

# The effect of psychoeducation-based on transtheoretical model on depression in patients with coronary heart disease

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## Abstract

**Background:** Depression is the most common psychological condition among patients with coronary heart disease (CHD). Although psychoeducational programs (PEPs) based on the Transtheoretical Model (TTM) have shown promise for psychiatric patients, their application among individuals with medical conditions, particularly cardiovascular disease, remains limited—especially in Indonesia.

**Purpose:** This study aimed to assess the effectiveness of a TTM-based PEP intervention in reducing depression among CHD patients.

**Methods:** A quasi-experimental design was employed, involving 80 CHD patients hospitalized in the coronary care unit (CCU) of a private hospital in West Java, Indonesia, in 2022. Participants in the intervention group attended seven sessions, each lasting 60 to 90 minutes. Depression symptoms were measured using the Hamilton Depression Rating Scale (HDRS). An ANOVA was performed to compare pre- and post-intervention mean HDRS scores and subscale scores between the two groups. After accounting for attrition, the final analysis included data from 76 patients.

**Results:** The participants had a mean age of 59.39 years (SD = 11.10) and a mean disease duration of 4.05 years (SD = 1.69). A paired t-test showed a significant reduction in the mean HDRS score of the intervention group, from  $13.79 \pm 2.84$  pre-intervention to  $10.16 \pm 2.16$  post-intervention ( $p < 0.0001$ ). Most HDRS subscale scores also decreased significantly, except for insomnia, somatic/genital symptoms, and weight loss. ANCOVA confirmed significant differences between the two groups in overall HDRS scores.

**Conclusion:** The findings suggest that TTM-based PEP is effective in reducing depression among CHD patients. Incorporating such programs alongside standard treatments is recommended for enhanced patient outcomes.

**Keywords:** coronary heart disease; depression; psychoeducation; transtheoretical model

## Introduction

Coronary Heart Disease (CHD) is the leading cause of death worldwide, accounting for 36% of all fatalities, double the mortality rate of cancer (Li et al., 2020). In Indonesia, the mortality rate from CHD stands at 26.4%, with a prevalence of 1.5%. It is projected that the number of cases will rise to 23.3 million by 2030 (Ministry of Health, 2020). CHD, also referred to as ischemic heart disease, involves arterial blockages and functional impairments in the coronary arteries, leading to myocardial ischemia and hypoxia (Ulbricht & Southgate, 1991). Patients with CHD often experience significant physical and psychological challenges, including reduced health-related quality of life (QOL), which correlates with higher mortality and an increased risk of recurrent cardiac events (Barham et al., 2019; Birks, 2006). Furthermore, CHD has strong associations with psychosomatic disorders and poor mental health outcomes (Goldston & Baillie, 2008).

Depression is the most prevalent psychological issue among CHD

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patients (Kurnia & Sholikhah, 2020). A longitudinal cohort study involving 2,325 patients with stable CHD revealed that depressive and anxious symptoms increased the likelihood of mortality (Doering et al., 2010). In China, the prevalence of depression among CHD patients ranged from 8.2% to 35.7% in men and 10.3% to 62.7% in women (Li et al., 2020). Similarly, in Indonesia, 22% of CHD patients reported mild depression, 15% moderate depression, and 3% severe depression (Nuraeni et al., 2016). Depression and insufficient social support are among the most common psychological responses in individuals with cardiovascular diseases, contributing to higher healthcare costs and increasing the risk of disease recurrence or worsening (Dehdari et al., 2009; Taylor-Rodgers & Batterham, 2014).

Various alternative therapies such as music therapy, relaxation techniques, therapeutic massage, and guided imagery have proven effective in alleviating anxiety and distress in patients with acute and chronic conditions (Chan et al., 2009). Additionally, psychological interventions, including cognitive behavioral therapy (CBT), psychoeducational programs (PEPs), and support systems, have demonstrated effectiveness in addressing psychological issues like anxiety and depression (Taylor-Rodgers & Batterham, 2014). PEPs, in particular, have gained attention as an essential strategy for addressing psychological challenges in patients. These interventions aim to modify patients' thoughts and behaviors by providing a safe environment to express emotions, build hope, enhance self-awareness, and apply newly acquired insights (Ågren et al., 2012; Morokuma et al., 2013; Paranthaman et al., 2010).

