

## **The Impact of Illness Perception on Adherence in Coronary Heart Patient: The Mediating Role of Heart-Focused Anxiety and Depression**

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## The Impact of Illness Perception on Adherence in Coronary Heart Patient: The Mediating Role of Heart-Focused Anxiety and Depression

**Abstract**— In Indonesia, following stroke, coronary heart disease is the highest cause of mortality at all ages, approximately 12.9%. Treatment recommendations for cardiac disease include medication and lifestyle changes that need close patient adherence. Non-adherence is likely to worsen patient conditions, yet it is common among chronic illness patients. One model to explain adherence is Leventhal's Common Sense Self-Regulation Model (CSM), in which patients' perception and belief about their disease and treatment can affect adherence. Illness perception can affect patients' emotional response and coping behaviors such as adherence to medical recommendation, thus denoting the importance of assessing patients' illness perception and their psychological distress such as anxiety and depression. Heart-focused anxiety is a specific type of anxiety, a term used to describe fear of stimulus and sensation connected to the heart because of individual perception of negative consequences. Psychological distress among cardiac patients also includes depression, which is associated with impaired subsequent adherence behavior. Although CSM is commonly used, there is a dearth of its use in explaining adherence in coronary heart disease in Indonesia. This study used the CSM model to explain adherence in coronary heart disease patients by assessing the predictors of illness perception and heart-focused anxiety and depression. This pilot study had a cross-sectional design with 55 participants (age range: 28–81 years, 56% male), diagnosed with coronary heart disease for more than 1 year. Offline and online data collection used the Morisky Medication Adherence Scale (MMAS-8) and Lifestyle Adherence Measure (LAM) as measurements for adherence, the Cardiac Anxiety Questionnaire (CAQ) as measurement for heart-focused anxiety, the Patient Health Questionnaire (PHQ-4) for depression screening, and the Brief Illness Perception Questionnaire (Brief-IPQ) to measure illness perception. Means for the CAQ, BRIEF-IPQ, and the PHQ (Depression subtest) were 2.39 (SD = .51), 5.17 (SD = .95), and 1.18 (SD = 1.11), respectively. The cut-off score for the PHQ was  $\geq 3$ ; thus 10.91% of participants had depressive symptoms. Means for MMAS-8 and LAM were 4.25 (SD = 1.48) (low medication adherence) and 4.93 (SD = 1.33) (medium lifestyle adherence). Predictors did not significantly predict the DV ( $p = ns$ ).

**Keywords:** illness perception, adherence, coronary heart disease, anxiety, depression, psychology

### Introduction

In Indonesia, following stroke, coronary heart disease is the highest cause of mortality at all ages, approximately 12.9% (Ministry of Health, Republic of Indonesia, 2017). Coronary heart disease happens when the arteries that supply blood to the heart muscle become hardened and narrowed due to buildup of cholesterol and other material called “plaque” on their inner walls (American Heart Association, 2015). In cardiac patients, treatment recommendations include medication, dietary restriction and changes, routine exercise, smoking and alcohol abstinence,

and overall lifestyle changes (Hinkle, 2014). Medication adherence is the extent to which a patient follows the doctor's recommendations regarding daily treatment such as medication intake (Bosworth et al., 2011, p. 421). Adherence refers to the extent to which a patient's behaviors align with medication and lifestyle recommendations agreed upon by both cardiologist and patient (Lowe, 2016). Non-adherence to medical recommendations is likely to worsen the condition (Baroletti & Dell'Orfano, 2010; Chow, Jolly, Rao-Melacini, Fox, Anand, & Yusuf, 2010; Jose & Jimmy, 2011; Lowe, 2016). Consequences of non-adherence are waste of medication, decline in patient's condition, lower quality of life, and increased use of medical resources (Jose & Jimmy, 2011). Another study (Baroletti & Dell'Orfano, 2010) found that non-adherence results in poor clinical outcomes, such as increased frequency of rehospitalization and subsequent myocardial infarction leading to increased mortality. Even so, non-adherence is common among chronic illness patients. In Indonesia, previous research on adherence in coronary heart patients showed low adherence to medical recommendations (Mufarokhah, Putra, & Dewi, 2016). Symptoms of non-adherence include not taking medicine, ignoring dietary restrictions, not exercising, delaying medical appointments, and maintaining an unhealthy lifestyle (DiMatteo, Lepper, & Croghan, 2000; DiMatteo, Haskard-Zolnierrek, & Martin, 2012). One model explaining adherence is Leventhal's Common Sense Self-Regulation Model (CSM), which proposes that an individual's sufficiently threatening representation of the illness will evoke a coping response (Leventhal, Phillips, & Burns, 2016). Based on this model, patients' perception and belief about their disease and treatment can affect their adherence. Illness perception is patients' cognitive representation or belief about their illness and medical condition (Petrie & Weinman, 2006). A previous study found that illness perception consists of five core components: illness identity, causal beliefs, timeline beliefs, beliefs about control or cure, and belief about illness consequences. Illness perception can lead patients to reduce threat from their illness or symptoms by actively coping with their illness. Furthermore, illness perception can affect patients' emotional response and coping behaviors such as adherence to medical recommendations (Petrie & Weinman, 2006).

