). Some of the most significant low-and middle-income countries (LMICs) (population >100 million people) experienced an increase in the level of CVD burden. Indonesia is a country where the reduction in CVD burden is still low at 8.8% (4).

According to research, 126 million individuals worldwide, or 1.72% of the world's population, have

CHD (1,655 per 100,000), and it is predicted that by 2030, this number will rise to 1,845 per 100,000 from the current 1,655 per 100,000 (1). CHD was the sixth most common non-communicable disease in Indonesia, with a total incidence of 138,380, or 9.89% of all deaths (5). Based on a doctor's diagnosis, the prevalence of heart disease in Indonesia in 2018 was 1.5%, or 15 out of 1,000 Indonesians. West Sumatra is one of the provinces that is in the top ten provinces with highest prevalence of heart disease, namely 1.6% in 2018, an increase from 1.2% in 2013 or exceeding the prevalence of Indonesia (6).

A common revascularization method for treating coronary heart disease is called percutaneous coronary intervention (PCI) (7). PCI is a way of treating heart disease that involves inserting a catheter (thin tube) to dilate blocked heart arteries by placing stents that help restore blood flow to the heart muscle, with the goal of improving the survival of CHD patients (8). According to a study by Collet et al., (2021), the mortality rate of CHD patients undergone PCI decreased in the first six months from 17.2% to 6.3%. When patients presented ≤ 72 hours to hospital, there was an increase in PCI

use by 51% within 20 years, and the PCI performed while in initial hospital stay increased by 54.5%. (9). This increase varies from one study to another. Stone et al., (2019) in their study found there were 49% of CHD patients who underwent PCI therapy (10), while Redfors et al., (2020) had shown that usage of PCI for revascularization increased by 6.4% per calendar year (11).

A meta-analysis study explained that there was an increase in quality of life (QoL) after PCI in the first month compared to Coronary Artery Bypass Graft (CABG) in the short term, QoL improved but in the medium and long term, became worse (12). In addition, PCI measures impact patients' ability to care for themselves. Patients experience physical susceptibility to various complications, so many patients have psychological problems and the inability to adapt socially (13). Self-efficacy affects self-care ability, and low self-efficacy is a predictor of cardiovascular disease events that are detrimental to patients and has a self-management effect that leads to a decrease in quality of life (14).

According to research on myocardial infarction patients, their quality of life changed after the event, both physically and mentally, and this could be a barrier to their recovery (15). This is important in a biopsychosocial exploration because the perceived barriers after PCI can affect self-efficacy and the patients' inability to carry out self-care (16). Previous research revealed that the patients' overall barriers after acute syndrome (ACS) at home included psychological, physical, lack of knowledge and lack of compliance (17). Unhappiness was shown to be the symptom or emotion that most influenced how patients perceived the effects of PCI in studies involving the signs and symptoms they reported after the procedure (18). Research exploring the perceived barriers to CHD patients after PCI is still rarely carried out in Indonesia, especially in the West Sumatra area, so it is essential to investigate this. This study aimed to explore perceived barriers to self-care management among CHD patients after PCI.

## **MATERIALS AND METHODS**

### **Study Design**

This study used a descriptive qualitative design. This study described the patient's perception of the perceived barriers to CHD patients after PCI and can help make the findings of further intervention studies clinically significant. The Consolidated Criteria for Reporting Qualitative Research's checklist is used in the research report (COREQ) (19).

### **Setting**

This study was carried out at one of the hospitals in Bukittinggi, West Sumatra Province, Indonesia. The hospital offers percutaneous coronary intervention and other cardiovascular treatment facilities. Participants

in this study were patients with coronary heart disease following PCI during a cardiac outpatient appointment.

### **Participant selection**

In total, based on data saturation, it was found that 15 participants satisfied the requirements for inclusion. The purposive sampling method was used in the recruitment of the participants. The inclusion criteria of the participants consisted of: 1) CHD patients after percutaneous coronary intervention for more than one month, 2) Not exceeding 70 years of age (> 70 years at risk has many barriers), 3) Stable condition as measured by blood pressure and pulse, 4) No cognitive impairment 5) Can speak Indonesian or Minangkabau, and 6) Are willing to be interviewed.