Several studies have explored the impact of PEPs on mental health. For instance, Luciano et al. (2011) found that PEPs improved mobility, pain management, fatigue, and mental health issues, including anxiety and depression, in patients with fibromyalgia. Similarly, Guo et al. (2013) reported that cancer patients undergoing radiotherapy benefited from CBT and supportive environments, which reduced anxiety and depression, leading to improved QOL and physical health. However, a meta-analysis by Dusseldorp et al. showed no significant impact of PEPs on anxiety (10 studies) or depression (13 studies) among CHD patients (20 studies). Likewise, Hartford et al. found that telephone-based psychological training for nurses did not significantly reduce anxiety in patients recovering from coronary artery bypass grafting (CABG) surgeries (Hartford et al., 2002). Similarly, Johnston's research on education and psychological counselling after myocardial infarction found no significant effect on depression symptoms (Johnston et al., 1999). These mixed findings suggest that further research is needed to assess the effectiveness of psychological interventions for CHD patients.

Recent studies suggest that psychoeducational

interventions based on the Transtheoretical Model (TTM) offer promising outcomes for managing depression in CHD patients (Li et al., 2020). The TTM is an integrative model of behavior change that supports interventions aimed at modifying harmful behaviors. It divides behavior change into five distinct stages: pre-contemplation, contemplation, preparation, action, and maintenance (Prochaska & Velicer, 1997). In the pre-contemplation stage, individuals show no intention of changing their behavior. During contemplation, they begin to recognize the need for change and consider taking action. In the preparation stage, individuals make initial steps toward change, followed by concrete behavior changes during the action stage. Finally, the maintenance stage involves sustaining these changes to prevent relapse (Prochaska, 2008). The TTM's structured, gradual approach makes it adaptable across different age groups, enhancing its relevance for behavior change interventions (Li et al., 2020).

Most research on TTM-based psychoeducational programs has focused on individuals with psychiatric conditions, with limited studies targeting those with medical illnesses, including CHD. However, healthcare professionals are increasingly recognizing that effective treatment for chronic diseases must address both physical and psychological aspects to optimize patient outcomes (Dashtbozorgi et al., 2009; Eker & Harkin, 2012). Psychoeducational programs grounded in the TTM framework hold potential for enhancing the functional health of CHD patients by addressing their psychological needs alongside physical care (Taylor-Rodgers & Batterham, 2014; Tofighian et al., 2010). This study aims to evaluate the effectiveness of a TTM-based psychoeducational intervention in reducing depression among patients with CHD.

## Materials and Methods

### Design

This study was conducted using quasi-experimental design at June to August 2022.

### Sample and setting

This study was conducted in the coronary care unit (CCU) of a private hospital in West Java, Indonesia. The inclusion criteria were as follows: participants had to be between 20 and 65 years old, willing to participate, capable of answering questions and attending meetings, without a history of angioplasty or neurological disorders, and able to read and write in Bahasa. Exclusion criteria included participants withdrawing from the study or experiencing acute or urgent medical or psychological disturbances. To further reduce bias, individuals with substance dependence or diagnosed mental or psychological disorders were also excluded. The sample size for this study was determined using G\*Power version 3.1, a widely used software for statistical power analysis (Faul et al., 2007). We set the following parameters

**Box 1. Content of the psychoeducation based on TTM Program for CHD Patients****Sessions****Session I: Pre-contemplation**

Gaining an understanding of coronary heart disease (CHD), as well as its causes, treatments, and implications for patients.

**Session II: Contemplation**

Introducing and listening participants' feelings and problems related depression, risk of depression.

**Session III: Preparation**

- a) Asking and listening to the patient to determine how much they know about depression management
- b) Describe and provide strategies for preventing and managing depression in patients
- b) Describe and provide strategies for preventing and managing depression in patients
- d) Facilitate a Q&A session if the patient has any questions about depression prevention or treatment.

**Session IV: Action**

Training on depression management: relaxation and distraction

**Session V: Action**

Training on problem-solving skills

**Session VI: Action**

Training on skills to deal with depression

**Session VIII: Maintenance**

Concluding remarks, going over the training materials again, and hearing from patients all figure into this phase