However, a recent meta-analysis showed that illness perception has low effect on adherence (Brandes & Mullan, 2014). In other words, illness perception has a weak direct pathway to adherence. Researchers suggest that another variable mediates the pathway. Chronic negative emotions such as anxiety and depression have been associated with coronary heart disease risk (Platt, Green, Heather, Jayasinghe, & Morrissey, 2014). Thus, the present study examined whether the tendency to experience chronic negative emotion could act as mediator of how illness perception affects adherence.

Heart-focused anxiety, referring to a specific type of anxiety, is fear of cardiac-related stimuli and sensation based on perceived negative consequences of the illness (Eifert, Zvolensky, & Lejuez, 2000). Patients with heart-focused anxiety are likely to avoid daily activities and use more unnecessary medical resources to ease their anxiety. Possibly, patients will not adhere to lifestyle change recommendations such as exercise. Indeed, many cardiovascular patients experience depression associated with poor health outcomes (Meijer et al., 2011; Steca et al., 2013; Schopfer, Regan, Heidenrich, & Whooley, 2016; Carney & Freedland, 2017), perhaps because of medication non-adherence (Eze-Nliam, Thombs, Lima, Smith, & Ziegelstein, 2010;

Goldstein, Gathright, & Garcia, 2017). Furthermore, cardiac patients with severe depression were found less likely to adhere to lifestyle changes. It is postulated that heart-focused anxiety and depression might affect adherence by weakening focus, energy, motivation, and willingness to engage in medical recommendations (DiMatteo et al., 2000, p. 2101). Anxiety and depression may be caused by how patients perceive their illness; hence negative illness perception has been related to anxiety and depression (Husain, Dearman, Chaudy, Rizvi, & Waheed, 2008). This study aims to use the CSM model to explain adherence in coronary heart disease patients. Predictors assessed are illness perception and heart-focused anxiety and depression. It was hypothesized that heart-focused anxiety and depressive symptoms mediate the relationship between illness perception and medical adherence in coronary heart patients. Further hypothesized is that heart-focused anxiety and depressive symptoms mediate the relationship between illness perception and lifestyle change adherence in coronary heart patients.

## Methods

### Participants

Participant criteria were

- Male / female
- Age 18 years and above
- Diagnosed with coronary heart disease for more than 1 year
- Indonesian and understand the Indonesian language

This study included 55 participants diagnosed with coronary heart disease for at least 1 year. Their ages ranged from 28 to 81 years, with 31 males (56%). Participant marital status was 3.5% single, 78.2% married, 7.3% divorced, and 9.1% widowed. Education levels were as follow: 5.5% junior high school, 43.6% senior high school, 10.9% diploma, 25.5% bachelor's degree, 10.9% master's degree, and 3.6% doctoral degree. Of participants, 70.9% participated online, and 29.1% completed the offline questionnaire, which was distributed by the researcher at a health facility.

### Study Design

This study was cross-sectional, measuring at one time the psychological aspects of a sample of coronary heart disease patients. No intervention or treatment was given. A reward of a souvenir (participation offline) and phone credit (participation online) were given upon completion of the questionnaire.

*Offline:* Participants were recruited from a health facility by the researcher. In Puskesmas Sukmajaya Depok, patients were approached individually and invited to take part in the study after seeing the doctor. Patients who agreed to participate were requested to provide written informed consent prior to the study. Then they completed the hard-copy questionnaire, demographic data, and psychological measures (described below).

*Online:* Potential participants known to meet the criteria, but unable to complete the hard-copy questionnaire because of time and distance were provided a link to the online questionnaire by the researcher. Online participants provided informed consent online; they had to answer “yes” to the first question “Are you willing to participate in this study?” If they answered “no,” they could not proceed to the next question.

## Measures

**Brief – Illness Perception Questionnaire.** Illness perception was measured using the Brief–Illness Perception Questionnaire (Brief-IPQ), which consists of nine items ranked on a Likert scale from 0 (no affect at all) to 10 (strongly affecting my life).

**Morisky Medication Adherence Scale – 8 (MMAS-8).** The MMAS-8 has been widely used to assess patient medication adherence in clinical research. It consists of eight items with yes / no responses; higher scores indicate higher medication adherence.

**Lifestyle Adherence Measure.** Lifestyle adherence was measured using the Lifestyle Adherence Measure (LAM), consisting of 12 items, adapted from a previous study by Lowe (2016).