### **Data Collection**

Data collection used a semi-structured interview approach between June 2021 and January 2022. Before data collection, the researcher received formal permission to visit the hospital. The researcher met the cardiac outpatient nurse to identify the patient control schedule that fit into the inclusion criteria. Researchers then waited for patients who came in for outpatient cardiac visits. Patients who met the inclusion criteria were then asked about their willingness to be involved in the study. The participants were requested for their consent before the interview was recorded by the researcher. Furthermore, the researchers conducted face-to-face interviews in the cardiac outpatient ward according to the agreement with the participants after or before a check-up with the doctor. On average, the overall patient interviews lasted for 20-30 minutes. Researchers provided freedom of exploration of perceived barriers after PCI. Interviews were conducted using the Indonesian or Minangkabau languages. Interviews were conducted by one researcher with a Master's degree in cardiovascular specialist nursing, training and experience in qualitative and cardiovascular research. In addition, they were accompanied by another researcher as an interpreter of the interview results using the Minangkabau language. The two authors who conducted the interviews were female researchers.

For example, using five open-ended questions, the researcher created a semi-structured interview guide, that contains questions 1) How the patient feels after PCI, 2) What are the perceived barriers after PCI, 3) What kind of perceived physical barriers do you feel, 4) What kind of perceived psychological barriers do you feel, 5) Other barriers such as what the patient feels. In contrast, following each respondent's response, more questions were posed, and this process was continued until a saturation point of 15 participants was reached. Data saturation is confirmed when all new codes are not found for other themes. Interviews were recorded with an audio-visual recorder and verbatim transcription was carried out directly and validated by re-listening to the recordings by the researcher. Each interview and

transcript were examined, analyzed, and discussed collectively by all of the researchers. Participants in the study were assigned a P1–P15 code.

### Data Analysis

The transcript of the interview results was carried out by the interviewing author into Microsoft Word and appraised by other authors who were interviewed to ensure the accuracy of the transcript. Based on transcripts, data coding and analysis were conducted by two authors. The data were analyzed using Colaizzi's seven-step method approach was used as a step to analyze the data (20). This included the following steps: 1) reading and re-reading transcripts from participant recordings; 2) looking into noteworthy remarks that were pertinent to the phenomenon being studied; and 3) characterizing and classifying each meaning, 4) compiling all the essential ideas that were repeated, 5) developing and articulating the meaning of the meanings received, 6) incorporating and categorizing the same meaning into the topic, and 7) giving the results back to the participants for validation. In the verification phase, all authors verified the data to get the true meaning of this study's results and agree with the data analysis results. All textual data, including themes, were translated into English from the Indonesian.

### Trustworthiness

Trustworthiness in this study uses credibility, confirmability, dependability and transferability (21). Credibility is achieved by using triangulation sources and member checks such as direct observation, field notes and medical records. In this study, confirmability was carried out by sending interview findings in the form of the results obtained and then asking for feedback to obtain approval from the representative participants. In addition, the researchers also used an external check method on CHD patients after other PCI who had the same characteristics but were not involved in the study: as many as four patients. Utilizing a qualitative research professional to audit and analyze a number of research processes helps to preserve dependability. Transferability is achieved by distilling the study's findings and then providing a narrative explanation of the interview findings.

### Ethical considerations

The Ethics Committee of the Faculty of Nursing, University of Indonesia gave its clearance for this study (reference number: Ket-170/UN2.F12.D1.2.1/PPM2021). The hospital where the study was conducted also granted clearance for the research. Participants who completed the requirements received an explanation of the research's goals, methods, drawbacks, risks, advantages, confidentiality, and voluntary involvement. In order to participate in this study, participants were then required to sign a written consent form. All information was kept private and published anonymously using a code that only the researchers knew (e.g., P1 for participant

number 1).