**Table 1. Demographic comparison between intervention and control group (n=76)**

Variables	Total (n=76)	Intervention Group n=38 (%)	Control group n=38(%)	p-value
Age in year, Mean ± SD	59.39 ± 11.10	59.42 ± 12.62	59.37 ± 9.70	0.079
Duration of disease in year, Mean ± SD	4.05 ± 1.69	4.11 ± 1.76	4.00 ± 1.66	0.930
Sex				
Male	40 (52.6)	12 (31.6)	14 (73.7)	0.516
Female	36 (47.4)	26 (68.4)	5 (26.3)	
Marital status				
Married	62 (81.6)	30 (78.9)	16 (84.2)	0.330
Unmarried	14 (18.4)	8 (21.1)	3 (15.8)	
Education level				
Elementary school	12 (15.8)	12 (31.6)	0 (0)	0.014*
Junior high school	8 (10.5)	2 (5.3)	6 (15.8)	
Senior high school	30 (39.5)	12 (31.6)	18 (47.4)	
University	13 (34.2)	12 (31.6)	14 (36.8)	
Employment status				
Yes	28 (36.8)	4 (21.1)	20 (52.6)	0.313
No	48 (63.2)	15 (78.9)	18 (47.4)	

**Note: \*: significant**

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**Table 2. Depression and its dimension before and after intervention in intervention and control group (n=76)**

Variables	Pre-test	Post-test	t	p-value
	Mean ± SD	Mean ± SD		
<b>Total score of HDRS</b>				
Intervention group	13.79 ± 2.84	10.16 ± 2.16	-11.795	0.000*
Control group	13.58 ± 2.34	13.84 ± 2.00	1.564	0.135
<b>Domain score</b>				
<b>Mood dan Depression</b>				
Intervention group	2.74 ± 1.04	1.31 ± 0.93	-2.964	0.008*
Control group	2.25 ± 1.14	2.31 ± 1.14	-0.460	1.000
<b>Feeling of guilt</b>				
Intervention group	2.74 ± 1.25	0.89 ± 0.11	-2.964	0.000*
Control group	2.71 ± 1.37	2.26 ± 1.14	-1.321	0.320
<b>Suicide</b>				
Intervention group	1.74 ± 1.04	1.26 ± 0.93	-2.964	0.008*
Control group	1.26 ± 1.14	1.26 ± 1.14	0.000	1.000
<b>Insomnia</b>				
Intervention group	2.47 ± 1.26	2.37 ± 1.30	-0.809	0.429
Control group	2.89 ± 0.87	2.95 ± 0.84	0,39375	0.578
<b>Work and activity</b>				
Intervention group	1.24 ± 0.57	0.34 ± 0.11	-2.964	0.000*
Control group	1.65 ± 0.41	1.16 ± 1.14	-0.321	0.678
<b>Retardation</b>				
Intervention group	2.58 ± 1.50	2.00 ± 1.29	-3.012	0.007*
Control group	2.42 ± 1.26	2.42 ± 1.34	0.000	1.000
<b>Retardation</b>				
Intervention group	2.58 ± 1.50	2.00 ± 1.29	-3.012	0.007*
Control group	2.42 ± 1.26	2.42 ± 1.34	0.000	1.000
<b>Agitation</b>				
Intervention group	1.57 ± 0.25	0.69 ± 0.11	-3.231	0.001*
Control group	1.24 ± 0.43	1.05 ± 0.76	-0.890	0.632
<b>Somatic dan Genitalia symptoms</b>				
Intervention group	1.95 ± 1.02	1.84 ± 0.83	-0.438	0.667
Control group	1.89 ± 0.56	1.89 ± 0.56	0,25625	0.716
<b>Hypochondriasis</b>				
Intervention group	0.89 ± 0.65	0.89 ± 0.65	0.000	1.000
Control group	0.95 ± 0.52	0.95 ± 0.52	0.000	1.000
<b>Loss of weight</b>				
Intervention group	0.68 ± 0.94	0.47 ± 0.69	-1.287	0.215
Control group	0.26 ± 0.45	0.26 ± 0.45	0.000	0.000*
<b>Insight</b>				
Intervention group	1.11 ± 0.31	0.05 ± 0,23	-11.339	0.000*
Control group	1.05 ± 0.23	1.05 ± 0.23	0.000	1.000

**Note: p-value obtained from paired t test; \*: significant**

**Table 3. Difference of total score HDRS among intervention and control group**

Source	Type III Sum of Square	df	Mean Square	F	p-value
Corrected Model	187.5	2	93.8	111.8	0.000*
Between group	122.2	1	122.2	145.7	0.000*
Error	29.3	35	0.84		

Note: \*: significant

for a two-tailed test: an effect size (Cohen's *d*) of 0.5, a significance level ( $\alpha$ ) of 0.05, and a power ( $1 - \beta$ ) of 0.80. These parameters are commonly chosen in behavioral and social sciences to detect a medium effect size with sufficient statistical power. Based on these inputs, the calculated sample size for independent groups was 76, with 38 participants allocated to the intervention group and 38 to the control group. This study utilized a convenience sampling technique, a non-probability sampling method that involves selecting participants who are readily available and willing to participate (Etikan et al., 2016). Convenience sampling is often used in clinical or behavioral studies where the focus is on accessibility and feasibility rather than generalizability (Bornstein et al., 2013). Although this sampling method limits the generalizability of findings, it is effective for exploratory studies aiming to establish foundational insights.