**Cardiac Anxiety Questionnaire.** The Cardiac Anxiety Questionnaire (CAQ) was used to measure heart-focused anxiety. It consists of eight items comprising three subscales (fear, avoidance, and attention). Participants responded by choosing a number from 0 (“never”) to 4 (“always”) on a 5-point Likert scale.

**Patient Health Questionnaire (PHQ – 4).** The Patient Health Questionnaire-4 (PHQ-4) was used to measure the tendency of depression. Participants responded to the question: “Over the last 2 weeks, how often have you been bothered by any of the following problems?” on a scale of 0 (“not at all”) to 3 (“nearly every day”) regarding four items, such as “little interest or pleasure in doing things.”

## Statistical Analyses

Mediation analyses in SPSS ver. 21 were conducted to test the hypotheses.

## Results

This study included 55 participants diagnosed with coronary heart disease for at least 1 year. Below are participants’ demographic data.

Table I. Participant Demographics for 55 Indonesian Cardiac Patients

Participants’ Demographic		Sample	
		<i>N</i> = 55	<i>Percentage</i> (%)
Sex	Male	31	56
	Female	24	44

Participants' Demographic		Sample	
		<i>N</i> = 55	<i>Percentage (%)</i>
Age	28–45 yo	20	36.4
	46–63 yo	24	43.6
	64–81 yo	11	20
Marital Status	Single	3	3.5
	Married	43	78.2
	Divorced	4	7.3
	Widowed (death)	5	9.1
Education	Junior high school	3	5.5
	Senior high school	24	43.6
	Diploma	6	10.9
	Bachelor's degree	14	25.5
	Master's degree	6	10.9
	Doctoral degree	2	3.6%

A significant association was found in the relation between illness perception and heart-focused anxiety ( $r = 0.515$ ,  $p < 0.001$ ) and heart-focused anxiety and depression ( $r = 0.317$ ,  $p < 0.05$ ), as shown in Table II. More negative illness perception was associated with greater heart-focused anxiety, and greater heart-focused anxiety was linked to greater depression.

Table II. Correlation among Variables Reported by Cardiac Patients

		Correlations				
		MEAN_	TOTAL_I	TOTAL_PHQ	TOTAL_	TOTAL_
		CAQ	PQ	_DEP	MMAS_8	LAM
MEAN_CAQ	Pearson Correlation	1	.515**	.317*	.017	.231
	Sig. (2-tailed)		.000	.018	.900	.089
	N	55	55	55	55	55
TOTAL_IPQ	Pearson Correlation	.515**	1	.226	-.186	.083
	Sig. (2-tailed)	.000		.097	.174	.546
	N	55	55	55	55	55
TOTAL_PHQ_DEP	Pearson Correlation	.317*	.226	1	-.040	-.054
	Sig. (2-tailed)	.018	.097		.772	.697
	N	55	55	55	55	55
TOTAL_MMAS_8	Pearson Correlation	.017	-.186	-.040	1	-.178
	Sig. (2-tailed)	.900	.174	.772		.193
	N	55	55	55	55	55
TOTAL_LAM	Pearson Correlation	.231	.083	-.054	-.178	1
	Sig. (2-tailed)	.089	.546	.697	.193	
	N	55	55	55	55	55

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

The mean, minimum, and maximum scores for each measure are displayed in Table III.

Table III. Descriptive Statistics for All Variables in Adherence to Medical Recommendations

Descriptive Statistics					
	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std.Dev</i>
MEAN_CAQ	55	.94	3.33	2.3867	.51833
MEAN_IPQ	55	2.50	6.63	5.1711	.94847
TOTAL_PHQ_DEP	55	.00	5.00	1.1818	1.10706
TOTAL_MMAS_8	55	2.00	8.00	4.2545	1.48097
TOTAL_LAM	55	2.00	7.00	4.9273	1.33131
Valid N (listwise)	55				

The mediation analysis with medical adherence as the dependent variable and heart-focused anxiety as mediator showed that the overall model  $R^2 = .052$ ,  $p > .05$  was not significant. Furthermore, depressive symptoms did not mediate the relationship between illness perception and medical adherence,  $R^2 = .053$ ,  $p > .05$ . Thus, the hypothesis regarding medical adherence as the dependent variable was not supported. See Fig. 1 for medication adherence results.

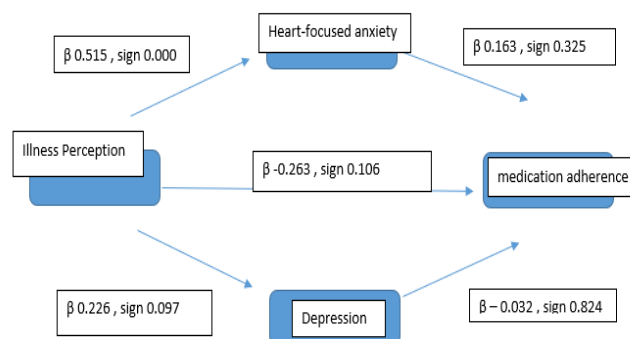


Fig. 1. Medication adherence results for 55 Indonesian cardiac patients.