## RESULTS

In this study, 15 participants were interviewed. The genders of most participants were male 14 (93.3%) one female only (6.7%), with a 55.40-year average age (40-69 years), divorced 4 (26.7%) and married 11 (73.3%). Most participants had a higher education level (bachelor and master) with 9 (60%) and followed by those with a high school education of 6 (40%). The average length of time after PCI was 5.5 months (1-24 months) with a stent placement frequency of 1.1 times (1-2 times) (Table I).

**Table I: Demographic Characteristics of Participants (n=15)**

No.	Gender	Age (Years)	Marital Status	Education Level	Length of time after PCI (month)	Frequency of PCI (times)
P1	Female	65	Divorce	Bachelor	24	1
P2	Male	47	Married	Bachelor	2	1
P3	Male	40	Married	Bachelor	6	1
P4	Male	45	Married	Bachelor	2	1
P5	Male	50	Married	High school	1	1
P6	Male	51	Married	Master	2	2
P7	Male	52	Married	High school	2	1
P8	Male	68	Divorce	Bachelor	6	1
P9	Male	59	Divorce	High school	3	1
P10	Male	56	Married	High school	5	1
P11	Male	56	Married	High school	5	1
P12	Male	56	Married	Bachelor	6	1
P13	Male	69	Married	Bachelor	6	1
P14	Male	57	Married	Bachelor	3	1
P15	Male	60	Divorce	High school	3	2

The results of the qualitative study identified four themes related to the perceived barriers among patients after PCI; 1). Perceived physical barriers; 2). Perceived psychological barriers; 3). Low adherence; 4). The adverse side effects of medications. The results of the study are described in Figure 1 which consists of themes and categories

### Theme 1: Perceived physical barriers

Participants indicated that physical barriers were the most significant obstacles that most participants faced after PCI. This theme is formed by the categories of chest pain, shortness of breath, sleep disturbances, dizziness, decreased appetite and fatigue. Chest pain was still felt up to the date of interview in six out of fifteen participants, as stated by the next two participants who participated in the interview while indicating the left chest region, which occasionally still pains:

*"Until now, I still have chest pain"* (P1)

*"I still have chest pains"* (P4)

Shortness of breath was felt when doing activities in four of the fifteen participants. the following participants described this condition while displaying shortness of breath following vigorous exercise:

*"...Shortness of breath when I force hard work and walk long distances"* (P5)

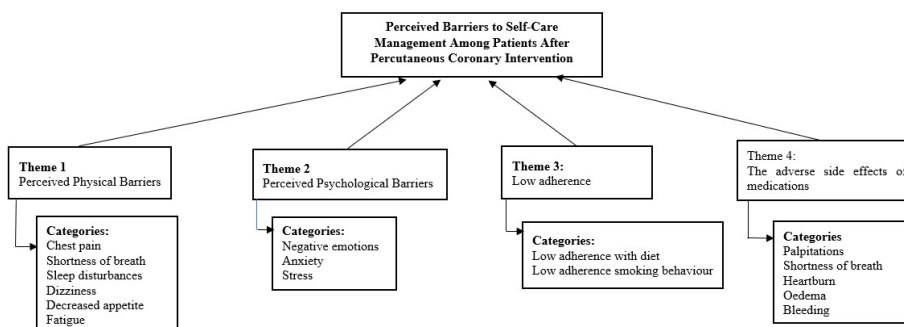


Figure 1: Overview of themes and categories

*“After putting on the ring, squatting became short of breath. Sometimes it is tight, pressing when you take something down, it is tight” (P12)*

Three out of the fifteen participants experienced sleep disturbances and dizziness, expressed by the participants below:

*“... and then sleeping is not comfortable, at this hour, it is time to wake up, it is the night...” (P6)*

*“Then the problem of sleeping, the pillow must be high, yes the supine position, for a moment it is shortness of breath...” (P12)*