### Variable

The intervening variable in this study was psychoeducation based on the transtheoretical model, with depression as the dependent variable.

### Instruments

The demographic data collected included participants' age, sex, education level, marital status, employment status, and duration of illness.

The Hamilton Depression Rating Scale (HDRS), originally developed by was originally developed by Max Hamilton, a British psychiatrist, in 1960, is a 17-item questionnaire designed to assess various symptoms of depression. These symptoms include mood, feelings of guilt, suicidal ideation, insomnia, work and activity levels, psychomotor retardation, anxiety, somatic and sexual problems, hypochondriasis, weight loss, and insight. Items related to mood, guilt, suicidal ideation, work and activity, psychomotor retardation, agitation, anxiety, hypochondriasis, and weight loss were evaluated using a four-point Likert scale. In contrast, somatic and genital symptoms, as well as insight and insomnia, were assessed using a three-point Likert scale. The Cronbach's alpha for the Bahasa version of the HDRS was 0.74, indicating acceptable internal consistency (Apriani et al., 2018).

### Intervention

Each group session for the intervention group lasted between 60 and 90 minutes, with a total of seven sessions conducted. The PEP-based intervention, grounded in the Transtheoretical Model (TTM), was adapted from (D'Souza et al., 2010; Karamlou,

2010; McGillion et al., 2008). The PEP-based TTM intervention provided to the experimental group addressed topics such as lifestyle, depression management, problem-solving, and relaxation techniques. The content was developed based on the information outlined in Box 1.

A certified nurse facilitated every meeting. At the end of each session, participants received take-home assignments to work on at their own pace. At the beginning of the following session, participants' experiences with the previous assignment were reviewed and discussed, followed by the distribution of new materials. The investigator contacted participants in the intervention group weekly for 10–15 minutes to monitor their progress, answer questions, and coordinate upcoming sessions. After completing all seven sessions, participants in the intervention group were asked to fill out the study questionnaire again.

Patients in the control group received only standard medical care along with an AHA pamphlet on basic cardiac care (Mohammadi et al., 2006). They completed the study questionnaire at the time of enrolment and again seven weeks later.

### Data collection

Participants were fully informed about the study's purpose, design, and the voluntary nature of their participation. Written informed consent was obtained from all participants before they took part in the study. The research process began with the collection of demographic information from the participants. Meanwhile, the primary outcome measurements for both groups were gathered simultaneously.

### Data analysis

Socio-demographic factors between the two groups were compared using the Chi-square test, while the Kolmogorov-Smirnov test assessed the normality of the variable distributions. An independent samples *t*-test was conducted to examine differences in mean age between the groups. To compare the mean HDRS questionnaire scores before and after the intervention, a paired-samples *t*-test was used. Furthermore, ANOVA was applied to compare the mean HDRS scores and subscale scores across both groups before and after the intervention. A *p*-value below 0.05 was considered statistically significant for all tests. Data analysis was performed using IBM SPSS Statistics, version 20.0.

### Ethical consideration

This research received ethical approval from STIKep PPNI's Research Ethics Commission on 3 May 2022

(No.087/KEPK/STIKep/PPNI/Jabar/III/2022). After gaining ethical approval, the researcher, assisted by the head nurse of the CCU, approached eligible patients. The researcher explained the research procedures and sought informed consent from the respondents.

## Results

Two participants from the intervention group were excluded from the analysis due to inconsistent participation, reducing the total number of participants to 78. In the control group, one participant passed away, and another was excluded for not completing all the required information on the post-test questionnaire. Consequently, data from a total of 76 participants were included in the final analysis. The average age of the participants was 59.39 years (SD = 11.10), and the mean duration of illness was 4.05 years (SD = 1.69). Most participants were male (52.6%), married (81.6%), had completed high school (39.5%), and were either unemployed or underemployed (63.2%). No statistically significant differences in demographic characteristics were found between the intervention and control groups (see Table 1).