Mediation analysis with lifestyle change adherence as the dependent variable and heart-focused anxiety as mediator showed that the overall model  $R^2 = .055$ ,  $p > .05$  was not significant. Furthermore, depressive symptoms did not mediate the relation between illness perception and lifestyle change adherence,  $R^2 = .072$ ,  $p > .05$ . Thus, the hypothesis regarding lifestyle change adherence as the dependent variable was not supported. Fig. 2 illustrates lifestyle change adherence results.

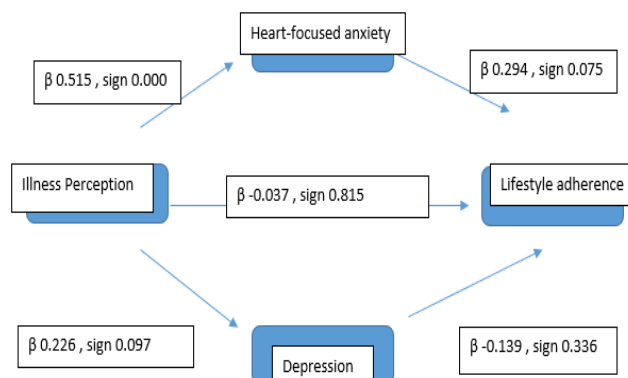


Fig. 2. Lifestyle adherence results for 55 Indonesian cardiac patients.

## Discussion and Conclusion

The multiple regression analysis showed that heart-focused anxiety and depression did not significantly mediate the relation between illness perception and adherence in coronary heart patients. Several previous studies have shown that negative illness perception was clearly related to reports of mood symptoms, such as anxiety and depression (Husain et al., 2008; Stafford,



Berk, & Jackson, 2009; Khosravi, 2016; Mika, 2016). Thus, depression clearly affects medication adherence (Eze-Nliam et al., 2010; Goldstein et al., 2017, p. 547).

Heart-focused anxiety was proven by data to affect medication adherence even though not significantly. The higher the CAQ score, the higher the medication adherence score. In line with lifestyle adherence, the higher the CAQ score, the higher the lifestyle adherence. Depression affects medication and lifestyle adherence negatively even though not significantly. The higher the PHQ-4 score (depression subscale), the lower medication and lifestyle adherence. Depression has been well researched as a barrier to medical adherence and treatment, and, therefore, these results were expected.

Illness perception was proven by data to affect medication adherence even though not significantly. The more negative the illness perception, the lower the adherence to medication intake. Lifestyle adherence results were similar; the more negative the illness perception, the lower the adherence to lifestyle changes.

The major cause of this study's results showing lack of significance is likely the small sample size. Moreover, this study shows that age correlates with lifestyle adherence ( $\beta$  (-0.207), sign 0.130) even though not significantly, and patients at younger ages tend to adhere more to lifestyle changes than older patients. Previous studies have found those ages 55–64 the most adherent, followed by ages 65–74. Thus, age seems to predict medication treatment adherence significantly (Chapman et al., 2005). Sex also correlates significantly with medication adherence ( $\beta$  0.372, sign 0.005), with women more adherent than men. In general, women have a greater tendency to use both preventative and treatment healthcare resources, including medicine (Lowe, 2016). Additionally, the patient's level of education correlates significantly with medication adherence ( $\beta$  0.302, sign 0.025); the higher the level of education, the greater the adherence to medication intake. These data suggest that as education level becomes higher, knowledge of illness is greater. In a previous study, greater knowledge about illness was shown to improve patient adherence to lifestyle changes and medication regimens (Lowe, 2016). Therefore, including measurement of medical knowledge in future studies is important. The present coronary sample showed low medication adherence and medium lifestyle adherence. The most common explanation (qualitative) is that if patients feel better and have no signs of cardiac symptoms, they cease taking medication. For lifestyle, however, they adhere to dietary restrictions and soft exercise (e.g., a morning walk) to maintain their health.

A limitation to this study's medication and LAMs is self-reported adherence behavior. Thus, future research should combine self-report and objective measurements of adherence for a complete lifestyle change overview according to medical recommendations.

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## Compliance with ethical standards

**Conflict of interest** Talitha Sya'banah Fajrin Sudana and Sali Rahadi Asih declare they have no conflicts of interest.

**Human and animal rights and Informed Consent** All procedures followed were in accordance with ethical standards from Ethical Committee Faculty of Psychology Universitas Indonesia. Informed consent was obtained from all participant of this study.

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