Two out of fifteen participants endured a decrease in appetite because the nutritional diet for post-PCI patients was not well tolerated by participants. Based on the following participant comments

*“The taste is alarming to the appetite because the food is not good” (P2)*

*“Usually eats well now appetite has decreased” (P5)*

Participants reported fatigue as another physical barrier. The following participants all reported feeling fatigued after engaging in too many tasks too quickly.:

*“Feel fatigued when moving fast and have reduced activity” (P9)*

*“The body is often weak and easily fatigued” (P11)*

### Theme 2: Perceived psychological barriers

Psychological perceived barriers by participants emerged as a result of physical perceived barriers after PCI. Psychological barriers were identified as negative emotions, anxiety, and stress. As indicated by participants being irritable after PCI, participants felt negative emotions, as indicated by as many as seven out of fifteen participants.

*“...after the stent, this emotion exploded a bit too...” (P2)*

*“The emotional level is a bit different after the stent” (P7)*

Participants also experienced anxiety due to a lack of knowledge of the PCI process that was carried out and this led to secondary health problems such as increased blood sugar and blood pressure in two out of fifteen participants, as described by individuals who felt anxiety following PCI:

*“...if the pain is already there, the feeling of anxiety because I do not know whether there is still a blockage or not...” (P4)*

*“...there is a feeling of anxiety, so if I have any thoughts, my blood pressure and blood sugar increase...” (P9)*

In the early post-PCI period, four of the fifteen participants reported experiencing post-PCI stress. These four participants were, in order of recall:

*“But sometimes, thinking about this disease is stressful on its own” (P12)*

*“In the beginning, it felt stressful because I really could not do anything...” (P14)*

### Theme 3: Low adherence

Low adherence is the cause of therapy failure, which directly impacts the patient’s health status. The low adherence described by the participants was formed by the category of low adherence with diet and smoking behaviour. Ten out of fifteen participants reported low adherence to the diet by consuming fatty foods and drinks containing caffeine as a result of their acclimation to the cultural milieu. According to the participants mentioned below, P6 consumes high-fat foods despite having twice the PCI.:

*“...sometimes I eat curry and fat but take only a little, because it is the habit of the Minangkabau people to eat delicious food especially during Baralek (Minangkabau traditional events) ...”*

*“Sometimes I am stubborn, I want to eat well, and finally I go to a restaurant like Nasi Kapau (Minangkabau food)” (P6)*

Low adherence to smoking cessation behaviour was shown by three out of fifteen participants where smoking behaviour continued even though it was strictly prohibited after PCI. One of them was revealed by P15, who had undergone PCI twice but was still smoking.

*“...I cannot change that is smoking, if the cigarette addiction is stopped, it will be a bit confusing...” (P5)*

*“...Sometimes the urge to smoke is still there, and it cannot be stopped it has become a habit...” (P15)*

### Theme 4: The adverse side effects of medications

According to participants, the side effects of medications

are the adverse effects felt by participants after undergoing the treatment process after PCI. The adverse effects of drugs experienced by participants included shortness of breath, heartburn, oedema and bleeding

*"...taking heart medicine has a stinging effect in the stomach"* (P1)

*"I have been taking high blood pressure medication (amlodipine) for a long time, and my feet are swollen"* (P13)

*"If there is a wound, you have to be careful because the blood stops for a long time; I was short of breath before I took Brilinta medicine..."* (P15)

## DISCUSSION

The first theme generated arises from the physical barriers that the patients feel after PCI is the most significant of the barriers found. The study found that almost all participants experienced physical barriers. Perceived physical barriers by participants took the form of chest pain, shortness of breath, sleep disturbances, decreased appetite and fatigue. The biggest barriers for people who frequently perform multiple activities at once are chest pain and shortness of breath. Other participants felt a decrease in appetite due to diet restrictions so that food does not feel good and experienced activity intolerance due to restrictions on daily activities resulting from fatigue.