The paired t-test revealed a significant difference in the mean overall HDRS scores of the intervention group before and after the intervention, with mean scores of  $13.79 \pm 2.84$  and  $10.16 \pm 2.16$ , respectively ( $p < 0.0001$ ). In contrast, the control group showed no significant changes between the beginning and end of the study, as indicated by a p-value of 0.135 (see Table 2). Most HDRS subscales demonstrated a significant reduction following the intervention, except for insomnia, somatic and genital symptoms, and weight loss.

An ANCOVA test was conducted to compare the average HDRS scores between the two groups. The results revealed significant differences, with a p-value of  $< 0.0001$  (see Table 3).

## Discussion

The results of this study demonstrate that psychoeducation based on the Transtheoretical Model (TTM) can have a positive impact on reducing depression among patients with coronary heart disease (CHD). Similar research conducted in China revealed a significant difference in depression levels between the intervention and control groups (Wang et al., 2018). TTM-based psychoeducation supports CHD patients by providing tools to manage, treat, and prevent depression (Lee et al., 2020). It can be delivered individually or in groups, aiding patients in rehabilitation and reducing the likelihood of recurring health problems when managing similar conditions (Chen & Xu, 2021). Psychoeducation also plays a vital role in helping individuals with physical and mental health challenges overcome psychosocial issues through structured health education (Smith

et al., 2019).

The primary aim of this study was to implement psychoeducation based on TTM to help participants develop healthy lifestyle strategies aligned with the stages of change. There are five-stage process—precontemplation, contemplation, preparation, action, and maintenance—offers a structured approach that enhances the effectiveness of psychoeducation by helping patients systematically overcome obstacles (Farrona, 2015). Through this framework, patients can better navigate emotional and behavioral challenges associated with depression. In this research, TTM-based psychoeducation addressed key psychological components, such as helping patients identify and describe their emotional states and sources of stress that could trigger depression. This approach also highlighted stressors related to CHD prognosis and the impact of poor management when symptoms arise. It emphasized recognizing depression-related behaviors and provided patients with practical techniques to reduce depressive symptoms.

The effectiveness of these programs is closely tied to the patient's knowledge level. Research indicates that individuals with a greater understanding of their condition and coping strategies are more likely to engage in effective self-management than those with limited knowledge (Lee et al., 2020). Thus, improved knowledge correlates with stronger coping abilities, reinforcing the importance of psychoeducation in managing depression (Wang et al., 2018). Consequently, it is recommended that psychoeducation programs be used in conjunction with other treatment modalities to maximize outcomes.

However, this study faced several limitations. One significant limitation was the absence of a blinded approach, which may have introduced bias. Furthermore, the duration of participant follow-up was relatively short, limiting the ability to assess long-term outcomes. Another constraint was the inability to control for the participants' psychological state during questionnaire completion. Additionally, the researchers could not monitor external sources of information or emotional support the participants may have accessed outside of the study, potentially influencing the results.

## Conclusion

The results of this study indicate that psychoeducation based on the Transtheoretical Model (TTM) has a promising effect on reducing depression in individuals with coronary heart disease. TTM-based psychoeducation acknowledges the varying stages of change (precontemplation, contemplation, preparation, action, and maintenance). This framework allows for stage-specific strategies, ensuring that the psychoeducational content is relevant and engaging. For instance, individuals in the precontemplation stage benefit from raising awareness about the link between depression and

CHD, while those in the action or maintenance stages are supported with strategies to sustain positive changes, such as adherence to exercise or stress management routines. Psychoeducation grounded in TTM promotes cognitive restructuring and behavioral activation, which are essential in combating depressive symptoms. Patients are guided to recognize maladaptive thought patterns and replace them with constructive coping mechanisms. This approach empowers individuals to adopt healthier lifestyles, such as regular physical activity, dietary modifications, and stress reduction techniques, which are known to alleviate depression.

The findings suggest that TTM-based psychoeducation is a practical and effective intervention for CHD patients experiencing depression. Healthcare providers should consider incorporating TTM principles into routine care, ensuring that psychoeducational interventions are tailored to the individual's readiness for change. Furthermore, integrating TTM with existing cardiac rehabilitation programs can enhance their effectiveness in addressing mental health challenges. Future research should explore the long-term effects of TTM-based psychoeducation on depression and CHD outcomes, as well as its scalability and adaptability in diverse healthcare settings. Additionally, investigating the integration of digital tools or mobile applications to deliver stage-specific psychoeducation could enhance accessibility and engagement. Given the significant psychological needs of patients with coronary heart disease, it is recommended that such interventions be integrated into standard cardiac care plans and included in medical and nursing education curricula.

### Declaration of Interest

The author declares no conflict of interest.

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### Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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