The angina phase or chest pain after PCI appears within six weeks of discharge in one-third of patients, and many patients have angina that persists within one year (22). There are two causes of PCI angina, namely structural mechanisms such as restenosis, thrombosis and incomplete revascularization. The second functional mechanisms include epicardial vasospasm and coronary microvascular dysfunction (23). According to research by Kim et al., (2019) the main symptom felt by patients after PCI was fatigue. Fatigue was the most severe symptom, followed by shortness of breath and discomfort in the chest (24).

Dizziness seen following PCI is caused on by medication-induced postural hypotension, low blood pressure, and low heart rate (25). A systematic review determined that after a heart attack patients tend to experience changes in sleep pattern for up to six months. This occurs along with anxiety, depression and sleep-disordered breathing (SDB) (26). The decrease in appetite found in this study was caused by various factors. Namely the taste of food and a sense of lack of appetite. Data shows that there are still stable CHD patients undergoing PCI, with as many as 38.2% experiencing mild to severe malnutrition (poor appetite) (27).

The second theme is perceived psychological barriers arising from negative emotions, anxiety and stress. The study found that most of the participants experienced psychological problems. The data showed that

psychological problems arise as a result of the patients' perceived physical barriers after PCI and the patient's lack of knowledge about the PCI process itself. The impact of psychological problems on participants is increased blood glucose and blood pressure. This psychological problem appears in the early period, after which the patient can adapt.

Within three months of receiving PCI, 24%–72% of patients reported experiencing anxiety and 25%–50% of people reported experiencing depression, according to an epidemiological study (18). PCI is closely related to psychological symptoms at a particular time when evaluated, and patients still experience them from day one to 12 months after PCI (28). A lack of knowledge of the condition and its treatment options, inadequate health literacy, physical issues following PCI, and the dread of recurrent heart attacks and mortality are the main contributors to psychological symptoms (29). Other factors that increase anxiety in PCI patients are age less than 65 years, low education, and primary PCI (30).

Through physiological changes, anxiety and depression increase the cardiovascular risk in Acute Coronary Syndrome patients such as increased platelet activity, endothelial dysfunction, decreased heart rate variability, increased blood pressure and neuroendocrine disorders (31). Patients with stented CHD may be more susceptible to a poor prognosis if they experience negative emotions like anxiety and sadness (32). It was further explained that major adverse cardiovascular events (MACE) were 7.3 times more common in individuals with anxiety and depression than they were in people without these conditions (33).

This study's third theme describes the effect of low adherence to dietary restrictions (such as eating fatty foods and consuming caffeine) and smoking cessation behaviour. Participants acknowledged that they still found it challenging to control their eating habits, and they attributed this to their daily routines and the cultural setting in which they were raised. The actions taken by the participants were still eating high-fat foods, even in small amounts, even though they were on a diet and had no appetite because the food tasted bad. The male participants admitted that it was still tough to stop smoking and drinking a lot of coffee. The environment, where the majority of people smoke, supports the habit's development into an addiction, which is the reason. Participants in the study also believed that smoking could help people unwind because it relieves mental stress.

Low adherence to diet and lifestyle modifications such as smoking is a problem that is still found in PCI patients is one of the risks driving recurrent PCI measures. In Indonesia, 58% of people smoke, with 95% of smokers being males, and 22% of smokers continuing to smoke

despite being ill (34). Smoking is the most significant non-adherence factor contributing to Indonesia's high incidence of PCI recurrence (35). Smoking is a cultural practice and a representation of close family ties among the Minangkabau ethnic group. As a result, it is challenging to break the Minangkabau people's smoking custom (36). In addition to smoking, which is a symbol of society, traditional food is one of the characteristics of a community group in Indonesia. Traditional Minangkabau food, for instance, is a culinary practice that is renowned for its delicacy and richness in spices that are healthy for the body (37). Currently, the issue is that these foods are being consumed in an excessive and imbalanced manner, which can result in an increase in cholesterol levels (38).

As a result, up to 46% of non-adherent patients experienced repeat PCI (39). There is still a low percentage (29%) of patients with coronary heart disease who adhere to the implementation of a healthy lifestyle, (adherence to no smoking, increasing activity and losing weight). Most patients indicated a lack self-efficacy as the main barrier to adherence (40). Barriers experienced by patients after a heart attack were still found in two out of fifteen participants. Despite a decrease in frequency and quantity of cigarettes smoked by two individuals following a heart attack, they were unable to cease smoking (17). Based on research by Ali et al., (2017), Because the majority of patients do not think that diet can increase the risk of heart attacks in the future and some argue there is no evidence to support dieting, 45.3% of patients do not follow a specified diet (41). Patients' understanding of adherence regarding secondary prevention is still limited, so patients perceive only taking medication as adherence (42).

The final theme of this study describes another of the patients' problems, namely the side effects of medication. Five participants reported feeling unwell after taking medication and citing palpitations, shortness of breath, heartburn, oedema, and bleeding as symptoms. The patients complained of shortness of breath after taking a medication containing ticagrelor. Additionally, the patients also said that the blood stopped during an injury. Gastritis is felt when the patient takes heart medication and feels very sore. Meanwhile, patients also complained of oedema when taking hypertension medication for a long time.

Patients who take the drug ticagrelor experienced shortness of breath but this does not reduce the therapeutic advantage of the drug (43). The three main side effects of taking ticagrelor within a month were dyspnea (29%), bleeding (2.5%), and hypersensitivity responses (0.6%) (44). According to a meta-analysis research, third-generation P2Y12 inhibitors, particularly reversible inhibitors, increase the risk of dyspnea in sensory neurons, which heighten the sense of dyspnea, in patients who are being treated with them (45).

Based on the study by Turgeon et al., (2020) there was no relationship between ticagrelor and MACE and this was statistically lower than clopidogrel. But the occurrence of bleeding and dyspnoea had a statistically more significant relationship (46). In another study, 65% of ticagrelor use was successful and 35% stopped, being switched to clopidogrel due to dyspnoea (47). There are several drugs that are taken by patients after PCI that have the effect of gastroesophageal reflux disease: GERD/gastritis such as taking statin drugs (48). No patients who received antiplatelets had any severe adverse effects, however 50% of them displayed indications of gastritis, according to the study (49). The literature review study found that there is a potential for side effects by using high doses of amlodipine and what often occurs is peripheral oedema. Haemodilution, which happens with high doses of amlodipine taken for a long time, is what causes peripheral oedema, which is the accumulation of fluid in the circulation (50).

### **Strengths and limitations**

The results of this study serve as information and reference for nurses to make holistic interventions using a biopsychosocial, spiritual and cultural approach based on the patient's perceived barriers. In addition, continuous intervention is also important to be administered in patients. The intervention is aimed at increasing self-efficacy in patients' self-management. Monitoring of patients by nurses after PCI while the patient is at home coupled with the provision of interventions is very important because it can improve patient outcomes, minimize MACE, minimize the risk of new cardiac events and reduce readmission. Based on the problems experienced by the patients, the intervention can also involve their families.

This study has several limitations, namely the researchers did not explore the problems experienced by patients before PCI so that researchers have not been able to provide a comparison of patient behaviour before and after PCI. The inclusion criteria of patients regarding the length of time after PCI were not limited so that patients who had been more than one year after PCI found it difficult to explore problems that were felt before because now the patient felt stable.

### **CONCLUSION**

The focus of this study was the problems experienced by patients after PCI. From the patient's problems we elucidated four research themes, namely: physical problems, psychological problems, patient non-adherence and side effects of medication. These four problems are considered as holistic problems and need monitoring by nurses. Recommendations for future research include the need to develop a nursing model in preparing patients' self-efficacy in self-care. This can be achieved via a holistic and sustainable nursing

intervention model for patients with coronary heart disease undergoing PCI and viewed from the cultural context related to the patient's lifestyle habits.

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